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FNP led Mobile Health Services for the Homeless population

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FNP led Mobile Health Services for the Homeless population

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Section I: Abstract

A small percentage of the U.S. population uses the greatest portion of the healthcare services. Homeless people are often such a group of “super-utilizers” of the healthcare system. Due to multiple medical and psychosocial conditions, people experiencing homelessness face numerous barriers to accessing healthcare, thus leading increased utilization of hospitals and emergency departments (EDs) services. Many of these events are preventable through improved primary care interventions. The literature on Respite/Recuperative Care, Transitional Care, and Mobile Health interventions have shown effectiveness in providing safe and quality care to homeless individuals during the critical transitional period post hospital discharge while also reducing the readmission rates to hospitals and EDs. The goal of this DNP project was to establish a Mobile Health Services program and function as a part of a larger Recuperative Care pilot program for Marin County's homeless population. The partnership between the University of San Francisco School of Nursing and Health Professions (USF-SONHP) and local organizations in Marin endeavored to improve the quality of care for the homeless population and reduce rehospitalizations and ED visits. This goal was accomplished through the successful implementation of the pilot project. Outcome evaluation demonstrated that the project team was able to prevent rehospitalization in all eight patients that enrolled in the program. These results also showed a potential for a significant positive financial impact on the overall healthcare system by reducing utilization rates of EDs and hospitals and costs associated with it.

Key words: Homeless, healthcare utilization, super-utilizers, respite care, transitional care, nurse practitioner, home visits

Section II: Introduction

Background knowledge

Several million Americans experience homelessness every year (Bharel et al., 2013). In the U.S. on a given night in January 2014, the point-in-time estimate of homelessness was 578,424 people (The U.S. Department of Housing and Urban Development [USDHUD], 2014). People experiencing homelessness encounter various barriers to accessing health care (Post, 2007; Kushel et al., 2001; White et al., 2014). In a survey of the U.S. homeless population, Post (2007) found that the primary barriers are a lack of health insurance and transportation. With the advent of the Affordable Care Act (ACA), the health insurance rate among the homeless population was expected to increase. However, Fryling et al. (2015) found that majority of homeless individuals (70%) did not have knowledge of their eligibility for Medicaid (or subsidized health insurance) under the ACA regulations. Many of the homeless also pointed to the barrier of limited phone and internet access, which in turn, minimizes their access to updated information on ACA (Fryling et al., 2015). Post (2007) cited other barriers, such as being intimidated by the traditional health system or lack of trust in the systems of care. Many homeless individuals also have many chronic medical and mental health conditions, often including drug and alcohol abuse (Kushel et al., 2001). All of these barriers limit timely access to health care services for conditions that would not require the use of emergency departments and subsequent admission to hospitals.

General Healthcare Costs and Burden of "Super-Utilizers."

The healthcare spending in the United States is much higher than many of the other developed countries in the world (Kaiser, 2014). In 2012, the U.S. spent an average of \$8,915 per person on health care, reaching a total of \$2.8 trillion (California Healthcare Foundation

[CHCF], 2015). According to the Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project, the average cost of a hospital stay was \$9,700 in 2010, which usually averages to about four to five days (Pfundner, Wier & Steiner, 2013) and an average inpatient day costs \$3,128 in California (Kaiser Family Foundation [KFF], 2013). Moreover, the average cost of each emergency department (ED) use is \$1,318 according to the Medical Expenditure Panel Survey (MEPS) (AHRQ, 2015). In connection, the total number of Avoidable Hospital Days (AHD) is 133 days per 1,000 people in the U.S. (Segal, Rollins, Hodges & Roozeboom, 2014). These healthcare costs summary (see Appendix 1) associated with hospitalizations are important to note to understand the impact on the overall economy. The costs related to AHDs are astounding and cost-effective strategies should be put in place. As such, efficient interventions in primary care settings and better coordination of care have the potential to combat these high costs by preventing or reducing hospitalizations or ED visits (AHRQ, 2012).

Various initiatives are being proposed and implemented to reduce the cost of healthcare spending with the focus on providing cost-effective care. The Agency for Healthcare Research and Quality (AHRQ) has laid out the 'Patient-Centered Medical Home' model, as a framework for strengthening primary care in coordinating care for adults with complex care needs (2012). These complex patients have multiple medical and psychosocial needs, and they tend to be the most costly group. Due to a fragmented healthcare system and lack of adequate coordination of care, vulnerable patients regularly utilize emergency services and get hospitalized due to inadequate health care (AHRQ, 2012). A small proportion of the total U.S. population uses the greatest bulk of the healthcare spending (CHCF, 2014). This group of patients is termed "super-utilizers" and various initiatives are being implemented to target that population to improve

outcomes and lower healthcare costs. Center for Medicare and Medicaid Services (CMS) (2014) has recommended several strategies to combat the ongoing high utilization of emergency departments (ED) for non-urgent healthcare needs. Some of the strategies to lessen ED use are to broaden access to primary care services, focus on frequent ED users (super-utilizers) and target needs of people with behavioral health problems (CMS, 2014).

Homeless patients as "Super-Utilizers"

People experiencing homelessness are one such group of "super-utilizers" and add another dimension to an already burdened healthcare economy. Homeless individuals are at greater risk for medical and behavioral conditions and are high drivers of health costs with increased use of EDs and hospital services due to various barriers accessing health care (Doran et al., 2013; Kushel et al. 2001). A homeless person prioritizes finding basic food and shelter and often neglects their health until it becomes an urgent situation (Bharel et al., 2013; Donovan et al., 2007), thus leading to increased use of ED and subsequent hospitalizations. Many of these events are "non-urgent" and could be managed in primary care settings (White et al., 2014), especially in the early stages of the health conditions.

Moreover, homeless patients often get caught up in a cycle between the hospitals and the streets (see Appendix 2). Due to poor discharge planning or lack of an efficient system of care coordination or resources, homeless patients get discharged from the hospitals to the streets or shelters (Doran et al., 2015). These individuals are too sick to be on the streets, yet not sick enough to require inpatient hospital services. With no systems of care in place and facing various barriers, the health conditions of these individuals worsen, and they end up back in the ED or hospitals (Doran et al., 2015). Therefore, strategies for improving care and reducing costs for these high-risk/high-cost patients in the primary care setting are pertinent.

Local problem***California***

Approximately 113,952 homeless individuals reside in the state of California (USDHUD, 2015). Moreover, California has the highest rate of “unsheltered” homeless people (67.5%) in the U.S. (USDHUD, 2015). In the year 2010, about 19,445 homeless patients were admitted to hospitals in California (White et al., 2014). About nine percent of the population had conditions that could be managed in primary care settings and likely would not require hospitalizations (White et al., 2014). The average length of stay for these homeless patients was five days, with total charges averaging about \$45,293 (White et al., 2014).

Homeless Population in Marin County

According to the Applied Survey Research (ASR), the Point-in-Time Count for people experiencing homelessness in Marin County was a total of 1,309 individuals (2015). From this population, 36 percent live in emergency shelters or transitional housing (ASR, 2015). The rest (64%) are unsheltered and living on the streets (25%), in abandoned buildings (1%), vehicles (18%), encampment areas (5%) and “anchor-outs” (14%) (ASR, 2015). Thirty percent of the respondents that participated in the Marin County Point-in-Time Count and Survey, mentioned that they have a health condition, namely, psychiatric or emotional conditions (30%), drug or alcohol abuse (28%), post-traumatic stress disorder (24%), chronic health problems (22%), physical disability (17%), traumatic brain injury (6%) and AIDS/HIV-related conditions (5%) (ASR, 2015).

Intended improvement

Homeless patients lack an efficient system of care and the need for an improvement in the care coordination is enormous as described above. The opportunity for this project arose

from the interest of this author and the timely need for an intervention within Marin County organizations. The University of San Francisco, School of Nursing Health Professions (USF-SONHP) developed an academic partnership with Opportunity Village Marin (OVM), a program supported by MarinLink, to provide a safe environment for homeless persons to recuperate after hospital discharge and improve the quality of care coordination. MarinLink organization is the fiscal sponsor of OVM and they initiate and support numerous innovative and collaborative programs to meet the needs of the Marin community (MarinLink, 2014). The team further partnered and collaborated with clinics and hospitals in the region and other organizations to encompass the medical and psychosocial needs of the homeless population.

The main undertaking of the USF-SONHP team was to establish a relationship with the stakeholders and provide a Nurse Practitioner (NP) led Mobile Health Services integrated within the larger project of OVM's Recuperative Care Program. This mobile health service for the homeless/fragile housing patients of Marin County post hospital discharge has the capacity to improve care and safety for the patients. It also has the potential for reducing health care costs associated with high utilization of hospital and ED services. Additionally, the goal and objectives of the project are congruent with the University of San Francisco's vision of educating leaders, who will create "a more humane and just world," and the mission to "distinguish itself as a diverse, socially responsible learning community of high quality scholarship and academic rigor sustained by a faith that does justice" (USF, 2015, para. 4). This DNP work gives the school and the students an opportunity to learn about the social determinants of health among the homeless population, their barriers to accessing healthcare, and improve care for this vulnerable population.

Aim Statement

The USF-DNP FNP led mobile health services in partnership with various organizations of Marin County will contribute to a 50% reduction in hospital readmission rates of homeless patients post discharge by improving the quality of care for the homeless individuals within one year.

Objectives

- To gather information and resources needed for the implementation of the pilot project
- To meet with the concerned organizations, form relationships and clarify roles and responsibilities
- To provide a NP led mobile health services for the homeless and fragile housing in Marin County.
- To meet the needs of the patients and improve their health and well-being
- To integrate care and communication through intra/interdisciplinary collaboration in a timely and effective manner
- To gather data of patients' rehospitalizations or ED visits and determine trends
- To keep reports/outcomes of the patients upon exiting the program

Review of the Evidence

A comprehensive literature search was done to look for evidence supporting this proposed project. The literature search included topics such as healthcare utilization trends by homeless individuals, implementation of respite care programs, and the role of the advanced practice nurse in transitional care using databases such as CINAHL and PubMed. Key terms used in the search were 'homeless,' 'healthcare utilization,' 'super-utilizers,' 'respite care,' 'transitional care,' 'nurse practitioner role', and 'home visits.' Three studies discussed the high

healthcare utilization patterns and the disease burden in the homeless population. Other studies evaluated the effect of respite care on patient's readmission rates compared to usual care, which is being back on the "streets." The strength of evidence for the literature review on interventions prevalent in health care for the homeless population were evaluated using the John Hopkins Evidence-based Practice Research appraisal tool (see Appendix 3).

High Utilization Trends

Due to the various barriers faced by the homeless individuals in accessing healthcare during health events, they end up using higher rates of ED and hospitalization services (Bharel et al., 2013; Hwang & Henderson, 2010; Doran et al., 2013). Studies showing these utilization patterns are discussed in the following sections.

Bharel et al. (2013) looked at the healthcare utilization trends by the homeless population in Boston, Massachusetts by using a sample size of 6494 homeless individuals, who were enrolled in the MassHealth program. The researchers used Diagnostic Cost Group (DxCG) score as a risk adjustment and predictive modeling tool to estimate a population's disease burden. DxCG risk analytics provides a "insight to identify and plan for population and individual-level risk" (Verisk Health, 2015, para. 1). A DxCG score "greater than 1.0 indicate higher disease burden and score less than 1.0 indicate that the disease burden is less than the average disease burden" (Bharel et al., 2013, p. S312). The researchers found that the disease burden in the homeless population was high at DxCG score of 3.8, which is significantly higher than average Medicaid population (Bharel et al., 2013). They also found that many of the study participants have multiple chronic diseases such as hypertension, hepatitis C, asthma/COPD and diabetes. Additionally, many of the participants also had mental health comorbidities, as well as substance

use disorders (Bharel et al., 2013). These behavioral health problems add to the complexity of the health care delivery for homeless patients.

Bharel et al. (2013) also found that the use of emergency services and hospitalizations in this population was high. On average, there were a total of 10 ambulatory visits, four ED visits and at least one hospitalization per year. Moreover, 20% of them had 6 or more visits to the ED, and 12% were hospitalized for 3 or more times in a year (Bharel et al., 2013).

Similarly, Hwang and Henderson (2010) conducted their study on the healthcare utilization in homeless people in Toronto, Ontario in 2004-2005. They used a random sample of 1190 homeless individuals, which included 603 single men, 303 single women, and 284 heads of families. Then they matched the cases with low-income general population controls using the demographic based on age and sex. Hwang and Henderson (2010) found that there were 1 to 2 times higher rates of office-based care in the homeless individuals (case) compared to general low-income population (controls). There were also 9 times higher rates among homeless single men, 12 times higher rates among homeless single women, and 3 times higher rates among heads in the families for the use of emergency departments. Furthermore, there was 8.5 times higher rates among single men, 5 times higher rates among single women, and 2 times higher rates among heads of homeless families with regards to hospitalization compared to general low-income population (Hwang & Henderson, 2010).

Likewise, Doran et al. (2013) looked at 30-day hospital readmission trends among the homeless population. The researchers conducted their study at an urban hospital in a northeastern city from May to August 2012. During the study period, Doran et al. (2013) enrolled a sample of 113 homeless patients in the study and conducted a retrospective chart review looking at the date of their prior hospitalization and their next hospitalization or ED visits and counted the number

of readmissions per patient within 30 days. In the total 113 patients, there was a total of 266 hospital readmissions within 30 days post hospital discharge. The authors also found that 50.8% to 70.3% of all hospitalizations led to readmission within 30 days after hospital discharge either to the hospital or other observational unit or emergency department (Doran et al., 2013). The researchers also noted that most of the readmissions occurred within one and two weeks; 53.9% and 74.8% respectively. Furthermore, Doran et al. (2013) found that factors such as discharge locations (streets, shelters, motels, with friends & family or other sites of planned care) were associated with higher or lower odds of readmission. Patients discharged to streets or shelters have higher odds of hospital readmission within 30 days compared to those discharged to motels, with friends and family, or other rehabilitation or skilled nursing facilities (Doran et al. 2013).

Intervention Care Programs

There were several effective programs identified which support the health of homeless individuals during their transition post hospital discharge. Medical Respite Care, Recuperative Care and Mobile Health Services for the homeless population in the community have shown a reduction in hospitalization and ED use (Kertersz et al., 2009; Buchanan et al., 2006; Post, 2007; Bruno & Grigsby, 2012). Medical Respite Care is "an acute and post-acute medical care for homeless persons who are too ill or frail to recover from a physical illness or injury on the streets but are not ill enough to be in a hospital" (National Healthcare for the Homeless Council [NHHC], 2014, para. 3). It is a transitional setting where homeless individuals can recuperate in a safe and clean environment, and get connected to various other supportive services (NHHC, 2014). The range of services offered by Respite Care programs vary, but typically they provide basic accommodation (bed and meals), transportation to appointments and a wide range of medical services, depending on the needs and resources available (Buchanan et al. 2006).

Several studies and projects have shown the significance of Respite Care for the homeless patient population in reducing readmission rates and decreased emergency department use (Buchanan et al. 2006; Kertersz et al., 2009; Bruno & Grigsby, 2012; Donovan et al., 2007; Post, 2007; Zerger, 2007). These studies are discussed in detail in following sections.

Buchanan et al. (2006) studied the effects of respite care for homeless patients. The study was conducted between October 1, 1998, and December 30, 2000, at Cook County Hospital and Interfaith House (a respite care) in Chicago, Illinois. The researchers looked at a cohort of 225 homeless patients, who were discharged from the hospital, and who met the eligibility criteria of Interfaith House. The cohort was then separated into Respite Care (RC) and the Usual Care (UC) group. Individuals in the UC group are those, who met the criteria for RC, but did not get accepted due to unavailability of beds, thus discharging them to overnight shelters or the street (Buchanan et al., 2006). On the other hand, the RC group received a range of services, which included temporary housing, food, acute care services by volunteer health providers, medication organization, substance abuse counseling, case management, and referrals to permanent housing (Buchanan et al., 2006).

Both groups had similar demographic characteristics (age and gender), diagnosis (most common- trauma, HIV/AIDS, and non-HIV), and inpatient days (average five days) during the 6-month period prior to the enrollment in the study (Buchanan et al., 2006). The result at the 12-month period showed that the RC group had shorter inpatient days than the UC group (3.7 days vs. 8.1 days). The study also showed that the RC group had 49% reduction in hospital admissions (Buchanan et al., 2006).

Similarly, Kertesz et al. (2009) conducted a study looking at the impact of RC in reducing hospital readmissions. The researchers compared the readmission rates of homeless

patients within 90 days by looking at three cohorts, who were discharged to a medical respite program versus "own care" (home/streets/shelters) and "planned care" (skilled nursing facilities, chronic care hospitals, or home healthcare). In their study, they used the administrative data and retrospectively identified a total of 743 homeless individuals, who had been admitted to Boston Medical Center during July 1, 1998 – June 30, 2001. Subsequently, they identified the number of patients discharged to Respite Care, other Planned Care, and Own Care, and compared their readmission rates within 90 days post-hospitalization discharge. After adjusting the analysis by controlling for individual characteristics, the authors came to the conclusion that the respite care program was "associated with an approximately 50% reduction in the odds of readmission at 90 days post-discharge" compared to the other groups (Kertesz et al., 2009, p. 139).

Homeless individuals, who were enrolled in the Medical Respite Care in Boston, received "customized" services, which included access to 24-hour nursing, onsite physicians, psychiatrists, nurse practitioners, physician assistants, caseworkers, and a dental team. Services also included, support for transportations to outpatient care, establishing a relationship with primary care providers, spiritual care, 12-step meetings, and identification of other social and financial resources (Kertesz et al. 2009).

Orange County's Recuperative Care (OCRC) program has also shown significant improvement in patient's health outcomes, reduction of readmission rates, and cost savings to the healthcare system (Bruno & Grigsby, 2012). After identifying barriers and lesson learned from the previous pilot project in Los Angeles (LA), the current Recuperative Care program was launched in January 2010 in Orange County (OC). After a referral from the hospitals and meeting the eligibility requirements, homeless patients were housed in local motels, where they received ongoing medical and social support/resources. The average length of stay (ALOS) was

13.5 days, with a minimum of 4-5 days and extending up to 3-4 weeks, depending on the patient's medical and psychosocial conditions/needs (Bruno & Grigsby, 2012). After 25 months of operation, OCRC reported that 504 patients were eligible and were accepted into the program. During their stay in the program, only 9% of patients were readmitted to hospitals. A total of 277 individuals (55%) were discharged to transitional or permanent housing. In addition, the authors estimated cost savings of \$3,180,000 to hospitals during the reported period (Bruno & Grigsby, 2012).

With the huge success of the OC program, the LA pilot program was subsequently launched, and the results were highly favorable. The collective cost savings from these two operations within a two-year period is almost \$6 million dollars (Bruno & Grigsby, 2012).

Post (2007) took a slightly different approach to providing health care to the homeless population and discussed the use of mobile health care (using a vehicle) to extend care. The author surveyed 33 Health Care for Homeless (HCH) grantees regarding their experience in providing such care. Lack of access (insurance, transportation and lack of trust with healthcare system) to "fixed site" clinics is a major barrier for homeless people (Post, 2007). The HCH providers accredited the success of their outreach programs by combating this major access issue. Out of all surveyed programs, 82 % provide health services on their mobile units, 12% transport clients to services, and 9% provide services at remote service sites, but not on the mobile unit (Post, 2007). The majority of the respondents also attributed the success of their programs to the selection of specific sites, where homeless people usually congregate, and collaboration with community partners (Post, 2007). Moreover, establishing rapport with the target population was deemed crucial and effective in the outreach programs.

The mobile units usually have one to two staff members, or more depending on the size of the vehicle. The programs utilize the services of volunteer clinicians, or contracts with physicians, physician assistants and advanced practice nurses, for a portion of their time. They also hire outreach workers, other nurses, social workers, case managers, or eligibility workers. Post (2007) described the functioning of mobile healthcare units (types, community partners, barriers, financing and administration, outreach strategies and reasons for success) in detail and offered recommendations from HCH Mobile Health Care providers. They suggested that any healthcare groups attempting to provide mobile healthcare to homeless individuals consider these recommendations (see Appendix 4).

Role of Advanced Practice Nurses (APNs) in Transitional Care

Earlier studies and reports have shown the effectiveness of Respite Care by integrating the role of clinicians in general. The specific roles of Advance Practice Nurses (APNs) were further explored in the following studies, where they played a crucial role in patient's health outcomes in the Transitional Care arena (Coleman et al., 2006; Naylor et al., 2004).

Coleman et al. (2006) conducted a randomized controlled trial to study the effect of care transitions intervention on rehospitalization rates. After determining eligibility for the study, 750 individuals were identified and randomly assigned to the intervention group and the control group. The control group received usual care, whereas the intervention group received coaching on 1) tools to promote cross-site communication, 2) encouragement to take more active role in their care, and 3) continuity across settings, and guidance from a "transition coach" (Coleman et al., 2006).

Subsequently, the APNs were trained to take the role of a "transition coach," whose primary role is facilitating the patient's and their caregiver's role in self-care. The responsibility

also included "competence in medication review and reconciliation, experience in helping patients communicate their needs to different healthcare professionals, and the ability to shift from doing things for the patient to encouraging him or her to do as much as possible independently" (Coleman et al., 2006, p. 1823). The APNs first visited the patients in the hospital prior to discharge, and then arrange for a home visit within 48 to 72 hours post hospital discharge. After the home visit, the APNs followed up with the patients and caregivers by making three telephone calls within the 28-days following the hospital discharge. At the 30, 90 and 180-day intervals after discharge from hospitals, the intervention patients showed lower readmission rates than the control group (8.2 versus 11.9 at 30 days, 16.7 versus 22.5 at 90 days & 8.6 versus 13.9 at 180 days) (Coleman et al., 2006). The results were statistically significant at each interval ($P = .048$, $P = .04$ & $P = .046$, respectively) (Coleman et al., 2006).

Naylor et al. (2004) studied the effectiveness of a transitional care intervention delivered by APNs to elders hospitalized with heart failure. The researchers conducted a randomized controlled trial at six Philadelphia academic and community hospitals. The total study subjects were identified and randomly assigned to control group and the intervention group. The control group received routine care, which consists of patient management, discharge planning critical paths, and standard home agency care (if referred) 7 days a week (Naylor et al., 2004). The intervention group received services, which included APNs trained by a multidisciplinary team of heart failure experts to provide a unique and comprehensive management of needs and therapies associated with acute heart failure (Naylor et al., 2004).

APNs made the first patient visit within 24 hours of hospital admission and then visits daily during the hospitalization. After the discharge, the APNs made the first home visit within 24 hours, and then seven subsequent home visits (weekly visits during the first month, bimonthly

visits during the second and third months) (Naylor et al., 2004). The APNs were also available through telephone calls, seven days a week.

Naylor et al. (2004) found that the rates of rehospitalization or deaths in the intervention group were lower (47.5%) versus the control group (61.2%). The adjusted mean costs in the intervention group were \$7,636 compared to \$12,481 for the control group, showing the cost savings through the intervention. The study also showed a greater overall quality of life and satisfaction of care in the intervention group (Naylor et al., 2004).

Another pilot project involving an NP providing home visits to "complex patients," which is currently being implemented at Santa Rosa Community Health Centers (SRCHC), California has shown promising results. In their program, they have designated a Nurse Practitioner (NP) and a Care Coordinator "Care Team" to integrate primary health care to "complex patients" (CCI, 2014). The NP makes home visits, provides advanced assessments, and writes/adjusts medications by communicating with the patient's primary care provider and other multidisciplinary teams, as needed in a timely manner. In order to be identified as a high-risk or high-cost patient and to be enrolled in SRCHC's program, the individual has to be diagnosed with two or more chronic conditions. In addition, they have to meet at least one of the criteria; 1) Minimum of 3 emergency room visits in previous 12 months, 2) Minimum of 2 inpatient stays in previous 18 months, and 3) Minimum of 8 prescription medications (CCI, 2014).

In the first six months of the operation of their program, they have "decreased hospitalizations by 45% in 50 complex, chronically ill Partnership Health Plan (PHP) patients, who together incurred \$5 million in healthcare costs in 2010 and 2011" (CCI, 2014). They have also reported savings of approximately 480,000 in 6 months and increased patient satisfaction, quality of life and knowledge of their conditions. Although this program is not specifically

designed for homeless patients, it included patients with multiple chronic conditions with limited resources.

Discussion of Literature Review

It is evident from the literature that the problem of high utilization of healthcare services by homeless individuals exists (Bharel et al., 2013; Hwang & Henderson, 2010; Kushel et al., 2001; Doran et al. 2013). Subsequently, interventions such as Respite Care/Recuperative Care and Mobile Health Services programs have shown as effective models of care for the homeless population (Buchanan et al., 2006; Kertesz et al., 2009; Post, 2007; Bruno & Grigsby, 2012). Buchanan et al. (2006) showed that the homeless patients receiving Respite Care interventions had 49% reduction in hospital admissions. Similarly, Kertesz et al. (2009) study also came to the conclusion that there was a likelihood of 50% reduction in hospital readmissions within 90 days by providing Respite Care. Both studies used similar methods of inquiry by comparing a case and a control group and measuring the readmission rates at the end of their study period (Buchanan et al. 2006; Kertesz et al. 2009).

The literature review also presented the effectiveness of Transitional Care for “complex” patients in reducing rehospitalization or ED visits by using the skills and knowledge of Advance Practice Nurses (Coleman et al., 2006; Naylor et al., 2004). Both studies demonstrated lower rates of rehospitalizations and lower mean total costs in the intervention groups compared to the control groups during the study intervals. Although, the participants in these studies were not homeless individuals, the complexities of patients and their health statuses warrant similar attention and vigilant monitoring by the Health Care Providers as in homeless population.

The results from specific programs such as Orange County Recuperative Care (OCRC) and Complex Care Management (CCM) were also encouraging. The OCRC’s intervention for

homeless population showed that only nine percent of the total 504 patients enrolled had readmissions to hospitals (Bruno & Grigsby, 2012). In other words, the OCRC intervention prevented rehospitalization in 454 patients and provided an estimated cost-savings of \$3,180,000 (Bruno & Grigsby, 2012). Comparatively, the CCM pilot program also presented a forty-five percent decreased in hospitalizations in fifty “complex and chronically ill” patients and cost savings of approximately 480,000 in 6 months (CCI, 2014).

In summary, the available literature strongly suggests that Recuperative Care and Transitional Care models reduce rehospitalization rates among vulnerable populations. Therefore, it is pertinent that the larger healthcare system takes notice of such trends and interventions and integrates these practices into the delivery of care for the homeless population. Although the outcomes of the review consistently demonstrated improvements in care, the available literature is limited by a lack of randomized controlled studies. Most of the research was retrospective observational studies or pilot programs. Therefore, interest and funding of randomized controlled trials will accurately quantify the healthcare impact of such interventions, and are needed (Kertesz et al., 2009) to make an effective case in front of interested stakeholders.

Implications for Nursing Practice

The promising results from many initiatives around the country give sufficient directions for the healthcare providers interested in working with the homeless population. NPs can play a significant role in caring for vulnerable populations by integrating holistic and best practices in the continuum of care. The NP role in such endeavors has the potential for growth by leading, forming relationships and collaborating with intra/inter-organizations, and furthering the advancement of the nursing profession.

Significant literature is available on the topic of healthcare utilization of the homeless patients and useful interventions for their benefit. However, it was realized that no particular studies were showing the specific NP roles in the programs. Coleman et al. (2006) and Naylor et al. (2004) mentioned the role of APNs in their Care Transition programs; however, it did not describe specifically whether the APNs were Nurse Practitioners, Clinical Nurse Specialists or any other APNs. There were also limited studies showing the role of NPs providing mobile health services. Therefore, future studies describing the specific roles of NPs in Mobile Health Services would be crucial in showing the actual impact of the NP role and profession.

Conceptual or theoretical framework

The design of the project is based on the conceptual frameworks of Patient-Centered Medical Home (PCMH), Transitional Care Model (TCM) and Medical Respite Care (MRC). PCMH encompasses the overall framework of patient-centered care while TCM and MRC model specific interventions for the specific population during transitions of care.

Patient Centered Medical Home

The Agency for Healthcare Research and Quality (AHRQ) has laid out the Patient-Centered Medical Home (PCMH) model, as a framework for strengthening primary care in coordinating care for adults with complex care needs (2012). Its five core functions are to provide comprehensive, patient-centered, coordinated, accessible, and quality and safe care (AHRQ, n.d.). Comprehensive care entails bringing a diverse team of care providers (physicians, advanced practice nurses, physician assistants, nurses, pharmacists, nutritionists, social workers, educators and care coordinators) to meet the physical and mental health needs of the patients. Patient-Centered Care is building a relationship with the patient by viewing them as a whole person, and making them informed partners in their healthcare plans. Coordinated care entails

coordination of services depending on the need of the patient and maintaining clear communication between different healthcare entities, patients and families. Accessible care requires meeting the demands of the patient in a timely and expedited manner by enhancing in-person hours, or through telecommunications (emails, telephones and video chats). Lastly, the Quality and Safety function of the PCMH model demonstrates the commitment to quality and safety by using evidenced-based information "to guide shared decision-making with patients and families, engaging in performance measurement and improvement, measuring and responding to patient experiences and patient satisfaction, and practicing population health management" (AHRQ, n.d.).

Transitional Care Model

Breakdowns in the care transitions pose significant risks to patient's health conditions and the overall healthcare economy. Dr. Mary Naylor and her colleagues at the University of Pennsylvania designed the Transitional Care Model (TCM). TCM looks at the negative effects associated with common breakdowns in care when older adults with complex needs transition from an acute care setting to their home or other care setting" (University of Pennsylvania Nursing [UPN], 2014). Common elements of the TCM model include the use of transitional care nurse (TCN) with advanced knowledge and skills, providing coordinated, comprehensive, holistic and collaborative services to patients and their families or caregivers. The model focuses on the active engagement of patients and their family members and building a strong communication between them and the healthcare providers, as they transition from one setting to another. The continuity of care is maintained through regular TCN home visits or telephone follow-ups or accompanying patients to their health appointments (UPN, 2014).

Medical Respite Care

Medical Respite Care is "an acute and post-acute medical care for homeless persons who are too ill or frail to recover from a physical illness or injury on the streets but are not ill enough to be in a hospital" (National Healthcare for the Homeless Council [NHHHC], 2014). It is a transitional setting where homeless individuals can convalesce in a safe and clean environment, and get connected to various other supportive services (NHHHC, 2014). The services are provided in different settings, which include homeless shelters, motels/hotels, apartments, board and care, or standalone facilities (Ciambrone & Edgington, 2009). The range of services offered by Respite Care programs also vary, but typically they provide basic accommodation (bed and meals), transportation to appointments and a wide range of medical services, depending on the needs and resources available (Buchanan et al. 2006).

To design and implement this project for homeless individuals in Marin County, the frameworks were used to lay basic structures. This project encompassed the core functions of PCMH model by focusing on homeless individuals, a vulnerable/complex population (patient-centered), and striving to improve the care of the patient by partnering with various community organizations to provide a comprehensive and coordinated range of services. Accessibility to healthcare was improved by integrating a Mobile Health Services team visiting the patient at their "home" (motels). In addition, community volunteers provided transportation services to patients to visit their healthcare providers, thereby also increasing/improving access to care.

The Transitional Care and Medical Respite Care models show the need for interventions during transitions of care where breakdowns in care occur. Therefore, this project focuses specifically on the critical transitional period after the hospital discharge to the attainment of a patient's goal of "healthier self." The USF Mobile Health team's partnership with community

organizations strives to meet the core elements of TCM and recommendations from National Healthcare for Homeless Council.

Section III: Methods

Ethical issues

This DNP quality improvement project was a translation of the available literature to implement best and innovative practices for the health and wellbeing of the participants. This author completed the online course from the National Institute of Health (NIH) on ‘Protecting Human Persons Research’ and made sure that this project was not intended for conducting a research study. As such, Internal Review Board (IRB) was not required. The project was approved by the Family Nurse Practitioner and the Doctor of Nursing Practice Department on behalf of University of San Francisco’s IRB.

This project was driven by the nursing ethical principles of autonomy (respecting patients irrespective of their socio-economic and cultural differences), beneficence (treating patients with compassion and intend to do good), and nonmaleficence (do no harm). Moreover, the project also aligned with nursing ethical values of fidelity (maintaining trust and loyalty to the patients) and justice (advocate for the vulnerable population) (Grace, 2014). However, the project team was aware of potential risks that could arise, such as increased distress or loss of confidentiality. The team respected and maintained the confidentiality of patient information all through the process. The patient encounters were documented using Practice Fusion, an HIPAA compliant electronic healthcare record system. The team also planned to provide support/referral for any patients experiencing additional distress related to the interventions. By implementing this project, this author and the OVMHS team intended to make a positive difference in the health and wellbeing of homeless individuals by improving the quality and safety of care.

Setting

The project implementation took place at three key sites in Marin County: Budget Inn at Corte Madera, Marin Community Clinics, and Hospitals in Marin (Marin General Hospital and Kaiser Permanente). The information and demographics of Marin County and the roles and responsibilities of principal partners are described below.

Marin County, California

Marin County is located to the north of the city of San Francisco and has a population of 260,750 (US Census, 2014). The county residents are mostly Whites (72.2%), followed by Hispanics or Latinos (16%), Asians (6.1%), Blacks or African Americans (2.9%), American Indian and Alaska Native (1.1%), Native Hawaiian and Other Pacific Islander (0.3%) and others. Marin is an affluent area with the median household income of \$90,839 for an average household of 2.3 persons. The median value of owner-occupied housing units was \$781,900 (US Census, 2015). While the median household income in Marin County is high, the cost of living and housing is also high and is continually on the rise. The cost of living index in Marin County is 145.3, which is considered very high compared to the U.S. average of 100 (City-Data, 2013).

The cost of living in Marin County is high and on the rise. On average, it costs more than \$86,000 a year to provide basic needs for a family of four in Marin County (Jason, 2011). In the county, 7.7 percent of people live below the poverty level (US Census, 2015). The rising cost of living and housing pose additional risks of “fragile housing” or homelessness for individuals or families, whose incomes cannot keep up with the rising costs.

Stakeholders

Primary partners for this collaboration are the University of San Francisco School of Nursing and Health Professions (USF-SONHP), Opportunity Village Marin (part of Marin Link),

and Marin Community Clinics. Other organizations involved in the project are Project Independence of Marin Health and Human Services and hospitals in Marin (Appendix 5A: Community partnerships and Appendix 5B: Intra/Inter-organizational Relationships). All of the participating organizations see the needs of the community and the importance of such initiatives in Marin County for their homeless population.

Description of the core partners/organizations

- *University of San Francisco, School of Nursing and Health Professions:* The School of Nursing & Health Professions at the University of San Francisco “advances the mission of the university by preparing health professionals to address the determinants of health, promote policy and advocacy and provide a moral compass to transform health care in order to further equity and positively influence quality, delivery, and access” (USF-SONHP, n.d., para. 3). The school is committed to developing and maintaining a faculty practice and inter-professional education and collaboration.
- *Opportunity Village Marin:* OVM is a fiscally sponsored program of MarinLink, a 501(c) (3) organization. OVM provides “a short term, healing support that allows people dealing with a medical crisis, the opportunity to rest in a safe environment while accessing medical care and other supportive services” (OVM, 2014, p. 1).
- *Marin Community Clinics:* MCC is a Federally Qualified Health Center that provides healthcare services to about 35,000 insured and uninsured patients annually (MCC, 2014). They offer a wide array of primary care, referral, and specialty services.
- *Project Independence:* Project Independence is a part of Marin Health and Human Services (MHHS). This organization “supports patients to transition safely from the hospital or skilled nursing facility, get their health care needs met during this vulnerable time, and stay

independent at home” by providing free, home and community-based, individualized and flexible care transition services for residents of Marin County (MHHS, n.d., para. 2).

- *Hospitals in Marin:* Patient referrals were to be mainly from Marin General Hospital and Kaiser Permanente, Marin. Marin General Hospital is the largest acute care, independent hospital in Marin County and “to provide exceptional healthcare services in a compassionate and healing environment” (MGH, 2015, para. 4). The Kaiser Permanente San Rafael Medical Center serves over 120,000 members annually and “is a leader in social responsibility with programs designed to keep [patients] healthy and remain healthy” (Kaiser, 2015, para. 1).
- Other potential referrals might come from rehabilitation centers or skilled nursing facilities.

Planning the intervention

Project models

The USF Mobile Health Services program is a part of a larger Recuperative Care program in Marin. It resulted from modeling after the works of the ‘Recuperative Care’ program of Orange County, Transitional Care programs and the Complex Care Management pilot project of Santa Rosa Community Health Centers. The target populations of the program are homeless patients, who will be discharged to the community, requiring “complex” medical and social support. These patients lack a system of care or follow-through, as they get discharged from the hospital in the community. They are too sick to be on the streets on their own, yet not “as acutely sick” to be in the hospital. These patients require vigilant monitoring of their conditions, medication adjustments, and other psychosocial needs. The Mobile Health Services team will visit the patient in the motels and address the medical needs of the patient. The project team aims to intervene at this critical period (up to 30 days) post hospital discharge and improve their

quality of care, and prevent adverse events requiring them to be readmitted to hospitals or show up to be seen in EDs.

Due to the complexity of the needs of the homeless patients, it “takes a village” to intervene effectively and provide comprehensive services to meet their needs. As such, community partnerships and collaborations are critical to addressing the demands of such population successfully. The USF Mobile Health team will, therefore, function as a part of the larger Recuperative Care Program, headed by Opportunity Village Marin.

The planning of the intervention involved two phases. The focus of the initial work or the phase I of the project was building the foundation for the project. This involved forming relationships with the key partners, ascertaining roles and responsibilities, and creating a basic structure of the project. Phase II of the project was the actual implementation of the Opportunity Village Mobile Health Services to provide healthcare for the homeless individuals during their vulnerable transitional period post hospital discharge into the community.

The planning phase involved multiple in-person and virtual meetings, and email communications between key stakeholders; Rita Widergren, the project director of Opportunity Village Marin and USF faculties (Dr. Jo Loomis and Dr. Alexa Curtis) and the DNP students involved in this project. The initial ‘in-person’ meeting was held at MarinLink organization’s office in San Rafael on October 27, 2014. During this meeting, the USF team was introduced to the project and discussion of the roles and responsibilities were held. At the same time, OVM representatives distributed OVM documents (see Appendix 7A & 7B) and information of other partners and resources that were available in the community. A Memorandum of Understanding (MOU) was signed by the OVM representative and the USF faculty. The principal partners (USF team & Opportunity Village Marin) decided to name the project “Opportunity Village Mobile

Health Services” (OVMHS). Furthermore, the team had a meeting with Dr. Mitesh Popat, Chief Medical Officer (CMO) of Marin Community Clinics on October 29, 2014. During the meeting, the USF team presented organizational relationship charts and described the roles and responsibilities of the key stakeholders. The specific roles pertaining to the Marin Community Clinics were also clarified with Dr. Popat. This meeting with the CMO of Marin Community Clinics solidified the initial ‘buy-in’ process and procured the clinic’s support.

Communication Matrix

Efficient communication between the project’s key players was crucial towards successful implementation of the project. As such, communication occurred through various mediums (information brochures, presentation slides, reports) and information was distributed through emails, telephone calls, virtual meetings (Skype & Zoom), and ‘in-person’ meetings with the concerned organizations. The project directory (see Appendix 6A) lists key people involved in the overall project, and the communication matrix (see Appendix 6B) shows details of communication patterns involved during the planning and intervention process. The frequency of the communications depended on the nature of the information and the role of the concerned organizations. The updated information on the patients and the project was sent promptly and whenever necessary. The communication between OVM representative and the USF team were frequent and ongoing, mainly through emails and telephone calls. Both entities also met (virtually or in-person) several times to update each other on the development of the project and strategize on resolving issues encountered along the way. Additionally, this author communicated regularly with the DNP Chair regarding project updates, schedules, and requirements for the DNP work.

The Process of OVMHS program

When a homeless patient is pending discharge from the hospital, and the individual is too frail to be discharged back to streets, the hospital contacts the project manager of OVM for a consultation and eligibility requirements. Then, once the patients meet the eligibility criteria and they sign the patient agreement form, they are enrolled in the program (see Appendix 7A & 7B: Eligibility criteria & Patient agreement form, respectively). The patients are then accommodated at a local motel for 21 days and provided three daily meals, linkage to medical, social and housing services, and volunteer transport services to appointments. The OVM representative notifies the USF team of the new patient referral. Subsequently, the USF team comprising of the Faculty, Family Nurse Practitioner (FNP) student and Psychiatric Mental Health Nurse Practitioner [PMHNP] student visits the patients at the motel and provides ongoing medical and psychosocial services, as appropriate. After spending 21 days at the motel and receiving various services, the patient exits from the program and transitions to a “community/home” setting. This author created a pathway flowchart (see Appendix 8) to simplify the process and to give a visual diagram for a better understanding of the enrollment process (from their entry into the program to their departure from the program).

Implementation of the project

The implementation of the project began as soon as the partnership between the USF team and Opportunity Village program of Marin Link was formed. The main focus and expectation for this author about this project was to build the foundation for the Mobile Health Services to provide care for the homeless population of Marin County in collaboration with Opportunity Village Marin. The term “Mobile Health” for this project does not necessarily pertain to providing care from a vehicle, but it refers to the mobility of the services that the team

provides, such as visiting patients at the motels, or community settings where the patients resided during the intervention.

Project controls/authority/ responsibility

This project involved multi-organizational collaboration to make an effective impact on the health of the homeless patient population of Marin. Although this author's purpose was to integrate an NP led Mobile Health Services within the larger Recuperative Care project, it was important to identify all the key players and partners of the overall project for coordinating care. Stakeholders were identified, and their roles and responsibilities are defined as follows:

Stakeholders, Roles, and Responsibilities

Stakeholders: The patients and their families, and the multidisciplinary team/organizations

1) Hospitals

- Discharge planner to contact representative of OVM to refer their patient
- Communicate discharge instructions with community organizations in a timely manner
- Pay referral fee of \$200 per patient/days (total \$4,200 per patient for 21 days) to OVM, MarinLink
- To contact local public health nurse for their services
- To contact Marin Community Clinic to assign a primary care provider for the patient
- Depending on the needs of the patient, the hospital also referred their patients to other health organizations for home health nursing services, physical therapy and others

2) Opportunity Village Marin, MarinLink

- The representative goes to the hospital after being contacted by the hospital discharge planner and assesses eligibility of the patient to be enrolled in the program

- When the patient fulfills the eligibility criteria, the patient is enrolled in the program and receives 21-days of housing at a local motel and following services (OVM, 2014):
 - Three daily meals
 - Lifeline emergency response system during the stay
 - Linkage to Medical, Social and Housing Services
 - Volunteer Transport Service to appointments

3) The University of San Francisco School of Nursing & Health Professions Team

- To integrate a Mobile Health Services for the patients, which includes:
 - A Family Nurse Practitioner student and faculty to perform a history and physical assessment, medication reconciliation, initiating a collaborative plan of care and referral to specialist, as appropriate.
 - A Psychiatric Mental Health Nurse Practitioner student and faculty to perform a history and physical assessment pertaining to psychiatric conditions, medication reconciliation and other services, as appropriate
 - Work closely with the representative of the lead organization
 - Depending on the needs of the patient, the team will provide an in-person visit once a week or once every two weeks, telephone check-ins the 1-2 times a week, or whenever needed for medical needs
 - Integrate care and communication within various organizations in a timely and efficient manner
 - Chart patient encounters on 'Practice Fusion' EHR
 - Chart patient encounters on Marin Community Clinic's EHR (*in progress*)

4) Project Independence, Marin Health & Human Services

- Provides Public Health Nurse Case Manager
- Holds the access to medical records of the patients
- Provide community volunteers for transportation and therapeutic companionship for program participants

5) Marin Community Clinics

- Establish relationship with the patient
- Assign a primary care provider for the patient
- Makes referral to specialist as appropriate
- Sign the scope of practice for the USF-SONHP's faculty
- Give USF team access to patient's medical records
- Appoint a social worker to integrate care of the patient

Phase II: Pilot of the intervention

Phase II began simultaneously as phase I (laying the groundwork) was ongoing. The USF team (DNP-FNP faculty, DNP-FNP student & MSN-CNL student) met the first patient at the Budget Inn at Corte Madera, Marin with the OVM representative. With the patient's permission, the team took the patient's health history and performed a physical examination. The team also reviewed and reconciled the medications with the patient. Subsequently, the patient communicated his understanding of proper use and dosages of the medications. The patient had a diary, where he had written down the timings of the medications and puts a check mark adjacent to it as he takes them. This helped him keep track of his medication regimen. This author documented the patient's health history, assessments and medications in 'Practice Fusion,' an Electronic Healthcare Record system. The team assessed the patient's needs and a plan of care for follow-ups and appointments were coordinated. After the initial 'in-person' visit to the

patient, this author initiated three “follow-up” phone calls to the patient to inquire about his health status, appointments and other necessities. The patient’s needs and expectations were assessed and communicated with the team through regular email updates.

During the 21-days of the patient’s stay in the program, he also received other services from OVM, Project Independence and Marin Community Clinic. He also received physical therapy services from another healthcare organization. Moreover, the patient’s ex-wife was very involved in his care and paid regular visits. The patient was very motivated to get better, be “off the streets” and maintain sobriety from alcohol. The details of the patient's health history, experience and outcomes will be discussed in the result section of this manuscript (page 41).

Project Resource Requirements

The resource requirements of the project (see Appendix 9) were shown with detail information on the location, people, tools, and funding involved. The key locations for the project were the motels in Marin (Budget Inn at Corte Madera & America's Best Value Inn at Novato) where the patients were housed during their stay in the program. Other location included the Marin Community Clinics and the Hospitals in Marin (Marin General Hospital & Kaiser Permanente). Key people involved in the project were representatives from MarinLink, Marin Community Clinics, USF-SONHP, Marin Health and Human Services and the hospitals in Marin. The USF-FNP team used a "Clinician's tool bag" to perform the physical assessment of the patient and documented the encounter in Practice Fusion, an online electronic healthcare record system. Lastly, the funding of the project was initially provided by MarinLink organization. Afterward, the hospitals paid a referral fee of \$200 per patient per day (\$4,200 for 21 days) to enroll their patients in the OVMHS program. This fee was used to pay motel rents

and other expenses involved. The services provided by the OVMHS were managed by using donations, in-kind services and the referral fee from the hospitals.

Planning the study of the intervention

The success and completion of the project were to be determined by whether the overarching aim of preventing hospital readmissions in the homeless patients in 30-days was achieved. The completion of the project's objectives will be assessed to fulfill this overall goal. Firstly, the work of completion of the organizational structure will be evaluated. These involve gathering information and resources needed for the implementation of the pilot project, meeting with the concerned organizations, and forming relationships and clarifying roles and responsibilities. Secondly, the results from the actual intervention of providing mobile health services to homeless individuals were to be evaluated. These involve objectives, such as designing and providing an NP-led mobile health services, meeting the needs of the patients and improving their outcomes, and integrating care and communication through intra/interdisciplinary collaboration in a timely manner. Additionally, the completion of record keeping of the patients' rehospitalization or ED visits and patients' outcomes upon exiting the program were to be assessed.

Specifically, the successful delivery of care for the patient in the program was to be evaluated through a checklist of purposes and outcomes (Appendix 10-A). At the end of the 21-day stay in the program, a questionnaire checklist would measure the individual patient's outcomes and the project's intervention. This checklist included whether 1) the patient's basic needs (food, clothing, shelter, etc.) were met, the patient 2) remained medically stable, 3) compliant with medications, 4) communicated their health needs, 5) understood and engaged in their plan of care. Furthermore, it would be assessed whether the patient, 6) established care at a

primary clinic, 7) connected with community resources (through social and caseworker), 8) utilized rehabilitation services, and 9) transitioned to a “home” setting. Finally, 10) the patient’s visits to emergency departments and readmission to hospitalization within the 21 days (if any) were to be noted and further explored to ascertain whether the events were avoidable. This form would be filled by the staff of the OVMHS Team upon the patient’s exit from the program. Information from the checklist would guide staffs whether the program fulfilled its goals. If the objectives were not fulfilled due to some reason, additional space was provided on the form for further commentary.

There would be frequent communication and reports shared among the key partners to continuously study the implementation of the project. As such, Plan-Do-Study-Act (PDSA) meetings were to be held monthly or every two months in the first six months, then every three months, thereafter. Conversely, such meetings would also occur whenever it is necessary.

Timeline and Milestones

The GANTT chart (see Appendix 11) depicted the timeline for the implementation of the project. In addition, the Work Breakdown Structure (WBS) of the project (see Appendix 12) portrayed major tasks that were needed and completed to accomplish the overall project. The initial work was on the introduction to the overall project by OVM, which occurred at the kick-off meeting. This meeting was held on Aug 27th, 2014 at Marin-Link’s office in San Rafael. The attendees were Nancy Boyce (President) of MarinLink and Rita Widergren (Project Manager) of Opportunity Village, MarinLink, Dr. Jo Loomis (USF Faculty), Tenzin Lama (USF DNP-FNP student) and Alvin Walters (USF CNL student). During this meeting, the USF team was introduced to the project, and expectations of roles were discussed. On the same day, the USF team was introduced to our first patient at the Budget Inn in Corte Madera. The FNP student

performed the history and physical assessment of the patient under the supervision of the USF faculty. The team, seeing the need to include a mental health expertise in the project, welcomed a DNP- Psychiatric Mental Health Nurse Practitioner (PMHNP) student to the group in October 2014. The team members updated the new member with the plan, the process, and the roles and responsibilities of each entity involved. Next, the “buy-in” from Marin Community Clinics (MCC) was procured after meeting with them on October 29, 2014. Roles and responsibilities were discussed and clarified during this meeting with the representatives of MCC. The CMO agreed to sign the Scope of Practice for the USF Mobile health Services and to give access to patient’s medical records after the completion of all the required paperwork including a Memorandum of Understanding (MOU) and MCC’s internship/externship package for the students. The paperwork was completed and sent to MCC. Communication regarding the development of the project and the statuses of the patients was frequent and ongoing between the key partners. The outcomes of the patients were measured at the end of their 21-day stay in the program. This evaluation comprised of key elements, such as the health status of the patients and the data of readmissions to hospitals during the intervention period. The details of further communication, follow-ups, and milestones of the project are shown in the GANTT chart and the WBS (see Appendix 11 & 12).

Methods of evaluation

The evaluation of the planning and intervention phase was assessed comparing it against the objectives of the project and fulfillment of the overarching aim of preventing unwarranted rehospitalization or ED visits by improving the quality of care for the targeted population. As noted above, the objectives of the planning phase were achieved by creating the basic structure of the project entailing all the work mentioned before. Secondly, the implementation phase was

completed by integrating an NP-led Mobile Health services within the larger project (Recuperative Care) and fulfilling specific objectives set beforehand.

The actual outcome of patient number one was evaluated by this author using the checklist (Appendix 10A) and verified whether all the provisions were met. Upon evaluating, this author found that all the intentions (1 to 10) were fulfilled and the patient had a successful exit from the program with no rehospitalization during his stay (see Appendix 10B). This checklist determined necessary provisions to meet the patient's needs and to improve the quality of care.

Throughout the program implementation period, the OVM representative and USF team had frequent communication (emails, phone calls and meetings) to inform one another of process updates and patient outcomes. These interactions did not happen according to the planned PDSA time intervals (2, 3 & 6 months), but occurred whenever the needs arose.

Other plans for the evaluation of the program included patient satisfaction surveys and questionnaires to discuss goals and expectations of the patients. This author's fellow project partner, Joan Fraino (DNP-PMHNP student) created a general Likert scale (see Appendix 10 C) to measure patient's satisfaction at the end of their 21-days stay in the program. Since both students were working on the same project and focusing on developing the foundational structure for the project, they deemed it unnecessary to create an additional patient satisfaction survey for evaluation, thereby avoiding duplication of work. Future students continuing this project can use the forms, 'Evaluation Checklist' (created by this author) and the 'Patient Satisfaction Survey' (created by the project partner) as a guide for evaluating their work and revise, as needed. These forms will also be helpful for future (PDSA) meetings to continuously improve the services delivered by the team.

SWOT analysis

The OVMHS team focused on identifying the project's strengths and weaknesses that could impact the health of the patient population. There was an organizational analysis of current and future trends (i.e., opportunities and threats) that impacted or were likely to impact the health of recipients of this program and the cost-effectiveness of this project (see Appendix 13: SWOT analysis).

Strengths. Upon analysis, the strengths belonging to the program have been identified. The implementation site already has a patient population with complex needs befitting the goal of the program, which could benefit from the program. The lead organization (OVM) has worked with various community organizations in Marin in the past and has a good track record. Therefore, the process of forming new collaboration for this went smoothly. A relationship with a local motel to accommodate patients enrolled in the program has also been established. USF-NP team has advanced knowledge, skills and guidance of their faculty, and hence, were able to provide the mobile health services at no cost. The project has a dedicated group of community organizations that care for the vulnerable population and are willing to work together to improve care and reduce costs. The clinic has physical space/room and technology to support the program. Additionally, service delivery performed by the clinic would involve the utilization of qualified and dedicated staff to provide a variety of services for the homeless population. The clinic will set up to provide a medical home for the homeless patients.

Weaknesses. Although the patient population could benefit from this program in a multitude of ways, there are potential weaknesses that could impede the effectiveness of the program. These weaknesses include breaks in communication. Since the project involves multiple organizations, it is crucial to ensure that all the team members are working from the same core values and that

they communicate appropriately and promptly to avoid delays in obtaining services. There might be a potential loss to follow-up on patients, who either move away or get their care somewhere else due to the transient nature of the homeless population. There might be increased demand for services for the primary care providers, who might be resistant to the added workload.

Workforce development and performance of the team members (not performing to the highest extent of their skill sets or proficiencies) might hinder the improvement process. There might also be unforeseen expenses or circumstances. Moreover, lack of continued USF faculty support and/or loss of MarinLink's support for the program might be pose as a potential weakness.

Opportunities. If the proposed program proves to be successful in its purpose, some remarkable opportunities for future development exist. These will include, marketing and expanding the program further to include more patients. It will involve working with other types of healthcare entities, who are currently not involved or resistant to the process. The projected success of the program will lead to increased partnerships with various stakeholders and expand income opportunities. Opportunities also include the possibility of this program bringing in increased incentives/reimbursements by expanding. There is also an assumption of workforce expansion by creating new direction by building on current processes and being a "role model" for other healthcare organizations.

Threats. The stakeholders gave consideration to potential threats to the smooth running of this program. One of the chief concerns is funding. If adequate funding and resources are not available, it will certainly threaten the progress and sustainability of the program. Lack of reimbursement or incentives by potential payers will also contribute to the threat of this program. Other possible threats include lack of communication and relationships between the multidisciplinary and multi-organizational structures.

Analysis

Cost benefit analysis

The key success of the project can be explored by showing the cost-benefit analysis. The project has potential for cost savings through prevention/reduction of hospitalization and ED visits by providing mobile primary care services during the 21-days of Transitional Care. Following are two separate cost-benefit analyses, where one analysis used mostly ‘in-kind’ services, and other analysis demonstrated benefit through hiring an NP and a community health worker. Either analysis can be used depending on the need and availability of resources.

1) Cost-benefit analysis using ‘in-kind’ services

This cost-benefit analysis was demonstrated by using OVM’s current referral fee of \$200 per person per day from the hospitals. Apart from the direct cost of motels, the Lifeline emergency response system, and some miscellaneous items, most of the services were maintained through donations or using ‘in-kind’ services. On average, it costs about \$3,129 per inpatient day at the hospital in California (Segal et al., 2014). Currently, the program was charging hospitals \$200 a day per patient, totaling up to \$4,200 as a client referral fee. This total fee includes 21 days of services, specifically the accommodation at a motel, three daily meals, Lifeline emergency response system device, linkage to medical, social and housing services, and volunteer transport service to appointments. This amount (\$4,200), in and of itself shows cost benefit of providing 21 days of the Mobile Health services compared to the cost (\$3,128), which only provides for one day at the hospital for “non-acute care.” A cost-benefit analysis was prepared and shown (see Appendix 14-A1) taking the example of hospitals costs of Avoidable Hospital Days (AHD) and comparing it to referring patients to the OVMHS program. This

analysis showed potential cost savings of \$389,424 by using the OVMHS services and preventing costs associated with 133 AHD per 1000 people in a year.

Another way to look at the cost-benefit analysis of this program was portrayed (see Appendix 14-A2). According to White et al. (2014), the average length of stay for a homeless individual admitted to a hospital in California was five days and the average total cost incurred during the hospitalization was about \$45,293 (approximately \$9,058 per patient per day). If the OVMHS program contributes to preventing at least two days of hospitalization (taking a conservative example) by enrolling one patient in the 21-day program, the projected cost-savings per patient would be around \$18,117 per patient. Likewise, if the program was successful in preventing five in-patient days, it was projected to save approximately \$41,093 per patient.

2) Cost-benefit analysis with hiring staffs

Following cost-benefit analysis was written with the plan of hiring a Nurse Practitioner (NP) and a Community Health Worker (CHW) to integrate home visits to “complex” patients. This analysis (an assumption) can be used with some revision to fit the need of the current and future similar projects.

The proposed plan of hiring a team of full-time nurse practitioner and a community health worker, and a project manager to implement the “complex care coordination” program will show high cost effectiveness or return on investment. Total operating expenses for the NP home visit program amounts to \$287,540 in the first year of operations, and then \$267,900 annually in the second and third year (see Appendix 14B-1). There is a slight decrease in the costs in second and the 3rd year since there will be reduced workload or number of paid hours for the project manager after the first year. Since this position was being proposed in an already established health setting, the majority of the capital budget, overhead charges, and space rental

charges were not considered in the financial presentation and were regarded as an advantage for the program.

The program will be self-sustaining after the initial grant to implement the program as evidenced by the cost-benefit analysis. Although the exact cost savings for the clinic cannot be shown, comparison of the operating costs with savings trend from other similar programs is presented (Appendix 14B-2). The overall savings from the decreased ED visits and hospitalizations reflect the return on investment (ROI). The ROI will also be shown in the non-monetary value in the form program evaluation measures such as increased patient satisfaction rate, quality of life, knowledge of their conditions and self-management skills.

Another projected savings from the program implementation is presented (see Appendix 14B-3). The average cost of an ER visit is \$1,500 (AAHCP, n.d), and if the proposed program aid in preventing an average of three ER visits in a year, it will be a savings of \$4,500 per person. If the project enrolls 50 patients in a year, the savings will amount to a total of \$225,000. An example of a common Medicare hospital admission is heart failure (AAHCP, n.d), which costs about \$12,555 per person. Hypothetically, if ten patients enrolled in the program has “Heart Failure” and if their care can be managed in the home and clinic setting preventing the need for hospitalization, a savings of \$125,550 can be assumed annually. These two preceding examples show a total cost saving of \$350,550 and this number is expected to increase if we add the complexity of other cases and treatments that will be needed in EDs and hospitals. All of these analyses show a huge savings trend that will offset the operating expense of the proposed NP home visit complex care coordination program.

Section IV: Results

Program Evaluation/Outcomes

The OVMHS project has been ongoing since its inception on August 27, 2014. The phases I and II of the project, which involved the groundwork of designing the project and piloting of the Mobile Health Services, were completed. The project had successful outcomes in the first year of its implementation and received much attention from other community and healthcare organizations in the region.

Within the first year of the OVMHS project operation, a total of eight patients were enrolled in the program. These patients were referred from Marin General Hospital and Marin Kaiser Permanente Hospital. The duration of the interventions for these eight homeless patients ranged from 2 days to 3 weeks. At the end of their stay, all eight of them had acquired medical homes and remained medically stable. None of the patients were readmitted to hospitals during their 21-days transitional period. All but one of the patients secured housing after exiting from the program. That individual patient did not pursue housing despite being offered support and resources. He preferred to go back to his previous dwelling as a “camper” of his own accord. Regardless, the overall outcomes of these eight patients were highly positive and can be attributed to the success of the pilot program.

The USF Mobile Health Team directly (and fully) participated in the care of one patient in the first year of the implementation. This patient graduated successfully from the 21-days program. Below is a brief report on the patient #1.

Case Report of Mr. T (name changed)

Mr. T. was a 57-year-old male with a history of multiple health conditions (neurological, cardiovascular & musculoskeletal). He also had a history of chronic alcoholism, relapses, and

had been in and out of rehabilitation programs. He was on multiple medications to manage his chronic health conditions. Mr. T's left side of the body was weak, and he used a cane to help with ambulation and also had a wheelchair. To add to his medical and behavioral health issues, Mr. T. was also homeless. Most recently, he was found on the side of a street, unconscious after a seizure. He was taken to the ED by the paramedics and was hospitalized for several days.

When Mr. T's condition was "stable" for discharge, the hospital contacted the representative of the OV program. After he had been deemed "eligible" according to the requirements set by the organization, the representative transferred him to the Budget Inn at Corte Madera, where he stayed for 21+ days and received the services through the program (food, lodging, healthcare and transportation). During this period, he reconnected with his family, and they provided him incredible support and paid him frequent visits. The social/case worker also connected him with other resources in the community. The volunteers provided transportations for him to visit his primary care provider, cardiologist, and orthopedist. He also received Mobile Health services from the USF team and follow-up 'check-ins' through telephone by this author, as needed. The patient's needs and expectations were regularly assessed and communicated through regular email updates between all the concerned organizations.

Outcomes of Mr. T's Case

Mr. T. had a successful outcome at the end of his 21-days stay in the program. He continued to maintain sobriety from alcohol and was compliant with his medications. He also rekindled his relationship with his family (his ex-wife, two sons and his mother). He established a relationship with the local Marin Community Clinic and had an assigned primary care provider. Mr. T. did not have any urgent medical events that required him to go to the ED or hospital within the 30-day period. He was determined to continue living a healthier life and

stated that failing is not an option for him. The patient was cooperative during his stay in the program and appreciative of all the services that he received through this community collaboration. Initially, he stayed with his friends and family upon exiting the program. Currently, he is residing in a Sober Living Community in Northern California, and serving as a peer counselor at the site.

The representative of Opportunity Village Marin Link presented few other cases of homeless individuals to the USF Mobile Health team. Due to schedule conflicts and other issues (described in barriers section), the USF team was not able to pay ‘in-person’ visits to those patients. Nevertheless, those patients were given information regarding the USF team’s mobile health services. The team remained on ‘stand-by’ and planned to visit the patients, when appropriate and requested for its services.

Section V: Discussion

Summary

The project had an overarching goal of reduction of readmission rates of homeless patients post hospital discharge by providing an efficient transitional care program. The Opportunity Village Mobile Health Services team provided a comprehensive range of services by intervening during this critical transitional period. Due to the nature of the urgent needs of the homeless individuals in Marin County, both phases of the project began simultaneously as soon as partnerships between key stakeholders were established.

Through the process of planning and implementation of the project, the goal and the objectives were fulfilled, and the interventions were successful. OVMHS team served a total of eight patients in the first year of the pilot program with positive outcomes both in their health status, as well as projected cost-savings to the healthcare system in general. The collaborative

interventions for the eight individuals served by the program led to zero readmissions to hospitals or ED visits within 21-days. As shown in the literature, the ‘avoidable hospital days’ for non-acute conditions are an enormous cost burden. The 21 days transitional period in the program gave the patients, time to recover in a safe setting, supported by multiple community organizations.

The project continually expanded throughout the first year, as more referrals kept coming in. However, due to the infancy stage of the project compounded with limited human resources and funding, OVMHS team was not able to accommodate all the requests (referrals) made by other organizations. Nevertheless, the team is confident that it will procure additional funding and human resources in the future, and will be able to accommodate and provide care for more patients by sharing these impressive results from the pilot phase of the program.

Relation to other evidence

Homeless patients encounter various barriers to accessing quality health care due to the complexity of their medical and psychosocial conditions (Bharel et al., 2013; Hwang & Henderson, 2010; Post, 2007; White et al., 2014). This project was a culmination of successful interventions gathered from several models of care (Respite/Recuperative Care, Mobile Health & Transitional Care) in delivering care for the targeted homeless population and reducing readmission rates to the hospitals. Both Buchanan et al. (2006) and Kertesz et al. (2004) performed their studies by integrating the principals of Respite Care interventions for homeless patients. The studies concluded that the intervention was effective in lowering hospital readmissions (Buchanan et al., 2006; Kertesz et al., 2004). Likewise, the intervention of the current OVMHS project, which utilized components of Respite Care program, resulted in zero hospital readmission within the 21-days period of the program. This outcome can be interpreted

as a 100% success rate in preventing rehospitalizations in the total eight patients enrolled within the first year of the pilot project.

The overall OVM project was inspired and modeled after Orange County's Recuperative Care (OCRC). Furthermore, the NP-led Mobile Health Services, a component of the larger project takes after the Transitional Care and Complex Care Management models. The results from the previously mentioned models of care showed a significant reduction in hospital admissions or ED visits (Bruno & Grigsby, 2012; Coleman et al., 2006; Naylor et al., 2004; CCI, 2014). Furthermore, these programs showed huge cost-savings by improving the quality of care and lowering hospitalization rates. Similarly, the OVMHS program also demonstrated congruency in outcomes. None of the eight patients enrolled in the program were readmitted to hospitals during their stay in the program. Also, the current project demonstrated huge cost-savings for preventing hospitalization in the eight patients in only one year of implementation, despite encountering some barriers and working with limited resources. As such, although no formal studies were done portraying the exact cause and relationship of specific interventions, the outcomes of this project were comparable with results from earlier literature in making a positive impact in the care of the homeless individuals.

Barriers to implementation/limitations

Although all the stakeholders welcomed the initiative and extended their support, there were some barriers encountered during the project implementation period. These issues are described in the following section:

Human and Time Resource. Due to limited FNP faculty and conflicts in the schedule to oversee FNP students, frequent 'in-person' visits to the patients were not carried out. The USF Mobile health team met with the patients at least once and then followed-up by telephone 'check-ins,' as

needed. The team recognized this barrier and communicated it to the USF-SONHP administration. Currently, the USF-SONHP administration is looking into hiring a faculty in order to fully engage in the project and to make this project a USF Faculty practice site. The faculty will be assigned the responsibility for overseeing students interested in this project and will be expected to be available on a flexible schedule.

Multi-organizational involvement. Initially, one of the key barriers faced was determining the key stakeholders/organizations and their roles and responsibilities for the project. After several meetings and email communications to clarify the roles and relationships, this author created organizational relationship flowcharts and a document depicting specific roles and responsibilities of the organizations involved. The documents were then handed to Rita Widergren, the project manager of OVM for clarification and agreement. Subsequently, it was handed to Mitesh Popat, Medical Director of Marin Community Clinics for his approval.

Access to patient's medical records. The USF team's patient encounter notes were documented in *Practice Fusion*, a free online HIPAA compliant Electronic Health Record system. Although this EHR can be accessed from any site with Internet capability, this system was not connected to patient's actual medical records from the hospital. This issue could lead to duplication of documentation and as well as services, and impede timely access to patient's health status and plan of care updates. The Chief Medical Officer of Marin Community Clinics (MCC) approved USF's request to gain access to the patient's medical records. The faculty and student paperwork were submitted to MCC and were being processed. Those USF-DNP students carrying forward the project will have access to patient's chart in the near future.

Interpretation

The OVMHS project involved multiple community partners and offered a comprehensive range of services that was needed to cater to the needs of homeless individuals. As such, no formal study was done to show the direct causation of one particular intervention over another. As literature shows, the complexity and need of a homeless individual encompass many things. In the care of people experiencing homelessness, fulfillment of basic physiological and safety needs of Maslow's hierarchy (McLeod, 2014) is crucial and needed. Then aiming to progress up the Maslow's pyramid to attain love and belonging, esteem and ultimately the attainment of self-actualization can be realized. It certainly "takes a village" to cater to the needs of homeless individuals in their journey to an attainment of stable and healthy self. The success of the project, therefore, can be attributed to the collaboration and effectiveness of the multiple stakeholders, including the patients themselves.

Firstly, the success of Phase I of the project was demonstrated by the completion of building the basic foundation and the creation of a framework for future DNP students to use. Future students can then continually assess, improve and expand the structure as needed. This author had worked on describing and clarifying the roles and responsibilities of various stakeholders/partners. Additionally, charts and program pathway documents were created to simplify the process and give a visual description. These charts and pathways were claimed to be "very helpful" by the project manager of OVM while presenting and "making cases" to other potential stakeholders or interest groups. Secondly, phase II of the project's success was portrayed by the positive outcomes as depicted by the patient case studies, directly or indirectly served by the USF Mobile Health Team in collaboration with Opportunity Village Marin Link. The cost benefit of providing such interventions by reducing hospitalizations or unwarranted ED

visits are enormous. The results of both phases can be interpreted as the success of the project made possible through the collaborative and comprehensive efforts.

Conclusions

The results from the first year of the pilot project were remarkable. As such, the team of stakeholders is optimistic that this venture of operating a Mobile Health Services under the Recuperative Care program is feasible, and will cater to the health needs and wellbeing of the Marin County's homeless/fragile housing population. Additionally, such an endeavor will also have a significant positive financial impact on the healthcare system by reducing utilization rates of EDs and hospitals as depicted by the cost-benefit analyses. The project team sees earlier mentioned barriers as temporary hurdles that could be eliminated with potential solutions, some of which were already being initiated.

Sustainability

As discussed earlier, the goal of this author was to create the basic organizational foundation for the project and implement the pilot phase of the project to positively affect the health of the homeless individuals in Marin. The success of the project through collaborations with various Marin Community organizations ensures the sustainability of the project. Presently, there have been growing interests and inquiries from other community and healthcare agencies. The network is expanding due to increased interest and positive results from the first year of implementation of the Opportunity Village Mobile Health Services. With outcomes showing a positive return on investment (ROI) and increased interest from the community, the project is expected to grow and self-sustain in the long run. Moreover, projects such as this will help define and create a structure for an NP role in the transitional care by providing mobile health services.

The USF School of Nursing and Health Professions plans to make this a faculty practice site with an assigned faculty to oversee the FNP and PMHNP students needing experience for practicum hours in primary care services. This site will provide clinical experiences for students in acute, chronic and "complex" populations. The OVM's partnership with USF-SONHP will also ensure continuous mobile health services for its homeless patients.

This author put together a folder of all relevant documents and forms created for this project. This folder and other related works (project outline, forms, and charts) will serve as a foundational organizational guide for future USF-DNP students to use in continuing this much needed and fulfilling project for the vulnerable population. The barriers section will also give directions for additional work that would require attention and improvements in the future. As the work continues forward, revision of the forms and charts will be needed and expected.

This author hopes that this foundational work will guide future students in implementing similar projects with vulnerable populations and making a positive impact on their health, as well as on the healthcare costs in general. This opportunity to work with Marin Community organizations also strengthened USF-SONHP's academic ties with the community and helped to portray USF's vision and mission of being socially responsible and caring for the vulnerable population. Ongoing and future works related to this project are exciting, and much to look forward to.

Next steps

There are several potential ventures of the project that will lead to the expansion of the project. As mentioned earlier, the USF-SONHP administration is planning to hire and assign a dedicated faculty to oversee the operations of the project and supervise DNP-FNP/PMHNP

students involved. The administrators also plan to incorporate an actual vehicle to extend health care to homeless individuals in the region and beyond.

The University is also planning to engage in the “Super-Utilizers” project in partnership with OV MarinLink. Apart from some minor differences in eligibility requirements, the intervention of providing “home visits” to the “Super-Utilizers” is similar to the work of this project. The potential patients for this “Super-Utilizer” project are not necessarily homeless, but they have complex medical and psychosocial issues that prevent them from getting medical care on time. These barriers lead to unwarranted ED visits and/or hospitalizations, but can be avoided through similar interventions such as the OV Mobile Health Services.

Section VI: Other information

Funding

This author received no funding from any sources for the implementation of this project. The students bore minor travel and expenses for supplies. The USF School of Nursing Faculty time was used to oversee students in the field and attend meetings, as appropriate. At the actual project site, the basic food and accommodation at the motel for the patient were provided by Opportunity Village, Marin (OVM). The OVM’s fiscal sponsor had provided some funding as the “seed money” for the pilot phase of the project. The program was primarily managed by using in-kind donations and the referral fee provided by the hospitals. Volunteers and staffs from Marin County Health Services provided other resources and services. Currently, several grant proposals are being prepared. One of the possible grants will be from Hartford Foundation for intervention in the “Super-Utilizers” population.

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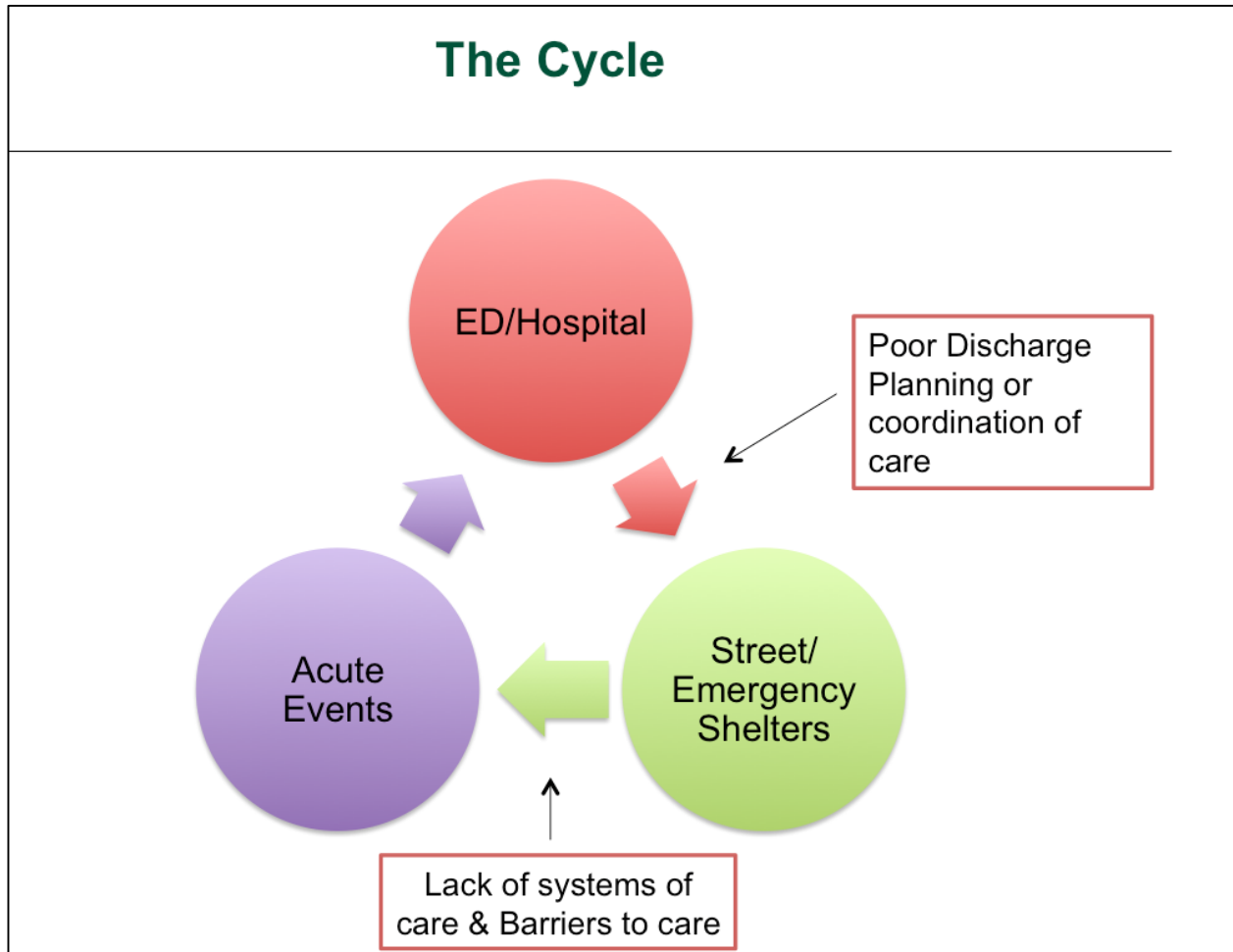
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Appendix 1: Highlights of Health Care Costs in U.S.

Costs	Per person	Source
Average Healthcare spending	\$ 8,915 per person	CHCF, 2015
Average cost of a hospital stay in the nation	\$9,700 per patient per stay	AHRQ HCUP, 2013
Average inpatient day in California	\$ 3,128 per patient per day	KFF, 2013
Average cost of each emergency department (ED) visit	\$ 1,318 per patient per visit	AHRQ, 2015

Appendix 2: The Homeless Patient's Cycle Between Hospital and the Streets



Appendix 3: Evidence Summary for Interventions

Authors/ Year	Study design	Sample & Site	Intervention	Key Findings/Results	Strength of the Evidence (John Hopkins Appraisal Tool)
Buchanan et al. (2006)	Cohort study, retrospective review	N = 225 Homeless patients; Cook County Hospital & Interfaith House (a respite care) in Chicago, Illinois	<u>Respite Care intervention</u> Participants separated into two groups (Usual Care & Respite Care) <i>UC</i> - Individuals in this group are those, who met the criteria for RC, but did not get accepted due to unavailability of beds, thus discharging them to overnight shelters or the street <i>RC</i> - Those individuals that received a range of services, which included temporary housing, food, acute care services by volunteer health providers, medication organization, substance abuse counseling, case management, and referrals to permanent housing	During the 12-month period of follow-up, results showed that the RC group had shorter inpatient days than the UC group (3.7 days vs. 8.1 days). The RC group had 49% reduction in hospital admissions	Level II Quality B
Kertesz et al. (2009)	Cohort study, retrospective review	N = 743 homeless individuals, Boston Medical Center	<u>Respite Care intervention</u> Identified patients discharged to Respite Care, other Planned Care, and Own Care, and compared their readmission rates within 90 days post-hospitalization discharge.	RC group had approximately 50% reduction in the odds of readmission at 90 days post-discharge	Level II Quality B
Bruno & Grigsby (2012)	Organizational Summary Report	N = 843 Homeless patients; Orange County (OC) n=461 Los Angeles (LA) n=382	<u>Recuperative Care intervention</u> All patients admitted to the program were housed in local motels, received ongoing medical and social support/resources.	<i>OC program</i> : After 25 months of operation, only 9% of the patients were readmitted to hospitals. A total of 277 individuals (55%) were discharged to transitional or permanent housing. In addition, there was an	Level V Quality A

				<p>estimated cost savings of \$3,180,000 to hospitals from the intervention</p> <p><i>LA program:</i> During first 17 months of operation, only 12% of patients readmitted to hospitals, 34% discharged to transitional/permanent housing. The estimated cost savings is \$2,684,000</p>	
Post (2007)	Survey	33 Health Care for Homeless (HCH) grantees in 24 states in the U.S.	Telephone interviews regarding HCH grantees' experience in providing mobile health care (using a vehicle, but not limited to) for homeless population. Topics include: Barriers to health care, rationale for the outreach, populations served, services provided, service delivery, community partners, type & design of vehicles, funding sources, outreach & marketing, program obstacles, strategies to address obstacles & program success.	The results of the survey provide extensive information for people interested in implementing Mobile Health services to the vulnerable population. The HCH mobile health care providers also gave important recommendations for interested administrators or direct service providers.	Level V Quality B
Coleman et al. (2006)	Randomized Control Trials (RCT)	<p>N= 750</p> <p>Site: A large integrated delivery system located in Colorado.</p>	<p><u>Transitional Care using Advance Practice Nurses</u></p> <p>Participants randomly assigned to the intervention group and the control group. The control group received usual care, whereas the intervention group received coaching on 1) tools to promote cross-site communication, 2) encouragement to take more active role in their care, and 3) continuity across settings, and guidance from a "transition coach." APNs also provided home visits and telephone follow-ups.</p>	<p>At the 30, 90 and 180-day intervals after discharge from hospitals, the intervention patients showed lower readmission rates than the control group</p> <p>Intervention vs Control patients; At 30 days (8.3 vs 11.9, $P=.048$) and at 90 days (16.7 vs 22.5, $P=.04$), respectively.</p> <p>Mean hospital costs were lower for intervention patients (\$2058) compared to control patients (\$2546) at 180 days (log-transformed $P=.049$)</p>	Level I Quality B

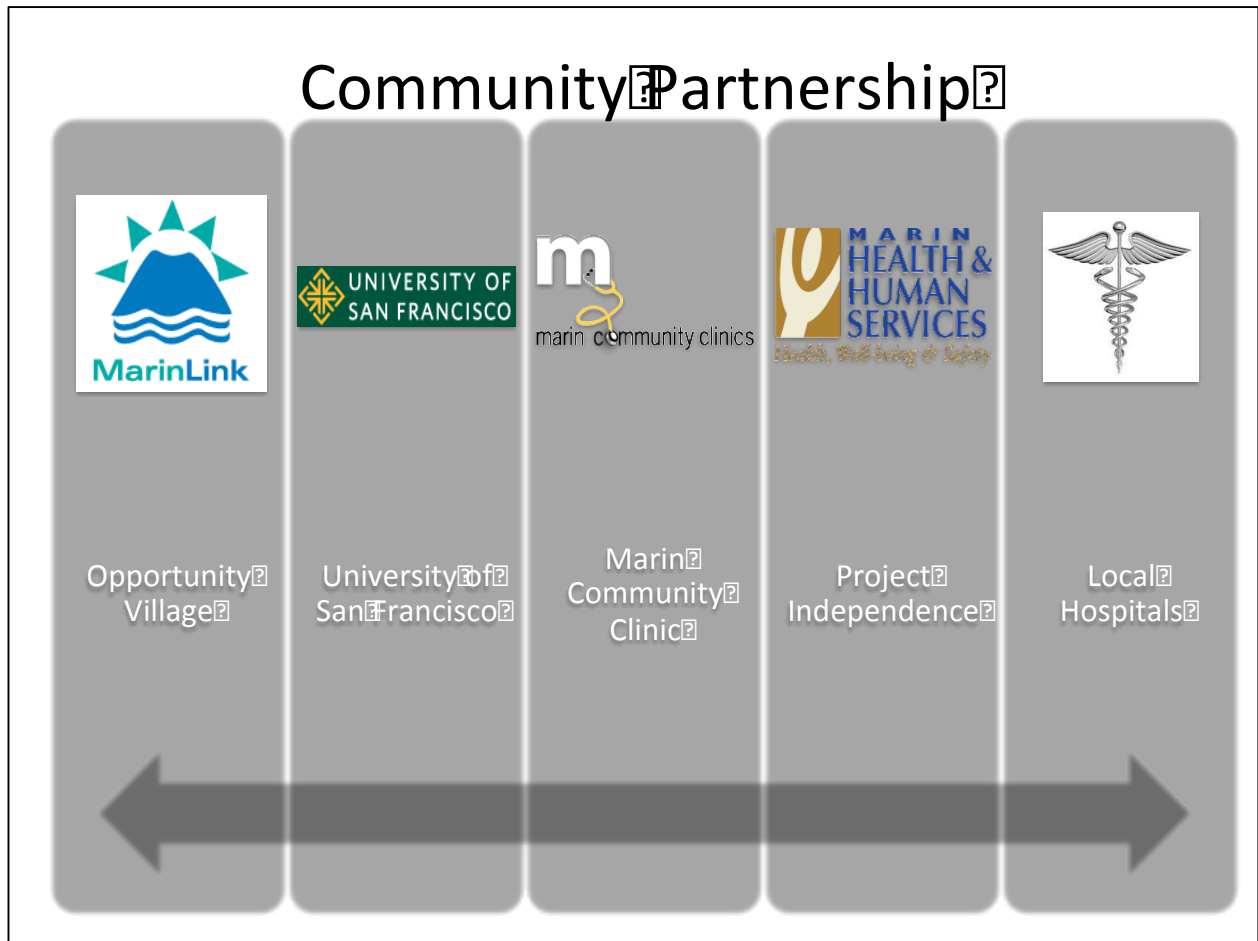
<p>Naylor et al. (2004)</p>	<p>Randomized Control Trials (RCT)</p>	<p>N= 239 Elders (age >65 years) admitted with a diagnosis of Heart failure Site: Six Philadelphia academic and community hospitals</p>	<p><u>APNs delivering Transitional care</u> Randomly assigned- The control group received routine care, which consists of patient management, discharge planning critical paths, and standard home agency care (if referred) 7 days a week. The intervention group received services, which included APNs trained by a multidisciplinary team of heart failure experts to provide a unique and comprehensive management of needs and therapies associated with acute heart failure. APNs provided home visits and telephone follow-ups</p>	<p>Rehospitalization rates in the intervention group were lower (47.5%) versus the control group (61.2%). The adjusted mean costs in the intervention group were also lower (\$7,636 vs \$12,481, $p=.002$) compared to the control group (.). Study also showed a short term improvement in overall quality of life (12 weeks, $P<.05$), physical dimension of quality of life (2 weeks, $P<.01$; 12 weeks, $P<.05$) and patient satisfaction (at 2 & 6 weeks, $P<.001$).</p>	<p>Level I Quality B</p>
<p>Center for Care Innovations (2014)</p>	<p>Pilot project result</p>	<p>N=50 Complex, chronically ill patients (super- utilizers) at Santa Rosa Community Clinic</p>	<p><u>NP Home visits & coordination of care</u> NPs made home visits, performed advanced assessments, and wrote/adjusted medications by communicating with the patient's primary care provider and other multidisciplinary team.</p>	<p>In the first 6 months of the operation of their program, they have decreased hospitalizations by 45% in 50 complex or chronically ill patients. They have also reported savings of approximately 480,000 in 6 months and increased patient satisfaction, quality of life and knowledge of their conditions.</p>	<p>Level V Quality B</p>

Appendix 4: Recommendation from HCH Mobile Health Care Providers

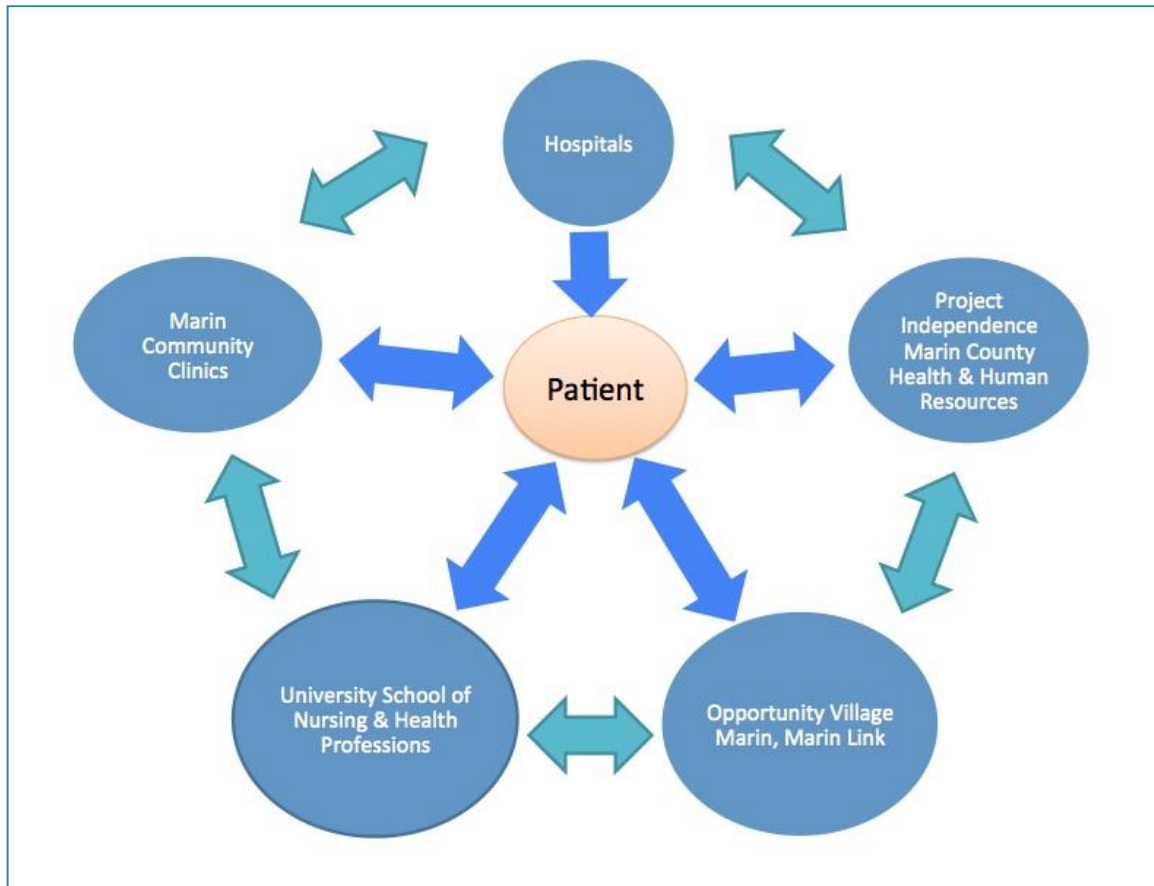
- Assess the need for a mobile health program and specify target populations.
- Assess your financial and service capacity and space requirements before selecting a mobile unit; be aware of the variety of mobile units in use.
- Capitalize the mobile program prior to implementation; identify funding sources and in-kind services.
- Recognize that a long-term investment is necessary.
- Choose providers who can work independently and enjoy working with homeless people.
- Identify and build strong relationships with community partners to meet service needs that you can't seek affiliations with medical teaching programs; develop referral contracts with specialty services.
- Understand state laws and regulations regarding service provision. Notify police about services to be provided and service sites.
- Select service sites where homeless people congregate.
- Plan where to park the mobile unit; consider road surface, space to turn around, access to plug-ins, distance from power lines, traffic patterns, and safe exit from the vehicle for patients.
- Communicate with potential clients; seek client input in developing and evaluating the mobile program.
- Establish and adhere to a reliable service schedule; be where you say you are going to be when you say you'll be there.
- Schedule sufficient preparation time before and after mobile outreach.
- Make a plan to ensure client and staff safety and security of the mobile unit.
- Let the program evolve; be flexible and adapt to change.
- Share knowledge; learn from programs working in similar environments, geographical and political.
- Groom younger people to replace yourself.

(Source: Post, 2007, p. 27)

Appendix 5-A: Community Partnership



Appendix 5-B: Intra/Inter-Organizational Relationship



Appendix 6-A: Project Directory

Project Team

Key Stakeholders/Partners	Name	Title	Email
	Alexa Curtis	DNP Department Chair	accurtis@usfca.edu
	Jo Loomis	Faculty	jaloomis2@usfca.edu
	Tenzin D. Lama	DNP FNP student	tdlama@usfca.edu
	Joan Fraino	DNP Psych NP student	jafraino@usfca.edu
	Alvin Walters	MSN CNL student	arwalters2@usfca.edu
	Nancy Boyce	President	nancy@marinlink.org
	Rita Widergren	Project Manager	som52@comcast.net
	Mary O' Mara	Executive Director	mary@marinlink.org
	Mitesh Popat	Chief Medical Officer	mpopat@marinclinic.org
	Linda Tavaszi	Chief Executive Officer	ltavaszi@marinclinics.org
	Peggy Dracker	Chief Operations Officer	pdracker@marinclinics.org
	Liz Digan	Human Resources	ldigan@marinclinic.org
	Donna West	Public Health Nurse	dwest@marincounty.org
Marin General Hospital	(OVM in direct contact with hospitals)		
Kaiser Permanente-Marin			

Appendix 6-B: Communication Matrix

COMMUNICATIONS MATRIX							
Project Name:			Opportunity Village Mobile Health Services				
Site: Marin County			Marin County, California				
Project Manager Name:							
Project Description:			FNP led Mobile Health Services for Homeless population in Marin				
ID	Communicaton Vehicle	Target Audience	Description/Purpose	Frequency	Owner	Distribution Vehicle	Internal / External?
0	Handouts, brochures	MarinLink Team & USF team	Introduction of the project. Introduce key players	Once	USF & MarinLink	'In-person' meeting	Internal & External
1	Updates	MarinLink Team & USF team	To update on the project and Patient updates	As needed	USF & MarinLink	Email, Zoom, Skype & 'In-person' meetings	Internal & External
2	Powerpoint PDF handouts- Roles, Responsibilities & Relationships	Marin Community Clinic's CMO & CEO and USF team	i) To introduce teams and clarify roles & responsibilities ii) Paperwork & update	Twice	USF & Marin Clinic	'In-person' meeting	Internal & External
3	Manuscript & Prospectus	Jo Loomis, Chair	Ongoing communication regarding requirements, project implementation and clarifications	As needed, ongoing	Tenzin Lama	Email, Skype, Zoom meeting, 'In-person' meeting	Internal

Appendix 7-A: Opportunity Village Program Eligibility Requirements

Who is eligible?

- ✓ Persons 18 years or older who lack a system of care at hospital discharge
- ✓ Independently mobile, able to manage Activities of Daily Living (ADLs) and medication regimen with minimal support
- ✓ Persons with an acute medical condition(s) with an identifiable end point of need for transitional care

Who is NOT eligible?

- ✗ Persons who are medically or psychiatrically unstable
- ✗ Persons who are aggressive or combative
- ✗ Persons not willing to accept assistance in controlling substance use

Additionally, to be safe and successful, clients must be:

1. Able to navigate independently & safely & manage activities of daily living (bathing, dressing, toileting) independently. If wheelchair support is needed, clients must be safe and independent in navigation.
2. Able to manage their own medications with minimal or no assistance.
3. For the safety of all concerned, substance use is not tolerated at the motel.
4. ****CLIENTS WHO VIOLATE #3 WILL BE EJECTED FROM THE PROGRAM****
5. Be willing and able to work with our staff toward an identifiable and achievable goal

(Source: Opportunity Village Marin, 2014)

Appendix 7-B: Patient Agreement Form

MarinLink presents **OPPORTUNITY VILLAGE MARIN**
**A TRANSITIONAL, HEALING ENVIRONMENT FOR PEOPLE
 REQUIRING SERVICE/SUPPORT FOLLOWING A MEDICAL CRISIS.**

OPPORTUNITY VILLAGE is a program which endeavors to provide select patients who are leaving the hospital, with services and support designed to lead to housing, independence and wellness. **At the BUDGET INN in Corte Madera, the following will be offered:**

- 1) Twenty-one days of transitional housing in a motel room
- 2) Three daily meals
- 3) Lifeline Emergency Response System during your stay
- 4) Linkage to medical, social and housing services
- 5) Volunteer transport service

Additionally, **OPPORTUNITY VILLAGE MARIN**, in partnership with the **University of San Francisco's School of Nursing and Health Professions**, provides our guests with an opportunity to meet **2 or 3 times a week** with Nurse Practitioner students who can further assist them with the rehabilitation and social aspects of their recuperation.

The **OPPORTUNITY VILLAGE MARIN** staff will endeavor to fulfill the expectations outlined in this agreement within the time allotted. If we are unable to do so, we will refer _____ to another organization where this process can be continued; and agree to facilitate the most expeditious plan of assistance for each of our guests.

____ I have read and understand the scope of this agreement.

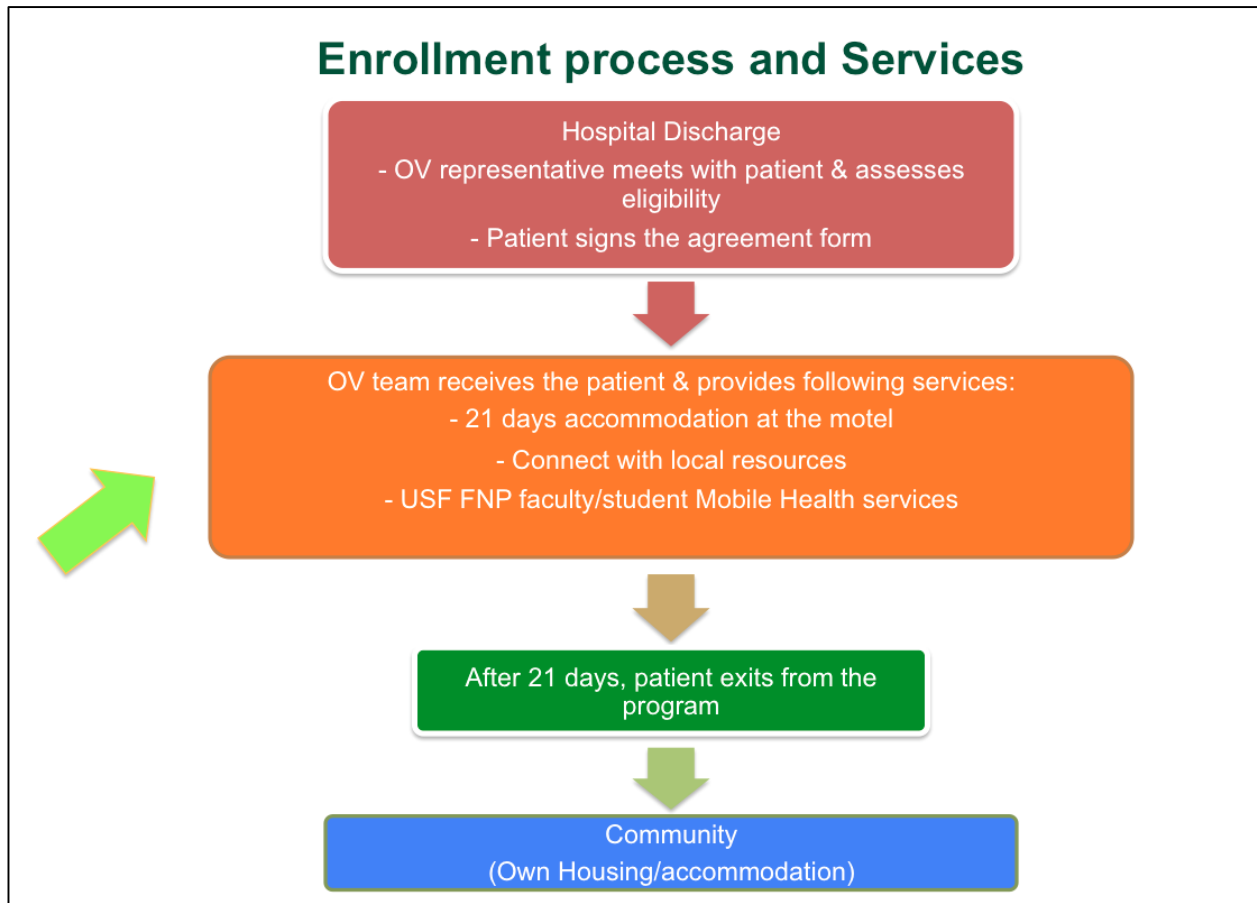
____ I understand that my stay is limited to **21 days** from the signing of this agreement; and I agree to comply with this check-out date: _____ at which time the provisions outlined herein will be null and void.

Signature: _____
 Date: _____

**OPPORTUNITY VILLAGE MARIN
 REPRESENTATIVE:** _____

(Source: Opportunity Village Marin, 2014)

Appendix 8: Program Pathway



Appendix 9: Project Resource Requirements

1) Locations

- a. Budget Inn at Corte Madera, Marin
- b. America's Best Value Inn, Novato (Another potential motel)
- c. Marin Community Clinic
- d. Hospitals in Marin (Marin General Hospital & Kaiser Permanente)

2) People

- a. Lead organization- Opportunity Village Marin, part of MarinLink organization
 - i. Nancy Boyce, President
 - ii. Mary O'Mara, Executive Director
 - iii. Rita Widergreen, OVM Project Manager (Key contact)
- b. Marin Community Clinics
 - i. Mitesh Popat, Chief Medical Officer
 - ii. Linda Tawaszi, Chief Executive Officer
 - iii. Peggy Dracker, Chief Operations Officer
 - iv. Liz Digan, Human Resources
- c. University of San Francisco, School of Nursing & Health Professions Team
 - i. Alexa Curtis, DNP Program Chair
 - ii. Jo Loomis, DNP-FNP Faculty
 - iii. Tenzin Lama, DNP-FNP Student
 - iv. Joan Fraino, DNP- Pysch NP Student
 - v. Alvin Walters, CNL Student
- d. Project Independence, Marin Health and Human Services

- i. Donna West, Public Health Nurse
- e. Hospitals in Marin County
 - i. (Names of representatives will be listed here as connections are made)

3) Tools

- a. Clinician's tool bag
 - i. Stethoscope
 - ii. Blood pressure cuff
 - iii. Thermometer
 - iv. Pulse Oximeter
 - v. Miscellaneous items (alcohol wipes, gloves, mask, band aids, gauze, cotton, etc)
- b. Electronic Healthcare Record
 - i. Practice Fusion
 - ii. Marin Community Clinic's EHR (*to be used in the near future*)

4) Funding

- a. Seed money provided to OVM by MarinLink
- b. Referral fee \$200 per patient per day (total \$4,200) paid by hospitals covered the rent for motel room and other expenses
- c. Donations, in-kind services and resources in the community
- d. Potential grants available
- e. USF faculty and students used their own "clinician tool kit" to assess patients

Appendix 10-A: OVMHS Program Evaluation Checklist

Please circle your responses and comment as appropriate

No.	Objectives	Responses			Comments
1	Basic needs met (Food, Clothing, Shelter etc.)	Yes	No	N/A	
2	Remained Medically Stable	Yes	No	N/A	
3	Remained compliant with medication regimen	Yes	No	N/A	
4	Able to communicate their health needs	Yes	No	N/A	
5	Understand and engage in their plan of care	Yes	No	N/A	
6	Establish care at a primary clinic	Yes	No	N/A	
7	Connect with community resources	Yes	No	N/A	
8	Utilize rehabilitation services	Yes	No	N/A	
9	Transitioning to a “home” setting	Yes	No	N/A	
10	ED visits/Readmission to hospital within the 21 days	Yes	No	N/A	

Additional Comments (*Use back page for additional space*)

Filled by: Name/Signature

Date:

Appendix 10-B: Patient Number One's Outcomes (OVMHS Program Evaluation Checklist)

Pt. name: DOB —

OVMHS Program Evaluation Checklist

Please circle your responses and comment as appropriate

No.	Objectives	Responses			Comments
1	Basic needs met (Food, Clothing, Shelter etc.)	<input checked="" type="radio"/> Yes	No	N/A	OVM
2	Remained Medically Stable	<input checked="" type="radio"/> Yes	No	N/A	No adverse events,
3	Remained compliant with medication regimen	<input checked="" type="radio"/> Yes	No	N/A	No,
4	Able to communicate their health needs	<input checked="" type="radio"/> Yes	No	N/A	
5	Understand and engage in their plan of care	<input checked="" type="radio"/> Yes	No	N/A	
6	Establish care at a primary clinic	<input checked="" type="radio"/> Yes	No	N/A	At Marin Community clinic. Referrals for orthopedist
7	Connect with community resources	<input checked="" type="radio"/> Yes	No	N/A	Social (case worker for SSI?)
8	Utilize rehabilitation services	<input checked="" type="radio"/> Yes	No	N/A	Sutter Health provided PT services
9	Transitioning to a "home" setting	<input checked="" type="radio"/> Yes	No	N/A	Initially, at friend's place Currently at sober living facility
10	ED visits/Readmission to hospital within the 21 days	Yes	<input checked="" type="radio"/> No	N/A	No adverse events

Additional Comments (Use back page for additional space)

The patient was motivated to get better and be "off the streets!" Compliant with the program's rules.

Filled by: Name/Signature Tenzin Lama, DNP-FNP Student Date: 10/
USF

Appendix 10-C: Patient Satisfaction Survey

Survey questions after discharge	Very Poor	Poor	Fair	Good	Very Good	Total	%
Rating scale	1	2	3	4	5		
How helpful was it to meet with a nurse before or shortly after being discharged from the hospital to discuss your goals for continued care in the community?							
How helpful were the mobile services provided by the nurse practitioner team help you to connect with services you would have normally not been able to access on your own?							
How helpful was it to have a mobile team of nurses help you connect with community services compared to your previous experiences of being discharge from the hospital setting?							
How likely would you recommend the nursing mobile health team to help other patients in need of community services?							
Total							
Do you have any suggestions or recommendations to help us improve our services?	Yes		No				
Comments:							

(Source: Fraino, 2015)

Appendix 11: GANTT/Timeline
GANTT- Opportunity Village Mobile Health Services

		2014					2015											
	Milestones / Months	Mid Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	OVM MarinLink team & USF Team Academic Partnership	1st Meeting 8/27												1st Anniversary of OVMHS				
2	Meeting with Patient & follow up	1st patient 8/27	Phone Calls x 3															
3	Addition of Psych Mental Health NP student			1st Meeting 10/29														
4	Team Communication	ONGOING as needed with OVM Representative, Faculty and students																
5	Meeting with Marin Community Clinic's CMO			1st Meeting 10/29												Meeting 10/13		
6	Paper work with Marin Community Clinic			Initiated & Submitted														
7	Literature Review & consultation with DNP Chair	ONGOING																
8	PDSA	ONGOING as needed with OVM Representative, Faculty and students																
9	Grant Writing																	
10	Project Implementation	Project started on Aug 27, 2014 ----- ONGOING ----- 1 year completion on Aug 2015																
11	Evaluation																	
12	Project result & present																	Finish project & Present

Appendix 12: Work Breakdown Structure

Work for the project was broken down in following manner:

1.0 Introduction to the project and implementation

- 1.1. Kick-off meeting at MarinLink organization's office
- 1.2. Introduction to Opportunity Village Marin program of Marin Link and community resources
- 1.3. Identifying key stakeholders
- 1.4. Discussion of roles and responsibilities of organizations involved

2.0 Buy-in from Marin Community Clinics (MCC)

- 2.1. USF Mobile Team meeting with MCC's Chief Medical Officer and Chief Executive Officer.
- 2.2. Presentation of organizational relationship charts and clarifying roles and responsibilities
- 2.3. MCC to sign the Scope of Practice for the Mobile Health Services and give access to patient medical records.
- 2.4. MOU sent to MCC
- 2.5. USF students completed the internship/externship package from MCC and submitted it to MCC

3.0 Project implementation

- 3.1. Meeting with the first patient
 - 3.1.1. History and physical assessment
 - 3.1.2. Medication Reconciliation
 - 3.1.3. Identifying needs and evaluation of resources available
 - 3.1.4. Telephone 'check-ins' as follow-up

3.2. Communication with the project manager

3.2.1. Frequent emails/telephone calls to update and communicate any issues

3.2.2. 'In-person' and virtual meetings to update and strategize for future tasks

3.3. Variance management

3.3.1. Schedule conflicts

3.3.2. Patient unable to show up

4.0 Results

4.1. Outcomes at the end of the patient's 21-day stay in the program

4.1.1. Medication compliance

4.1.2. Maintaining sobriety (if alcohol or drug abuse)

4.1.3. No rehospitalization or unnecessary ED visits

4.2. Dissemination

4.2.1. Physical or virtual meeting to discuss results

4.2.2. DNP paper

4.2.3. DNP presentation

Appendix 13: SWOT Analysis



Appendix 14-A1: Cost Benefit Analysis Using “In-kind” Services

Cost benefit Analysis	Cost	Source
Average cost of a hospital day in California	\$3,128/day	KFF, 2013
Average "Avoidable Hospital day" (AHD)	133 days in a year (per 1000 people)	Segal et al. (2014)
Cost of "Avoidable Hospital days" for hospitals	133 days x \$3,128 = \$416,024 per year per 1000 people	
OVMH Referral fee for hospitals	\$200/day per patient	
	\$200 x 133 AHD = \$26,600	
Potential Hospital Cost Savings in a year by referring to the proposed program	\$389,424	

Appendix 14-A2: Cost Benefit Analysis Using “In-kind” Services

Cost benefit specific for homeless population in California	Cost / Days	Source/Calculation
Average length of stay (LOS) in hospitals	5 days	White et al. (2015)
Total cost for each hospitalizations	\$ 45,293 per hospitalization (approximately \$9,058/day)	White et al. (2015)
OVMHS Referral fee	\$4,200 per patient (for 21 days)	OVMHS (2014)
Potential cost savings preventing 2 inpatient days	~ \$18,117 per patient	\$144,936 for 8 patients*
Potential cost savings preventing 5 inpatient days	~ \$41,093 per patient	\$328,744 for 8 patients*

** OVMHS program enrolled 8 patients within the first year of the pilot project*

Appendix 14 B-1: Financial Presentation and Cost Benefit Analysis
 (This is an assumption and can be adjusted)

Direct cost	Operating cost	Year 1	Year 2	Year 3
Salary for project manager	\$40 x 832 hrs (.4FTE)	\$33,280	\$16,640	\$16,640
Salary for NP	\$60* x 2080 hrs (1 FTE)	\$124,800	\$124,800	\$124,800
Salary for CHW	\$25* x 2080 hrs (1 FTE)	\$67,600	\$67,600	\$67,600
Combined benefits (@ 30%) for NP & CHW	\$37440 + \$20280	\$57720	\$57720	\$57720
BP cuff/device	\$70 x 2	\$140	\$140	\$140
Misc. Supplies	\$1,000	\$1,000	\$1,000	\$1,000
Total Direct cost		\$284,540	\$267,900	\$267,900
Indirect Costs	Amount	Year 1	Year 2	Year 3
Transportation (gas)	\$100 x 12 months	\$1,200	\$1300	\$1400
Phone bill	\$150x 12 months	\$1,800	\$1800	\$1800
Total Indirect cost		\$3000	\$3100	\$3200
Total operating cost (Annually)		\$287,540	\$271,000	\$271,100
Total operating cost (first 6 months)	6 months cost	\$143,770		

Appendix 14 B-2: Comparison with SRCHC project

Predicted savings from SRCHC project in 6 months	\$480,000
Total operating expense of the project at 6 months	\$143,770
Cost benefit Savings balance in 6 month	\$336,230

Appendix 14 B-3: Assumptions

ER visit prevention (3 episodes per patient) = \$1500x 3x50 patients = \$225,000
CHF Hospitalization prevention (10 patients) = \$12,555 x 10 = \$125,550
Total savings from preventing ER & Hospital utilization in a year= \$350,550

(*Based on average Nurse Practitioner (NP) & Community Health Worker (CHW) salaries using web search)

Common Abbreviations

APN	Advanced Practice Nurse
FNP	Family Nurse Practitioner
MCC	Marin Community Clinics
NP	Nurse Practitioner
OC	Orange County
OCRC	Orange County Recuperative Care
OVM	Opportunity Village Marin (<i>One of the programs under MarinLink</i>)
OVMHS	Opportunity Village Mobile Health Services
PMHNP	Psychiatric Mental Health Nurse Practitioner
SONHP	School of Nursing and Healthcare Professions
USF	University of San Francisco