

# **HOSPITAL READMISSION PREVENTION: A LITERATURE CRITIQUE**

by

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### **ABSTRACT**

The main purpose of this paper is to critically review the literature on interventions within the United States and globally, that aim to reduce hospital readmission. Special focus will be placed among interventions that aim to reduce hospital readmission among Medicaid and Medicare beneficiaries. With healthcare costs continually rising and hospital reimbursement dependent on patient satisfaction and length of stay, hospital readmissions have become a manner of measuring quality of patient care. Not only are hospital readmissions a measure of quality of care, they also impact the patient's well-being as a whole. This topic has public health significance due to health disparities for those at higher risk for readmissions; it provides an area for future public health policies and interventions that will aim to decrease disparities in healthcare. This paper will review the policy background to the problem followed by the most common readmissions within American healthcare, a focus will be placed on factors that may impact readmissions including length of stay for most common readmissions. After, it will take a look at the impact of comorbidities on hospital readmissions before going into the literature critique of interventions, the critique will be followed by a discussion of the findings and the theoretical background to the interventions. Finally, the paper will aim to recommend an intervention that incorporates what current interventions are doing positively and fix those that are lacking.

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## **PREFACE**

Thank you Dr. Thistle Elias for your constant guidance throughout this essay. It would have been a very difficult and much more stressful road if you had not been chair. Thank you Dr. Jamie Booth for your insight on the content of the paper. I would like to thank you both for challenging me to think critically and to continue growing in my skills within public health and social work. Without your help I would not have been able to finish this project.

## **1.0 BACKGROUND TO THE PROBLEM**

### **1.1 SCOPE OF THE PROBLEM**

Hospital inpatient care accounts for around a third of healthcare expenditure in the United States. Therefore hospitalizations affect American individuals and families as well as “represent a significant impact” to the economy(Weiss & Elixhauser, 2014). Hospital care is heavily dictated by how much money hospitals are making and losing with each patient. As patients’ length of stay in a hospital increases the goal may shift to getting patients stable enough to go to another facility instead of the overall health and well-being for patients’ post-discharge. Many hospital readmissions could be prevented if the care provided were shaped to each individual, taking into account the environmental and social aspects of the person.

The United States healthcare system is financially driven by insurance; either private commercial insurance or through the Medicaid and Medicare program. This literature critique, focuses on hospital reimbursement by Medicaid and Medicare programs because they cover the majority of hospital reimbursement. Medicaid in the United States is the government paid insurance for low income families, qualified pregnant women and children, and those who receive Supplemental Security Income (SSI) among other individuals (“Eligibility,”). Medicaid is the largest source of health coverage in this country and provides coverage to approximately 72.5 million Americans (“Eligibility,”). Medicare is the federal insurance equivalent of Medicaid

for individuals who are 65 or older, some individuals with disabilities, and those with End Stage Renal Disease ("What's Medicare?"). Since Medicaid and Medicare cover a great majority of all healthcare spending, it is important to understand how hospital care impacts the country's budgetary spending. It is also crucial to understand the different policies that have been made in an effort to reduce government healthcare spending, including regulations on length of stay, and readmissions.

## **1.2 EFFORTS TO REDUCE LENGTH OF STAY AND CURB HOSPITAL READMISSIONS**

One of the policies focuses on reducing patient length of stay in a hospital. This policy was introduced in 1983 by Medicare and changed hospital reimbursement from a per-diem basis to a flat payment based on the diagnosis (El-Eid, Kaddoum, Tamim, & Hitti, 2015). This change has prompted hospitals to reduce patient length of stay in order to increase their reimbursements. This policy also allowed for Medicare patients to receive solely care necessary for their diagnosis and reduces unnecessary care in a hospital setting. As a result of this policy, the average patient length of stay (LOS) was reduced to 5 days compared to the 7 days that was the average in the 1980's (El-Eid et al., 2015). Even with this policy the amount of readmissions and healthcare spending continued to consume high amounts of the budget spending and called for more policies to reduce the cost of healthcare spending.

In 2011, 58% of all hospital readmissions were paid for by Medicare along with 18% of all readmissions paid by Medicaid, thus the U.S government paid for about 76% of all hospital

readmissions(Fingar & Washington, 2015). Readmissions continue to be about 37% of all Medicare spending and accounts for about \$15 billion of the costs every year (Fingar & Washington, 2015). Many of the current readmissions can be prevented through patient discharge planning/instructions, coordination of post acute care, and the reduction of medical complications in patients (Fingar & Washington, 2015). Due to the cost of hospital stays and the volume of readmissions the Affordable Care Act established the Centers for Medicare and Medicaid Services Hospital Readmissions Reduction Program (HRRP) as an effort to reduce the amount of preventable readmissions. The HRRP has implemented a financial penalty for hospitals “with excess rates of readmissions for acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia among Medicare beneficiaries”(Fingar & Washington, 2015). Since 2015 other penalties are beginning to be calculated for readmissions for chronic obstructive pulmonary disease (COPD) as well as hip or knee replacements (Fingar & Washington, 2015). The HRRP has chosen those conditions as penalized readmissions due to their prevalence within this country as well as the cost of care for each hospital stay.

Even though there is increased focus on LOS and readmissions there are also other concerns in regards to the consequences that may come from these policies. Concerns such as the impact on quality of care, patient safety and discharge process/timing have begun to arise (El-Eid et al., 2015). In order to lower LOS and attempt to prevent readmissions, many hospitals in the United States have created and implemented multi-disciplinary teams that are composed of physicians, nurses, and other staff such as care managers or social workers to create more effective discharges. Even with these teams who work with the patients and their families the process of discharging a patient continues to be complex. This process of discharge is known as the Six Sigma methodology and has been criticized for the lack of demonstrable sustainability

(El-Eid et al., 2015). There continues yet to be a specific discharge and patient care process for the whole United States, although hospitalization processes and rates vary depending on the area, socioeconomic status, and access to post-acute care. Finding an intervention that can reduce hospital readmissions in a flexible manner is essential in the ability to provide individuals with lasting well-being and overall lasting healthcare interventions.

### **1.3 TYPICAL LENGTH OF STAY FOR COMMON READMISSIONS**

As can be seen in the HRRP data there are a few conditions that have the highest number of readmissions to hospital post-acute care. Readmissions are defined as “subsequent hospital admission for any cause within 30 days following an initial hospital admission, referred to as the index stay”(Fingar & Washington, 2015). It is important to know the average number of days that patients spend in a hospital for the most common readmissions. Length of stay determines what hospitals make in profit depending on the number of days that a patient is in the hospital. As mentioned above, hospitals are attempting to reduce the length of days that a patient is in the hospital because they only get paid per diagnosis. Readmissions are not always due to the same index stay, none the less it is important to reduce the overall rate. The most common readmissions and LOS are as follow;

1. AMI: In 2010, the average length of stay for individuals was about 5.3 days. The Healthcare Cost and Utilization Project published a projection for cardiovascular diagnoses in 2012 which predicted that by the end of the year the length of stay would decrease to 4.8 days at the hospital.

2. COPD: According to a brief from the Healthcare Cost and Utilization Project (2011) around 12 million people in this country have been diagnosed with this condition as of 2008. The average length of stay in a hospital is around 4.7-4.8 days. This report also shows that women experience more acute exacerbation discharges than men, as well as a higher likelihood of hospitalization between the ages of 75-84.
3. Pneumonia: The University of Rochester Medical Center reports that according to the HCUP sample from the Agency for Healthcare Research and Quality, the average LOS within the United States is 5.4 days.
4. CHF: When it comes to congestive heart failure, the average length of stay in 2001 was of 5.6 days at a hospital. In 2010 the average length of stay continues to be 5.6 days. The HCUP projection in 2012 predicted that by the end of the year in the length of stay would decrease to 5.3 days.

These lengths of stay are what is expected for those conditions; but instead the length of stay is influenced by acuity of the condition. Not only does the acuity matter but also the individual's age and ability to recover steadily can influence the amount of time that the individual is in the hospital. There appears to be a focus on reducing the average length of stay, not only due to the financial aspect that accompanies a hospital stay but also due to the risk for deterioration that comes with being inpatient at a hospital for extended periods of time.

## **2.0 FACTORS THAT AFFECT READMISSION**

### **2.1 PATIENT RELATED FACTORS**

Not all patients are at risk for readmission, there are certain groups of individuals who are at a higher risk. Medicare and Medicaid beneficiaries are considered high-risk groups of patients compared to those who are privately insured. (Jiang et al., 2016). It is also important to note that most Medicaid patients use safety-net hospitals that provide care for low-income, vulnerable and at risk populations (Jiang et al., 2016). There are numerous patient related factors that can exacerbate the rate of readmissions for Medicare and Medicaid patients.

- a) **Financial Stress:** It is not surprising that finances would be a burden for patients and families. Considering that most recipients and users of Medicaid/Medicare have low income status as a factor upon their receipt of federal health insurance (Kroch et al., 2016). Individuals who have low economic status are often in jobs that may prevent continual and periodic health-related checkups and preventive care (Jiang et al., 2016). Additionally, these jobs often do not provide patients with “sick leave benefits”, creating stressful burden to families when attending appointments post-acute care, as well as while the patient is receiving care in a hospital setting. Physicians can be oblivious to the cost of care-maintenance by prescribing brand name medications instead of generic

medication or less expensive medications that may have the same effects on health. Co-pays for medications can become an additional burden to patients.

- b) **Medication Non-Adherence:** This patient factor is closely related to the patient's ability to pay for the medication that is prescribed to them. Other factors that could lead to medication non-adherence by patients include lack of understanding of how the medication works, transportation to fill and pick up prescriptions, and lack of ability to remember dosage times and schedules (Jiang et al., 2016). While it is recognized that medication compliance is an important factor in predicting hospital readmission, there continues to be a lack of research that focuses on whether compliance is intentional or due to external factors.
- c) **Housing Instability:** Jiang et al., (2016) also observed that housing insecurity is a major concern for individuals who are considered frequent readmissions. Many hospitals have begun respite or transitional housing programs for patients who are at high risk of being readmitted due to housing insecurity. Individuals with home insecurity may at times also access hospitals in order to have a place to sleep on a hot/cold night. Housing insecurity can take priority over medication or medical compliance.
- d) **Mental Health and Substance Abuse Disorders:** There is a high prevalence of mental health and substance abuse comorbidities associated with multiple readmissions. Both mental health and substance abuse are also considered "major risk factor for Medicaid Readmissions", most hospitals are not equipped with sufficient resources to be able to manage these types of issues all hours of the day every day (Jiang et al., 2016). This patient related factor is important to consider especially with the amount of opiate addiction and dependence within the United States today. It is also important to

remember that some individuals may self-medicate for their mental health comorbidities and as they do so may develop substance abuse or dependence.

## **2.2 PROVIDER AND SYSTEM RELATED FACTORS**

Even though there are many patient-related factors that are associated with hospital readmission, there are other critical factors that interact with patient factors in predicting readmissions for Medicare and Medicaid patients. According to Jiang et al., (2016) some of the most important provider-related factors and readmission are the lack of awareness of readmission risk and the lack of financial incentives to reduce readmissions. There are multiple interventions and incentives throughout the country that may focus on reducing hospital readmission but these focus more on Medicaid patients than on Medicare patients. Medicaid does not have the same financial incentives to prevent readmissions as Medicare, and thus hospitals are not forced to become more cognizant of their patient care and patient education before discharge. Hospital staff and clinicians may be unaware of the magnitude of risk for readmission for Medicaid patients until they review their payer data (Jiang et al., 2016). Medicaid also pays hospitals under a fee-for-service payment program in which interventions to reduce readmissions would also reduce the amount of income that the hospital would receive from readmissions. There are also system factors that interact with provider and patient related factors to increase readmissions. The two most important factors are a shortage of primary care and mental health providers who take Medicaid and the lack of coordination among providers in and out of the hospital. With the lack of providers who will accept Medicaid or Medicare, follow-up post acute treatment can be delayed or not happen at all. The lack of coordination among providers can be seen when

patients access care in hospitals that are out of network and then need to access follow up care within their network. Without enough communication among providers and with different electronic patient medical files (i.e EPIC and CERNER) it can be difficult for providers to continue the level of care that patients may need. Patient, provider and system factors are important to know about when designing interventions that focus on reducing hospital readmissions.

### **3.0 CO-MORBIDITIES AND READMISSIONS**

Patients who have comorbidities, either psychiatric or medical are more likely to be readmitted to a hospital setting. It is important to note psychiatric related comorbidities as the most predictive in hospital readmissions due to the frequent polypharmacy that accompanies complex psychiatric diagnosis. Medicare beneficiaries who qualify for Medicare before the age of 65 are likely to have a diagnosis schizophrenia, bipolar disorder or mood disorders (Heslin & Weiss, 2015). In fact, according to Heslin & Weiss, (2015) approximately 37% of all Medicare beneficiaries had a severe mental health disorder diagnosis in 2011. For individuals with psychiatric comorbidities a readmission to a hospital may include “poor access to adequate community-based aftercare” as well as a lack of medication compliance and lack of ability to self-care (Heslin & Weiss, 2015). With Medicaid recipients’ psychiatric comorbidities also present to be predictive to hospital readmission. Psychiatric diagnosis have such a chronic relapse potential that in 2011 mood disorders and schizophrenia attributed to the highest number of all-cause hospital readmission within the 30-day window (Heslin & Weiss, 2015).

There have been multiple studies that focus on the readmission trends for individuals who have psychiatric comorbidities. One study reported that patients/individuals with psychiatric comorbidities were 3-5% more often readmitted to the hospital compared to individuals who don’t have a psychiatric comorbidity for heart failure, acute myocardial infarction and pneumonia (Ahmedani et al., 2015). It was also found within this same study that an estimated

30% of all patients admitted to the hospital for heart failure, acute myocardial infarction, or pneumonia had received a mental health diagnosis in the year prior to their admittance to the hospital (Ahmedani et al., 2015). This percentage of individuals with dual diagnosis is higher than the 26% of the population who have reported having a mental health condition in past national surveys (Ahmedani et al., 2015). These statistics are a reminder that mental health comorbidities are not being detected as often as they should be and that the healthcare system in the United States must continue to integrate both physical healthcare and mental health. Two different studies both reported that county mental health admissions and community tendencies at psychiatric admissions increase the likelihood of a hospital readmission for patients at risk (Busch, Epstein, McGuire, Normand, & Frank, 2015 and Epstein, Jha, & Orav, 2011). Community patterns of health usage can be predictors of hospital readmissions and thus provide insight to potential communities and patients in need of extra support.

Even though many studies have focused on mental health comorbidities such as schizophrenia, bipolar disorder, and personality disorders; substance abuse disorder and substance abuse dependency also play a role in hospital readmissions. Especially since Psychiatric and substance abuse related admissions were reported to have increased at a faster rate than any other hospitalization between 2003 and 2011 (Heslin & Weiss, 2015). Busch et al., (2015) incidentally found that “comorbidity (substance use disorder and general medical) was a key determinant of 30-day readmission”, this is because substance use when it is comorbid to other conditions can be a propelling factor to readmission for individuals with a psychiatric illness. The cost of hospital readmissions for individuals with mental health comorbidities is a high priority for hospitals and policy members.

## 4.0 METHODS

Due to cost of high rates of readmission this study aims to assess interventions that have been implemented in the past. For the purpose of this literature critique, two intervention literature searches were made within the University of Pittsburgh's PittCatt+database. The literature focused on peer-reviewed, full online text and scholarly journal articles. All literature reviews of existing interventions that focused on readmissions and all meta-analysis of already published literature were not accessed for this critique. Reviews and meta-analysis are excluded in order to be able to look at the specifics of different interventions that have been done and the limitations within these studies. This allows us to see how different interventions potentially apply the same techniques or concepts. The first literature search focused on the interventions that have been done within the United States in order to reduce hospital readmissions. These articles were found by using the key terms hospital readmissions AND interventions out of which about 2,000 articles were found. These results were furthered narrowed down by adding the search term AND *transitional care*, as well as, *At Risk* which resulted in 200 articles. This paper focuses on ten articles selected based on relevant title; abstract and references to "transitional care" to represent multiple interventions in the U.S that aim to reduce hospital readmissions for individuals at-risk. The outcome of the search includes articles from multiple discipline' journals such as; medicine, nursing, pharmacy, and social work.

The search done for the purpose of this critique used the search terms *hospital readmissions AND interventions AND Canada*, and in order to get articles from Europe the search terms were modified to include *Europe* instead of Canada. This captured articles on Australia and Singapore, likely due to former relationships with the United Kingdom. This search also focused on interventions that scholarly and peer-reviewed. Meta-Analyses were also not picked for the purpose of this search in order to be able to see the details within each intervention that makes them successful and to assess which aspects of the interventions could also be improved. The original search with Canada as the focus resulted in 1,365 articles of which 300 could be seen online, therefore the search was narrowed down even more by adding the term *at risk populations AND transitional care*. With the addition of these terms the results narrowed down to 150 available for review of which only 27 were intervention articles. In regards to the search made including Europe, 957 articles became available online and were narrowed down using *at risk populations AND transitional care* to 110 available online of which 16 were intervention articles abroad. Five articles were chosen by focusing on the abstracts and titles that mention of reduced hospital readmissions and interventions among high risk individuals. These articles were chosen with the purpose of shedding light on how other countries have the same issues and how they are attempting to reduce their hospital readmission. This portion of the literature search aims to provide insight to other approaches that could be adapted into interventions within the United States.

## **5.0 MODELS OF INTERVENTION WITHIN THE UNITED STATES**

There are multiple interventions intending to improve discharge outcomes and reduce readmissions. These interventions are focusing on the importance of addressing mental health and general medical needs of vulnerable populations. Interventions are provided in the community as well to provide the support that patients may need in order to continue their well-being and reduce readmission to the hospital. Community based interventions range from travel teams composed of multiple disciplines that visit the patient at home to community based out-patient centers follow-up.

### **5.1 NURSING SPECIFIC INTERVENTIONS**

A study in Denver, Colorado provided patients with a nurse practitioner-led intervention. This intervention used a prediction tool by the name of LACE to assess patients discharged from the medical and surgical unit at a community hospital in Denver. The tool focused on the likelihood for patients to be hospitalized again after discharge. LACE was initially created in Canada to help reduce hospital readmissions. In order to be included within the study patients had to receive a LACE within 11-15 and have plans to be discharged to home. Patients with that score were considered high-readmission risks and received a post-acute care transition (PACT) home visit (Smith, Pan, & Novelli, 2016). Not all patients who were eligible for program were

able to receive a PACT visit “due to staffing or schedule constraints” and therefore were considered controls within the study (Smith et al., 2016). These visits were carried out by advance practice nurses (APNs) who provided patients with education, independent medical assessment as well as with adjustments of clinical care that may be needed. Smith, Pan, and Novelli (2016) found lower readmission rates for all the patients that received the PACT intervention. This lower readmission rate “was between 42% and 53.9% lower than the control”, therefore the intervention was able to yield rates than the control. Even compared with Medicare readmission rates this intervention appeared to yield lower readmission rates among the patients that received the intervention. The main limitation to this study is that it was only performed within one hospital and the APNs had access to the patient’s electronic medical records, the other limitation is that individuals were not randomized into the control or experimental groups. The authors of this study did infer that this intervention may work within other hospital systems in which providers providing PACT interventions post-discharge, have access to all medical records for the patients and thus able to provide well-rounded and integrated interventions.

A nursing implemented intervention was done in Ravenna, Ohio. The staff developed “At Risk Care Plans” to help prevent readmissions. In this intervention Bahle et al., (2014) found that the patients who needed these specialized care plans do not have one single medical diagnosis in common, rather it was those that had psychosocial comorbidities to their diagnosis who were at higher risk. Care plans could be started by the patient’s bedside nurse, this plan triggered a meeting by the Clinical Nurse Specialist with case managers, unit managers, staff nurses and the nurse risk manager (Bahle, Majercik, Ludwick, Bukosky, & Frase, 2015). The hospital staff remained in communication throughout the patient’s hospital stay and even after the patient’s discharge from the hospital. This intervention focused on providing more specialized care and

increasing communication between providers for the individuals at risk of readmissions. It also looked at different aspects of the patient's lives that could affect their readmission to the hospital and targeted these circumstances. The authors reported that the at risk plans were able to reduce a patient's overall healthcare usage as well as decrease readmissions especially among "high-end users of care" (Bahle et al., 2015). These reductions in readmissions were due to open communication among care professionals during inpatient and outpatient interactions with the patient. Once again the main limitation within this intervention is the low number of participants within this study.

A study based in North Carolina focused on reducing hospital readmissions through nurse-directed transitional care. This study focused on assessing the effectiveness of an initiative passed in 2008 for individuals with psychiatric comorbidities. The initiative is within the state of North Carolina and it is for "Medicaid recipients enrolled in the enhanced primary care case management (PCCM) program of Community Care of North Carolina (CCNC)", this program focuses on providing a safe transition from the hospital back to home (Jackson et al., 2015). The study found that for 980 readmissions, within a year of the index hospitalization, 498 of those readmissions were for psychiatric treatment compared to 482 of those were for non-psychiatric treatment. In this same study 36% of readmissions were to a different hospital than the index hospitalization, therefore patients are not always receiving care from the same providers. It was also found that "Medicaid recipients with schizophrenia and a medical comorbidity, almost 70% of patients experienced another hospital readmission within one year after discharge" (Jackson et al., 2015). The authors found that transitional care support had a correlation to a significant decrease in the risk of readmission for individuals who have psychiatric comorbidities. In fact, if demographic and clinical factors were controlled it was reported that patients who had

transitional care support were 30% less likely to be readmitted in the year following the initial discharge. This care management model emphasizes the role of the care manager to provide multidisciplinary care management resources “among otherwise unaffiliated healthcare providers according to the needs of the patient” (Jackson et al., 2015). This specific intervention has been shown to aid individuals who are being discharged from a psychiatric hospitalization, and those who have a severe mental health diagnosis who also have a hospital discharge. Interventions such as this one in North Carolina can be modified to be successful in other areas of the country.

## **5.2 HEALTH NAVIGATOR/COMMUNITY HEALTH WORKER INTERVENTIONS**

Balaban et al., (2014) focused on the effects of a patient navigator on the readmission of high-risk safety net patients. The intervention was led and carried out by the patient navigators (PNs). Participants were randomized to receive a control intervention or to receive the PN intervention. Within the PN intervention patients would be assigned to a PN that would provide “one hospital visit and three completed calls” therefore contact between the PNs and the patients would begin prior to discharge. This visit focused on building rapport and assessing post-discharge needs as well as helping the patient to communicate any post-discharge concerns. During the post-discharge phone calls the “PNs confirmed appointments and rescheduled as needed; addressed barriers to obtaining or taking medications” and facilitated patient communication with their care providers (Balaban et al., 2015). Overall this study showed greater success in completing the intervention with older patients than with younger ones. This study did not show success in reducing hospital readmissions with patients under the age of 60. This intervention also showed greater adherence of the 7-day follow up appointments in primary

care after discharge. An increase in readmissions among younger patient involved in the intervention was found throughout the course of the study. The primary limitation within this study is that it did not take into account any readmissions to outside hospitals.

Kangovi et al., (2014) focused on creating a “standardized, exportable CHW model- Individualized Management for Patient Centered Targets (IMPACT)” in the Philadelphia, PA area. The randomization of patients within this study was done by research assistants and participants were randomized. For this intervention the community health workers (CHW) had to have at least a high school diploma and were trained to address barriers reported by patients, motivational interviewing, and professional boundaries. The IMPACT intervention carried out by the CHWs began on the first day of admission in which they conducted an interview to help patients set goals for their recovery. Through this initial interview the CHWs and patients created an action plan for recovery. As the patient received treatment within the hospital and after discharge the CHWs became crucial in facilitating communication between the patient and the treatment team. Especially in regards to discharge instructions from the doctors and questions the patients had. The CHWs provided support and coaching to patients to help them achieve their goals and attend their first post-hospitalization appointment. Interventions were terminated after the first post-hospitalization appointment. The authors reported; “we observed a modest reduction in recurrent hospital readmission in the overall cohort but a substantial reduction among the subgroup of readmitted patients” (Kangovi et al., 2014). According to the authors, the main limitation to this study is that the intervention was brief, and it was a single center study.

A study that took place in Oregon performed a randomized controlled trial at two non-profit hospitals. This study took place over multiple years, and it included multiple components to the intervention. The study included pre-discharge patient education, and discharge planning.

Post discharge the intervention included a follow-up phone call, patient hotline, a health coach and patient-centered discharge instructions (Linden & Butterworth, 2014). The intervention also included motivational interviewing and interactive voice response post discharge. The motivational interviewing portion of the intervention could last up to 90 days post discharge, the length of the intervention was dependent on “patient’s activation level, health literacy, severity of health condition, and preference” (Linden & Butterworth, 2014). This study focused on Medicare patients with chronic heart failure and/or COPD because those two conditions have high numbers of readmissions. The authors of this study report that even though the intervention attempted to be well rounded, it did not manage to reduce hospital readmissions. The authors hypothesized that the lack of success was dependent on adherence to the intervention. The also hypothesized that the population in the intervention was too ill to prevent readmissions. The authors disclose that other interventions have been able to reduce readmissions using many of the same concepts that this study attempted to carry out.

### **5.3 SOCIAL WORK INTERVENTIONS**

Boutwell, A., Johnson, M., and Watkins, R., (2016) studied the effects of an intervention in which social workers are able to act as a transitional care worker instead of a nurse. This intervention focused on “hospitalized adults with at least one chronic condition and a previous hospitalization within the past 6 months” (Boutwell, Johnson, & Watkins, 2016). Throughout this intervention ( known as the Bridge Model) the patient was provided with assessments at three different times; prior discharge, immediately after discharge and a month after discharge. Each intervention was guided by the needs of each individual, post discharge assessments were

done via telephone. This intervention was based on integrated healthcare, the social workers collaborated with other professionals, arranged for community services and were able to advocate on behalf of the client. The assessments performed by the social workers looked at social, logistical and coping aspects of the person in adjusting to a home post-discharge. This study found that within the Rush University Medical Center, those who received the Bridge Intervention had lower 30-day readmission rates compared to Medicare FFS beneficiaries. It was also found that those who did not receive the intervention had a 18.3% readmission rate compared to 16.1% for those in the experimental group. The authors reported that the limitation within this study is that the intervention was only analyzed in a single center.

Another social work focused intervention was carried out by Bronstein et al., (2015) to assess if care coordination done by social workers could reduce hospital readmissions. This intervention took place in upstate New York and focused mainly on low-income patients to address barriers related to staying at home post-discharge. Patients were randomly placed into the control and intervention groups, had to be 50 or older and at high risk for readmission. The intervention was carried out by Master's in Social Work interns (MSW interns). They contacted participants via telephone within 3-5 days' post discharge from the hospital. Then the MSW interns scheduled a home visit within the first and second week after discharge, and the final point of contact occurred at around 21-days after the patient was discharge through a final phone call (Bronstein, Gould, Berkowitz, James, & Marks, 2015). The MSW interns focused on "individualized needs assessment, identifying medication concerns, transportation issues, home care needs, home safety concerns, and behavioral barriers to follow-up care" , with this focus the interns were able to empower patients to find solutions to their problems and to ask for help when needed (Bronstein et al., 2015). Patients could also attend monthly meetings and other

educational opportunities at the hospital for extra support. The authors of this study found that the intervention improved the likelihood of not being readmitted by about 22%, but this finding is limited due to the small sample size.

#### **5.4 PHARMACIST-LED INTERVENTIONS**

A telephone intervention done by pharmacists in the Boston area aimed to reduce hospital readmissions. This intervention is also known as the Project Re-Engineered Discharge (RED) and it focuses on education done by nurses upon discharge and pharmacist follow-up telephone interventions (Sanchez, Douglass, & Mancuso, 2015). All patients who are discharged to home from an adult internal medicine service “were provided with comprehensive education by a discharge nurse educator (DNE), followed by a telephone call from a pharmacist ~2-4 days after discharge”. All in all this intervention done in 2004 found that emergency department visits and readmissions in 30-days post-discharge were reduced (Sanchez et al., 2015). A review of this intervention was conducted by the authors from July 2012- May 2013, the telephone intervention allowed the pharmacists to identify any medication discrepancies, or problems the patient may be experiencing post-discharge. The pharmacist would then contact the PCP or the discharge doctor to change the medication or update them on patient medication issues. Sanchez et al., (2015) found that hospital utilization for those who a telephone follow-up by the pharmacist was around 56% lower compared to those who only received discharge education and were unable to be contacted by the pharmacist. It is important to note that Emergency department usage was lower but overall readmissions was not significantly lower. This study reported the same limitation as the other studies mentioned above and it is that the results are only applicable to one medical

center. A high incidence of substance abuse abuse was also found among those who were unable to be contacted by the pharmacist which provides support to how comorbidities impact an individuals' ability to succeed after discharge.

A study that took place in Oregon performed a randomized controlled trial at two non-profit hospitals that serves more close to nine different counties. This study took place over multiple years, and it included multiple components to the intervention. The study included pre-discharge patient education, and discharge planning, post discharge included follow-up phone call, patient hotline, health coach and patient-centered discharge instructions (Linden & Butterworth, 2014). The intervention also included motivational interviewing and interactive voice response post discharge. The motivational interviewing portion of the intervention could last up to 90 days post discharge, the length of the intervention was dependent on “patient’s activation level, health literacy, severity of health condition, and preference” (Linden & Butterworth, 2014). This study focused on Medicare patients with chronic heart failure and/or COPD because those two conditions have high numbers of readmissions. The authors of this study found that even though the intervention attempted to be well rounded, it did not manage to reduce hospital readmissions. The authors hypothesized that the lack of success at reducing readmissions, is that there was not enough adherence to the intervention and that the population was too ill to prevent readmissions. The study does admit that other interventions have been able to reduce readmissions using many of the same concepts that this study attempted to carry out.

## 5.5 SYSTEM CHANGE

A study done within the state of New York focused on the possibility of shared electronic records to reduce hospital readmissions. This study was conducted based on the premise that “patients often report that their primary care providers have little information about recent hospitalizations and that post-discharge follow-up is often insufficient” (Vest, Kern, Silver, Kaushal, & investigators, 2015). This study reported that provider communication and provider access to patient related information is associated with 57% lower odds of 30-day readmission for that patient. This reduction in readmission odds is only likely when the provider accesses the information post- discharge and is able to see any changes in medication regimen, and an updated summary of the conditions that were treated within the hospital (Vest et al., 2015). What this study fails to mention or is how different electronic record systems can facilitate or impede provider communication when a patient moves from one healthcare system to another. Focus on creating a universal electronic medical record could help improve patient outcomes post discharge for individuals who access providers in different health networks.

Medicaid and Medicare are the primary sources of insurance for individuals with schizophrenia and other mental health diagnoses that the state of Texas has begun to penalize hospitals that have potentially preventable readmissions (Busch, Epstein, McGuire, Normand, & Frank, 2015). These penalties also include readmissions that could have been prevented when there was a history of substance abuse disorders, and it is predicted that other states will begin to implement their own penalizations to hospitals for these preventable diagnosis (Busch et al., 2015). Penalizing hospitals have provided incentives for the healthcare system and hospital systems to begin to look for ways in which they can change the manner in which care is provided. More specifically it is changing the discharge process from in-patient to out-patient.

Even though some readmissions may not be avoided based on the acuity of the disease on the patient there are some that can.

## **6.0 FIVE INTERNATIONAL MODELS THAT AIM TO REDUCE READMISSIONS**

Hospital readmissions are not solely an issue financially and for maintenance of care within the United States. Other European countries and Canada face the same issues when it comes to demand of health care utilization and health management after discharge. It is important to see different interventions being done in other countries to see if those countries have an intervention that could be altered to be applicable within the United States. As the United States moves towards integrated healthcare and universal healthcare, it could be possible that other countries that have universal healthcare also have insights to the problem that are not yet known within this country.

An intervention in Vancouver, Canada focused on how adverse drug events can lead individuals to unplanned hospital admissions or readmissions. Nurses in this study were able to identify patients who were at high-risk for adverse drug events in three different hospitals within Vancouver. The patients were identified as at risk “based on the patients’ age, comorbid conditions, recent antibiotic use and recent medication changes at triage” (Hohl et al., 2017). Participants were 19 years old or older, and this intervention took place within the emergency department at three different hospitals. The residency trained pharmacists and nurses who carried out this intervention focused on “obtaining a best-possible medication history, discussing the goals of therapy with the patient or caregiver, and reviewing patient’s medication” to begin to problem solve and prevent any adverse drug event, and to improve effectiveness of any

medication prescribed to the patient (Hohl et al., 2017). Previous medical providers and caretakers were contacted as part of the intervention in order to facilitate communication between providers and individuals seeking medical treatment. This intervention also focused on updating primary care physicians and family of changes in the medication regimen that a patient has due to the hospital stay, or changes in treatment plans based on prognosis. The primary outcome of this study was that the median number of hospital days was reduced by .48 days for those who received the intervention, and this reduction in length of stay was more prevalent among patients under the age of 80 (Hohl et al., 2017). This intervention attempted to reduce unplanned admissions for patients based on their risk of readmission from the moment in which they got to the emergency room. Even though the intervention was not able to prevent every admission, it was able to reduce the length of stay among high-risk patients under the age of 80.

An intervention carried out in the mid-eastern area of Canada assessed the impact of a patient navigator on length of stay and readmission to a hospital after 30 days. In this intervention patient navigators were incorporated into the multidisciplinary team that cares for the patient in order to facilitate provider-patient communication. In this one hospital intervention, each patient followed solely one patient navigator throughout their stay at the hospital, and each PN had a caseload of 20-30 patients on a daily basis. As part of this intervention the PNs would begin their day by rounding on the new admissions every morning, the PNs then participated in the multidisciplinary rounds. Overall the PNs were responsible for facilitating consultations and tests, and well as answering questions that the family and patient had as outlined by the medical team. The PNs were the “primary contact for every patient admitted to their clinical team following discharge to ensure proper follow through on discharge plans” (Kwan, Morgan, Stewart, & Bell, 2015). The authors of this study reported that admissions with PNs were about

1.3 days shorter than admissions that did not have a PN. The authors report on data from this hospital over the course of four years, and even though the data showed decrease in LOS, there was no difference found in the readmissions to the hospital. Kwan et al. did hypothesize that the lack of change in hospital readmissions could be due to readmissions in Montreal are to the index facility and thus there would not be a change in readmissions regardless. The main limit of this intervention is that it takes place solely within one hospital in Montreal and with a somewhat small sample size, therefore the results cannot be compared to other hospitals in the area.

Another intervention study in Australia has also focused on a telephone based intervention to reduce hospital admissions for patients at risk for readmission. This intervention's main focus was to keep individuals home, to enhance their access to community-based services and to assist individuals with the self-management of their diagnosis and condition (Morello et al., 2016). This intervention also worked with individuals who had private health insurance on top of the Medicare universal healthcare in Australia. Individuals in the intervention were provided with a clinician (either a nurse or an allied healthcare professional) for the intervention that completed a comprehensive assessment, and provided them with regular phone calls over the course of 4 months. During these phone calls the clinicians asked participants about "current health status, symptoms, and management plans" the clinicians also assessed to ensure that participants had a primary care provider (Morello et al., 2016). The intervention did follow patients for 12 months after they were enrolled in the intervention even though it was only a four-month long intervention. Morello et al. reported that in the year following enrollment in the program, participants had a reduction in their healthcare utilization as well as a reduction in their use of hospitals yet compared to the control group there was no difference in the reductions of hospitalization usage and claims. The authors suggest a more targeted approach to this

intervention in the future in order to truly be able to assess validity in reducing hospital readmissions and hospital usage. Another concern with this intervention as reported by Morello et al. is that the program is not necessarily cost effective for the results it is able to provide. Since it is still unknown in Australia the reason for increase in hospital usage and admissions, this type of intervention or any intervention is not going to be successful until that is understood. The authors state time and time again throughout the article that this is the first evaluation focusing on the effectiveness of the intervention with an elderly population that have chronic and complex healthcare needs, who also have both Medicare and private health insurance.

A study done in the northern area of England also attempts to implement a telehealth based intervention to reduce hospital usage and hospital readmissions. This intervention focused on individuals with COPD to help them manage their diagnosis and illness post-discharge. The intervention team was made up of nurses who specialize in COPD, a specialized physiotherapist, and a community matron who were employed full time specifically for this intervention. In order to be able to participate in this intervention patients had to meet specific medical criteria. The intervention was made up of “six home visits over the 8-week time frame” post hospital discharge for the patients (Bentley et al., 2014). Since a face to face intervention was not initially sustainable, the authors introduced a telehealth aspect to the intervention which allowed the patient to monitor vital signs daily, and if/when their vital signs fell outside of their individual parameters, or if they failed to monitor daily, then clinicians were alerted to take action. This intervention was carried out with an intervention group and a control group in order to be able to assess success in reducing hospitalizations. Participants were even followed for a follow-up for six months after the completion of the 8-week intervention. Bentley et al. report that the participants that received standard service care had lower readmissions rates, and fewer inpatient

days compared to the individuals that received the telehealth supported intervention. It is important to note that the group randomized to receive the telehealth supplemented intervention had a higher mean age among participants, and that the intervention sample size overall was small. The authors also reported that one of the limitations that make it unclear if telehealth can reduce hospital readmission or hospital usage is that clinician commitment to Telehealth was an issue partially due to the lack of support that the clinicians needed in order to carry out this intervention. This intervention does show that it appears that patients may prefer face-to-face contact and remote interactions with the clinician through Telehealth.

Lastly an intervention in Singapore that attempted to implement a virtual ward to detect the patients at high risk of hospital readmission, and provide them with intensive multi-disciplinary case management to prevent the readmission. The authors of this study reported that in Singapore readmission rates among the elderly are at 19% which is only slightly lower than the United States (Low et al., 2017) therefore they have a similar need to reduce hospital readmissions. To be a part of this intervention patients had to be 21 years or older, at risk of readmission as determined by the LACE tool, and were able to fit exclusion criteria such as not being critically ill at time of screening, not having a telephone contact among others. The intervention was carried out by “nurses, pharmacists, medical social workers, organized into an IPU led by attending family physicians” (Low et al., 2017). There was also an outpatient virtual ward (made up of nurse case managers and an attending family physician) that worked with the inpatient team. While the patient was in the hospital the inpatient team focused on patient education and coaching, to create individualized care plans for each patient that were also contained hospital discharge instructions. Once the patient was discharge the case was transferred to the virtual ward, and they would follow-up with the patient within 72 hours of

discharge to assess patient's needs and adherence to care plans. A home assessment was also completed within a week of discharge and to address areas in which the patient may be lacking. The virtual ward and the IPU would discuss the patients case every day to update on status of the patients. Low et al. found that this intervention was able to reduce hospital readmission for the intervention group. They hypothesized that the location of the VW as one within the hospital allowed patient to become comfortable with the team members. The authors also reported that early review of patients as an alternative of the emergency department was able to prevent hospital readmissions when avoidable.

## **7.0 THEORETICAL BACKGROUND**

Many of the interventions that have been done within the United States and abroad are grounded in two different theoretical backgrounds: person centered model and the health belief model. These theoretical backgrounds inform the intervention's flexibility with the individuals that they are being applied to. The main model that appears to guide many of these interventions is person-centered model. This model is also known as the socio-ecological theory within public health, and it highlights to how the person's environment is able to impact that person's health and well-being. Therefore, many of the interventions have attempted to focus on different aspects of a patient's environments to reduce the likelihood that the individual will be readmitted to the hospital.

This model/theoretical background is seen within many of the interventions that were found within the United States. The interventions which have nurses, social workers, and patient navigators were able to encompass the person-centered approach most clearly. These interventions were able to bring about a reduction in hospital readmission within their small sample size due to their focus on the external factors that keep patients from being compliant with their medications and their follow-up appointments. They were more flexible with the patients and adaptable to each individuals needs as they arose within the intervention timeline. The flexibility that is seen in Balaban et al., (2014) in which the patient navigator was able to confirm appointments with the patient, as well as help problem solve any barriers to accessing

and adhering to medication. This focus on the person within their environment provides insight to medical providers about factors that influence whether a patient is able to adhere to treatment and thus helps to remove the blame for not following directives upon discharge. Community health workers as seen in the study by Kangovi et al., (2014) also allowed patients to create their own plans for recovery as applied to their lives. This not only allowed a feeling of well-being to be adapted to their outside environment but also empowered the individuals to be accountable for their own health outside of the hospital. This level of support and empowerment provides individuals with the tools that they may be lacking to continue their recovery, and to attempt to take control of their health as it applied to their lives. This person-centered approach to interventions appears to be adaptable to different environments and different areas of the country.

Other interventions that have been done within the United States also showed influence of the health belief model. This model is focused on the perception that individuals are more likely to change their health behaviors if they are aware of threats along with benefits from the possible change in behavior. This model often includes use of motivational interviewing which assesses an individual's willingness to change their behavior. This model is especially prevalent in the study by Kangovi et al., (2014) which utilized motivational interviewing to help patients become more compliant with their post-discharge instructions, as well as to shed light on which areas the individual still needed support to make changes in their life. This model can also be seen in the intervention by Lisenby et al. (2015) in which individuals were followed by pharmacists after discharge. This model has been shown to be instrumental in helping individuals to take control of their environment and to increase patient awareness on polypharmacy, and which behaviors could lead to potential harmful situations post discharge. The health belief

model was able to bring about change within the interventions only when the individuals perceived a threat with positive consequences after a change.

Both the person-centered model and the health belief model can work hand in hand to bring about change in individuals. Many individuals need to become more aware of aspects of their environment that could potentially prevent their well-being once they leave the hospital. Boutwell et al. (2016) were able to implement both of these models within the intervention in how the social workers were able to carry out discharge assessments to clarify any challenges that patients have post-discharge as they come up. Both models were also seen in Sanchez et al. (2015) in which the pharmacists not only helped to identify medication discrepancies but also helped patient's problem solve with circumstances that came up post-discharge. By focusing on discrepancies that the individual is experiencing the pharmacists were able to incorporate the health belief model to tweak and help bring about change within the patients to adhere to medications and adapt to new medications if the medication needed to be changed. Both interventions showed reductions in hospital readmission and healthcare usage.

## **8.0 IMPLICATIONS OF THE LITERATURE CRITIQUE**

All of the interventions reviewed for the purpose of this paper have very similar limitations in carrying out the programs. The biggest limitation to assess actual impact in reducing hospital readmissions for many of the studies is that intervention groups were small. Most of the studies disclosed that the size of the intervention group, while they did show decrease in hospital readmissions, the decreases could not fully be considered significant. For any of the interventions to be deemed as successful, they would have to be conducted on a greater scale and in more than one site within the same continental area, involving a bigger experimental group. The other major limitation that was found within most of the interventions done in the United States was budget restrictions. Some of the interventions were restricted in the amount of staff that could be hired for the intervention and the credentials that staff would need to have to be able to carry out the intervention. Budgetary constraints led to Balaban et al., (2014) and Kangovi et al. (2015) choosing to incorporate patient navigators and community health workers to carry out the interventions. It is also why Bronstein et al. (2015) decided to use Master's in Social Work interns to carry out the intervention instead of licensed social workers. Even with financially smart ways of carrying out the interventions, many of them were limited in the amount of time engaging patients post-discharge. Even though budget can impact sustainability for an intervention, with the reduction in hospital readmissions, the money that hospitals save could be applied to continue interventions. The studies did not mention limitations

regarding race, culture or gender and how these factors could potentially impact outcomes for the interventions.

The interventions done within the United States varied regarding the amount of time that the intervention lasts post-discharge, some only lasting past 30-days post discharge and other interventions following the patient slightly further than the thirty-day mark of high-risk readmissions. There does not appear to be vast differences in results depending on the amount of length of the intervention. Even though time could be a significant factor in reducing hospital readmission with larger samples, at this time it is not possible to assess how time can affect an intervention's success past the first thirty days in which readmissions are prevented. It is also important to note that for the purpose of being considered a readmission, most studies only focused on the high-risk period of 30 days. As interventions continue to be reproduced throughout the United States it will be intriguing to see how the transition post-intervention affects hospital usage for Medicaid and Medicare consumers. Most interventions are able to provide patients with the support that they need to prevent a readmission within the first month after leaving the hospital, and none of the interventions mentioned any tapering off of the intervention. There is a possibility that interventions may need to be longer than 30 days solely to provide participants with gradual reduction of services and the time to adjust to become their own advocates.

This literature critique, suggests that other countries are also incorporating integrated health approaches to their interventions. This allows them to focus on multiple aspects of patients that may influence their likelihood of readmission to the hospital. There are two intervention-types that are different than those reviewed within the United States. The concept of a multidisciplinary team both inpatient and outpatient as seen in Low et al. (2017) aims to help

patients and providers continually communicate even after admission. The only issue with adapting that intervention to the United States is that healthcare consumers within the United States are very transient which makes it difficult to assess for readmission without a nationwide patient record software. The other intervention that was different was done by Bentley et al. (2014) in which Telehealth was incorporated to keep clinicians aware of a patient's vitals outside of the hospital and provide interventions at the moments that were needed. There is a financial burden that may come with providing large numbers of consumers with the technology necessary to be able to monitor their vitals every day. The concept of over reliance on the intervention could also prove to be a limitation when incorporating it to the United States. Another interesting aspect of this international search is the level of influence that different countries already have on interventions within the United States and abroad. One of the interventions that was found within the United States used a tool developed in Canada to predict a person's likelihood to be readmitted to a hospital and used it to pick individuals for the intervention. A similar circumstance was found within the Singapore study which used the LACE tool to be able to pinpoint patients that were at risk for readmission. It seems that countries are attempting to recreate some of the same interventions to assess how they can be adaptable in other environments, and to assess their validity.

The interventions within the United States and those abroad did not focus on the impact that psychiatric comorbidities can have on hospital readmissions as a whole. This was an interesting finding given the literature suggesting a relationship between psychiatric comorbidities and likelihood for readmission. In fact, the intervention done in North Carolina by Jackson et al., (2015) was the only intervention that mentioned a focus on individuals with psychiatric comorbidities and provided them with transitional care to improve the individual's

chance at success. Even though many of the interventions focused on increasing patient awareness and increasing support after discharge, there is a lack of discussion regarding other factors that may influence the patients participating in the interventions such as substance abuse. There continues to be a need for greater emphasis on reducing the impact of psychiatric comorbidities on readmissions, but also an emphasis on the impact of substance abuse on hospital usage and hospital readmission. This need for more specialized interventions was reported by Sanchez et al. (2015) in the patients that were not able to be reached by phone to fulfill the intervention. The patients that were non-compliant to the intervention were those that had a history of substance abuse. Within the United States given the opioid epidemic and heroin usage on the rise, it is important for interventions to assess this aspect of individuals' lives and environment in order to provide patients with the tools that they may need to be able to maintain their health and well-being after being discharged from the hospital. Future interventions should attempt to incorporate substance abuse and psychiatric comorbidities as risk factors for those who may need interventions post-discharge.

## **9.0 POTENTIAL USES**

The most successful interventions both within the United States and internationally are the ones that were able to integrate multiple disciplines in their intervention. They were the interventions that increased communication between the patient and their medical team. Through the communication and assessment of the individual as a whole, hospital readmissions were able to be reduced. Future intervention studies should focus on using patient navigators or community health workers to work closely with the patient and the treatment team in the efforts to bridge communication and awareness barriers and thus bring about sustainable improvements to individual health.

Based on the interventions reviewed in this study a proposed future intervention would focus on integrating multiple disciplines into standard patient care for longer than 30-days post discharge as a potential way of to reduce hospital readmissions. This intervention should have doctors, social workers, nurses, community health workers/patient advocates, pharmacists in the treatment team. Since financial constraints provide barriers to access to treatment, the individuals that receive the intervention should be individuals that have a substance abuse or psychiatric comorbidity to their main diagnosis, as well as individuals that score high in a hospital readmission prediction tool such as LACE that looks at length of stay, acuity of admission to the hospital, comorbidities, and number of visits to the emergency department. These patients must also be covered under Medicaid or Medicare since those two programs provide coverage to at-

risk populations. With the above mentioned aspects of the intervention, it can be adapted to a multitude of areas within the United States and applied at scales as financially possible by hospitals. Since it does not seem to really affect outcomes, the length of this intervention should be of three months' post-discharge in order to provide patients with enough support to make it past the 30-day intervention risk, but also provide them with the tools they may need beyond those first 30 days. The intervention should last three months in order to be able to follow individuals for a quarter of a year after they have left the hospital, but after the first month points of contact with patients will be tapered to be able to provide the patient with feelings of empowerment to take as much control as they can over their diagnosis and be able to live a healthy life outside of the hospital.

This intervention would incorporate the multiple disciplines at different times while the patient is at the hospital and after the patients are discharged. The nursing staff and the attending providers at the hospital should work together prior to discharge to provide patients with the knowledge of the importance of attending their follow-up appointments and following the treatment plan. The nurse could also work with the case manager at this time to provide patients with resources that may be needed as transitional care from the hospital back to the community. These resources should specifically focus on substance abuse centers and community mental health centers that patients may be able to participate in for support. The pharmacists and social workers should work together to change behaviors post-discharge through motivational interviewing. Information gathered from patients in the few days after they are discharged (2-5 days as seen in other interventions) should be used to guide the remainder of the intervention, by indicating areas of concern that should be continually touched upon to ensure patient success. Pharmacists should also focus on how the medications that are prescribed to patients not only

affect people physically but also financially since the individuals in the intervention will be Medicaid/Medicare it can be hypothesized that their medication budget is limited. Once they have been able to make it past the first thirty days without being readmitted to the hospital, then the CHWs or PNs can begin to provide individuals with follow-up phone calls that will be able to provide insight to providers on how the patient is doing as well as provide patients with insight and support to continue their journey to well-being.

## **10.0 CONCLUSION**

In the future an intervention with the same design should be applied to multiple areas of the country to be able to assess the likelihood that a single intervention could be modified for use throughout the country. It appears based on the findings from these studies that successful interventions were able to incorporate multiple disciplines and thus increased communication between providers. All in all, hospital readmissions continue to be an issue within the United States and abroad. With the population continuing to age and funding for Medicaid and Medicare continuing to be reduced, programs need to be implemented to help individuals be successful outside of the hospital and reduce healthcare costs within the United States.

Healthcare within the United States does not look at how the environment outside of medicine impacts the individual and their health. Substance abuse, mental health, financial stability are big stressors that help to shape people's ability to maintain health and wellbeing outside of the hospital. Until healthcare is able to provide individuals with well-rounded care that takes into account the context of their lives, the issues preventing long lasting health will remain post-hospitalization.

## BIBLIOGRAPHY

- Ahmedani, B. K., Solberg, L. I., Copeland, L. A., Fang-Hollingsworth, Y., Stewart, C., Hu, J., . . . Waxmonsky, J. (2015). Psychiatric comorbidity and 30-day readmissions after hospitalization for heart failure, AMI, and pneumonia. *Psychiatric Services, 66*(2), 134-140.
- Bahle, J., Majercik, C., Ludwick, R., Bukosky, H., & Frase, D. (2015). At risk care plans: a way to reduce readmissions and adverse events. *Journal of nursing care quality, 30*(3), 200-204.
- Balaban, R. B., Galbraith, A. A., Burns, M. E., Vialle-Valentin, C. E., Larochelle, M. R., & Ross-Degnan, D. (2015). A patient navigator intervention to reduce hospital readmissions among high-risk safety-net patients: a randomized controlled trial. *Journal of General Internal Medicine, 30*(7), 907-915.
- Bentley, C. L., Mountain, G. A., Thompson, J., Fitzsimmons, D. A., Lowrie, K., Parker, S. G., & Hawley, M. S. (2014). A pilot randomised controlled trial of a Telehealth intervention in patients with chronic obstructive pulmonary disease: challenges of clinician-led data collection. *Trials, 15*(1), 313.
- Boutwell, A. E., Johnson, M. B., & Watkins, R. (2016). Analysis of a Social Work–Based Model of Transitional Care to Reduce Hospital Readmissions: Preliminary Data. *Journal of the American Geriatrics Society, 64*(5), 1104-1107.
- Bronstein, L. R., Gould, P., Berkowitz, S. A., James, G. D., & Marks, K. (2015). Impact of a social work care coordination intervention on hospital readmission: a randomized controlled trial. *Social work, 60*(3), 248-255.
- Busch, A. B., Epstein, A. M., McGuire, T. G., Normand, S.-L. T., & Frank, R. G. (2015). Thirty-day hospital re-admission for Medicaid enrollees with schizophrenia: the role of patient comorbidity and local health-care systems. *Addiction science & clinical practice, 10*(1), A6.
- El-Eid, G. R., Kaddoum, R., Tamim, H., & Hitti, E. A. (2015). Improving hospital discharge time: a successful Implementation of Six Sigma methodology. *Medicine, 94*(12), e633.
- Eligibility. *Medicaid*. Retrieved from <https://www.medicaid.gov/medicaid/eligibility/index.html>
- Fingar, K., & Washington, R. (2015). Trends in hospital readmissions for four high-volume conditions, 2009–2013. *HCUP AHRQ Statistical Brief*(196), 1-17.
- Heslin, K., & Weiss, A. (2015). Hospital Readmissions Involving Psychiatric Disorders, 2012: Statistical Brief# 189: Agency for Health Care Policy and Research (US), Rockville (MD).
- Hohl, C. M., Partovi, N., Ghement, I., Wickham, M. E., McGrail, K., Reddekopp, L. N., & Sobolev, B. (2017). Impact of early in-hospital medication review by clinical pharmacists on health services utilization. *PloS one, 12*(2), e0170495.

- Jackson, C., DuBard, A., Swartz, M., Mahan, A., McKee, J., Pikoulas, T., . . . Lancaster, M. (2015). Readmission patterns and effectiveness of transitional care among Medicaid patients with schizophrenia and medical comorbidity. *North Carolina medical journal*, 76(4), 219-226.
- Jiang, H. J., Boutwell, A. E., Maxwell, J., Bourgoin, A., Regenstein, M., & Andres, E. (2016). Understanding patient, provider, and system factors related to Medicaid readmissions. *The Joint Commission Journal on Quality and Patient Safety*, 42(3), 115-121.
- Kangovi, S., Mitra, N., Grande, D., White, M. L., McCollum, S., Sellman, J., . . . Long, J. A. (2014). Patient-centered community health worker intervention to improve posthospital outcomes: a randomized clinical trial. *JAMA internal medicine*, 174(4), 535-543.
- Kwan, J. L., Morgan, M. W., Stewart, T. E., & Bell, C. M. (2015). Impact of an innovative inpatient patient navigator program on length of stay and 30-day readmission. *Journal of hospital medicine*, 10(12), 799-803.
- Kroch, E., Duan, M., Martin, J., & Bankowitz, R. A. (2016). Patient factors predictive of hospital readmissions within 30 days. *Journal for Healthcare Quality*, 38(2), 106-115
- Linden, A., & Butterworth, S. W. (2014). A comprehensive hospital-based intervention to reduce readmissions for chronically ill patients: a randomized controlled trial. *Am J Manag Care*, 20(10), 783-792.
- Lisenby, K. M., Carroll, D. N., & Pinner, N. A. (2015). Evaluation of a Pharmacist-Specific Intervention on 30-Day Readmission Rates for High-Risk Patients with Pneumonia. *Hospital pharmacy*, 50(8), 700-709.
- Low, L. L., Tan, S. Y., Ng, M. J. M., Tay, W. Y., Ng, L. B., Balasubramaniam, K., . . . Lee, K. H. (2017). Applying the Integrated Practice Unit Concept to a Modified Virtual Ward Model of Care for Patients at Highest Risk of Readmission: A Randomized Controlled Trial. *PloS one*, 12(1), e0168757.
- Morello, R. T., Barker, A. L., Watts, J. J., Bohensky, M. A., Forbes, A. B., & Stoelwinder, J. (2016). A telephone support program to reduce costs and hospital admissions for patients at risk of readmissions: lessons from an evaluation of a complex health intervention. *Population health management*, 19(3), 187-195.
- Sanchez, G. M., Douglass, M. A., & Mancuso, M. A. (2015). Revisiting Project Re-Engineered Discharge (RED): The Impact of a Pharmacist Telephone Intervention on Hospital Readmission Rates. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, 35(9), 805-812.
- Smith, J., Pan, D., & Novelli, M. (2016). A Nurse Practitioner–Led Intervention to Reduce Hospital Readmissions. *The Journal for Nurse Practitioners*, 12(5), 311-316.
- Vest, J. R., Kern, L. M., Silver, M. D., Kaushal, R., & investigators, H. (2015). The potential for community-based health information exchange systems to reduce hospital readmissions. *Journal of the American Medical Informatics Association*, 22(2), 435-442.
- Weiss, A., & Elixhauser, A. (2014). Overview of hospital stays in the United States, 2012. *HCUP Statistical Brief*, 180.
- What's Medicare? Retrieved from <https://www.medicare.gov/sign-up-change-plans/decide-how-to-get-medicare/whats-medicare/what-is-medicare.html>