

IMPLEMENTATION OF A QUALITY-IMPROVEMENT PROJECT TO  
IMPROVE IDENTIFICATION OF PATIENTS AT HIGH RISK  
FOR PSYCHIATRIC HOSPITALIZATION

by

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## ABSTRACT

Readmission to a psychiatric hospital within 30 days is a common problem. Worldwide, nearly one in seven individuals hospitalized for psychiatric reasons are readmitted within 30 days of discharge. Frequent readmissions in individuals with a psychiatric cause are also problematic in the Western United States. The aim of this DNP project was to use the READMIT tool to determine if it can predict psychiatric readmission within 30 days of hospital discharge. The cohort included in the project were adults 18-years-old and older diagnosed as having a psychiatric disorder that caused them to be admitted to an inpatient psychiatric treatment unit. Data were collected from a “healthcare organization in a western state” using a retrospective chart review of 50 electronic medical records (EMRs) that were at least one year old. The data were collected on the retrospective dates of 06/24/17, 7/01/17, and 7/08/17. The dates were selected close together so that treatments, providers, and cares would be relatively similar, thus having less of a chance to skew the data. Each of the 50 patient charts was examined and each was given its own separate score generated by the READMIT tool. The READMIT tool’s scores ranged from 0 to 41, with higher scores indicating an increased probability for readmission. The mean READMIT score for patients that were readmitted was 23.21 compared with a mean of 17.78 for the group of patients that were not readmitted. Of the charts examined for this study, 14 (28%) of them were readmitted within 30 days. The READMIT index did show that the higher an individual scores, the more likely he or she would be readmitted. The READMIT tool has the potential to enhance psychiatric treatment as it can identify individuals more likely to be readmitted.

## CHAPTER ONE

### INTRODUCTION

#### Purpose Statement

The purpose of this project is to identify potential readmissions to an acute psychiatric inpatient unit. The overall goals and objectives of this project are to reduce readmissions and improve the quality of life for psychiatric patients. By being able to identify patients at risk for readmission, they can be treated based on needs so that readmission is less likely to occur.

#### Background and Significance of the Problem

Frequent readmission to a psychiatric hospital is significant because it disrupts normalcy and is associated with despair, hopelessness, and an increased risk of suicide (Mgutshini, 2010). Globally, nearly one in seven persons who receive inpatient treatment for psychiatric reasons is readmitted within 30 days (OECD, 2013). Readmission is also consequential because it is highly disruptive to patients and their families (Vigod et al., 2013). Still, families, and even patients, believe that hospitalization will provide the best course of treatment (Castro, Furegato, & Santos, 2010). This frame of mind condones that readmission to a psychiatric hospital is an acceptable part of life and has substantially increased healthcare costs. Readmissions have significantly contributed cost to both the patient and the healthcare system (Byrne, Hooke, Newnham, & Page, 2010). Individuals who are frequently readmitted to a psychiatric hospital also have a certain set of

characteristics. Webb, Yaguez, and Langdon (2007) identified that persons were more likely to be readmitted to a psychiatric hospital if they were single, living alone, unemployed, psychotic, and receiving no medications.

Despite this information, even though multiple studies have been conducted to determine risk factors that increase the chance for readmission, there has been limited effort placed on implementing an evidence-based instrument to help identify individuals at increased risk for readmission while they are still in the hospital (Vigod, et al., 2015). In order to fully understand readmission to a psychiatric hospital, one must understand that mental illness is not an isolated occurrence, but is actually quite common in the adult population.

### Prevalence and Impact of Mental Illness and Readmission

In 2012, nearly a quarter of adults in the United States experienced some form of mental or substance abuse disorder (Heslin & Weiss, 2015). Heslin and Weiss (2015) further discussed that, between 2003 and 2011, psychiatric hospitalizations increased at a higher rate than any other type of hospitalization. Mental health disorders are among the most common cause of disability affecting an estimated 13 million adults (Healthy People 20/20, 2016). Mental health disorders also cover a wide spectrum. It is estimated that 18.1% of adults in the United States have anxiety, 6.9% have had a major depressive episode in the last year, 2.6% have bipolar disorder, and 1.1% have schizophrenia (NAMI, 2015). This data is considerable because it encompasses many of the readmissions to psychiatric hospitals. Persons afflicted with schizophrenia, bipolar

disorder, major depressive disorder, and anxiety disorder (to a lesser extent) are more likely to be readmitted to a psychiatric hospital (Vijayaraghaven, Messer, Xu, Sarkin, & Gilmer, 2015). NAMI (2015) presents that one in 25 adults in the United States (or 10 million persons) experiences a serious mental illness that legitimately interferes with one or more important life activity. When a mental illness becomes this life altering, hospitalization is usually required. Moreover, this is troublesome considering that up to 13% of patients are readmitted to an inpatient psychiatric hospital shortly after discharge (Vigod et al., 2013). This is significant when considering the enormous cost of hospitalization and readmission.

#### Mental Health Cost and Readmission

Worldwide, mental health disorders are among the more prevalent of disabling disorders, costing the United States alone \$104 billion in 2001 (Cawthorpe, Wilkes, Guyn, Li, & Lu, 2011). As the years have gone on, mental health costs have only increased. NAMI (2015) reports that serious mental illness costs the United States \$193.2 billion in lost earnings per year. Costs are only compounded when considering that many that are mentally ill do not have medical insurance. The portion of adults aged 18-64 with a mental illness that are uninsured is 30.4% (Weissman, Pratt, Miller, & Parker, 2013). NAMI (2015) also estimates that three-quarters of all chronic mental illnesses occur by the age of 24. This is substantial to cost because those first admitted to a psychiatric hospital at a younger age are more likely to be readmitted (Byrne, Hooke, & Page, 2010). This information begs the question: Would it be cheaper to do nothing? Surely this could

reduce healthcare costs. The evidence says no. It is estimated that the cost of doing nothing will cost the United States \$300 billion per year (Miller, Prewitt, & Sadowski, 2013). Most of the cost comes from lost wages and hospitalizations. There is also evidence that shows individuals with chronic diagnoses increase healthcare costs.

Mental health disorders that are chronic are costly because they often lead to individuals being hospitalized multiple times during a lifetime. Schizophrenia has been shown to have high healthcare costs and this occurs for two reasons. Firstly, the disorder occurs in young adulthood and, secondly, the disorder is chronic, generally leading to increased impairments as one ages (Chi et al., 2016). Heslin and Weiss (2015) provide data that show there were 383,000 patients diagnosed with schizophrenia, hospitalized in 2012, that had an average hospital stay of 10.4 days. Of this group, 15.7% were readmitted to the hospital within 30 days (Heslin & Weiss, 2015). Heslin and Weiss (2015) further identified the average initial hospital stay was \$8,800 and subsequent readmissions were \$8,600 for patients diagnosed with schizophrenia. Evidence shows that high cost of care for patients diagnosed with schizophrenia is not exclusive to the United States. Chi et al. (2016) report that Japan paid \$6.59 billion and Norway paid \$106,000 per patient for the treatment of schizophrenia, with much of the cost being a direct result of multiple hospitalizations. Patients diagnosed with mood disorders accounted for 847,000 admissions to psychiatric hospitals in 2012, with an average hospital stay of 6.6 days (Heslin & Weiss, 2015). Heslin and Weiss (2015) provide further evidence that shows 9% of this group was readmitted at a cost of \$5,800 for the initial hospital stay and \$6,500 for readmissions. These costs do not factor in the stay or

treatment in the emergency department (ED). The ED plays a significant role given most patients with mental illness are evaluated there prior to admission to the psychiatric unit.

### The Emergency Department and Readmission

Almost all patients admitted to an acute inpatient psychiatric facility are admitted through the ED. Adams and Neilson (2012) reported in their study at BryanLGH Medical Center that over 80% of psychiatric inpatient admissions entered through the ED. At the “healthcare organization in a western state” that was the setting of interest for project implementation, it is policy that all psychiatric patients are first assessed in the ED before being admitted to the acute psychiatric inpatient hospital. A vast number of psychiatric patients visit the ED on a regular basis. Mental disorders and substance abuse account for one out of every eight visits to the ED, which translates into 12 million visits per years (AHRQ, 2010). AHRQ (2010) also reports that 40% of this group receives hospitalization. Further hindering proper treatment of the large number of persons with mental health problems that come to the ED, the staff are often underqualified to treat them (Manton, 2012).

Mental health patients who are admitted to the emergency area are under the care of an ED physician while in this section of the hospital (Adams & Nielson, 2012). Evidence also suggests that this may contribute to hospital admission and readmission. Adams and Nielson (2012) identify that a need for medications was one of the most frequent reasons for visiting the ED. Psychiatric patients returning to the ED within 30 days of admission were more likely to be readmitted when they were provided traditional

emergency care (Adams & Nielson, 2012). Emergency physicians lack training in treating mental health patients. When combined with limited interaction with a psychiatrist this often leads to recidivism (Manton, 2012).

### Mental Health Stigma and Readmission

Stigma can present mental health patients with many obstacles. Mental illness stigma is an influential attribute in nearly all aspects of social networks and relationships (Corrigan, Kuwarbara, & O'Shaughnessy, 2009). Those with a poor social network and limited relationships have a greater chance for multiple hospitalizations. Patients who are not married and live alone are more likely to be readmitted to a psychiatric hospital (Boaz, Becker, Ross, Van Dorn, Choi, & Sikirica, 2013). Unfortunately, negative attitudes toward those with mental illnesses persist. Stigma is a social phenomenon that is grounded in both being intolerant to human differences and the inability to capitalize on human diversity (Krupa, Kirsh, Cockburn, & Gewurtz, 2009). A major frustration to an individual with mental illness is that family members are often the worst perpetrators of this kind of behavior. Family stigma toward mental illness likely contributes to increased readmissions of relatives with psychiatric problems (Loch, 2011). Loch (2011) further identifies that family members contribute to the revolving door because of the antiquated belief that psychiatric hospitalization was the only method of care for mental illness. Stigma also provides others barriers that will increase the chance for hospital readmission.

Stigma is one of the largest barriers to full social inclusion and community participation of those with a mental illness (Loch, 2011). The ability to be employed is perhaps one of the greatest social and community contributions one can provide. There is strong evidence that stigma persists at work. Krupa and colleagues (2009) identified that employers have made assumptions that individuals with mental illness were dangerous in the workplace because they could be unpredictable (Krupa, et al., 2009). They also found that employers maintain the belief that work is unhealthy for those with a mental illness. Therefore, those with a mental illness are more likely to be unemployed. This is noteworthy to readmission because evidence shows that people with a mental illness who are unemployed are more likely to be readmitted to a psychiatric hospital. A study found that 90.6% of 65 patients with a mental illness that had a history of multiple hospitalization to a psychiatric hospital were unemployed (Langdon, Yaguez, Brown, & Hope, 2001).

#### Montana/Yellowstone County and Readmission

There is also evidence that supports other forms of mental illness in Montana. Ballew & Curtis (2010) report that Montana State Hospital has statistics that show admissions by diagnosis were: schizophrenia 46.5%, mood disorders 16.8%, and alcohol abuse 5.8%. This information is significant because it shows that Montana encompasses the disorders that pose a high risk for readmission.

The Community Health Needs Report (CHNP) (2014) in Yellowstone County reports that 8.5% of adults describe their mental health as fair and 2.1% describe their

mental health as poor. Despite these low percentages, 21.2% of Yellowstone County adults have been diagnosed with having a depressive disorder, which is higher than the national average of 20.4% (CHNP, 2014). CHNP (2014) also reports that 26.9% of adults report chronic depression lasting more than two years and, of the groups reporting depression, 85% have sought professional help. The acute inpatient psychiatric facility at the “healthcare organization in a western state” has seen an increase in adult readmissions. Yellowstone County currently has an inadequate number of treatment facilities and psychiatrists (CHNP, 2014). If patients recently discharged from a psychiatric hospital have the outpatient support that they need, readmissions could be decreased (AHRQ, 2014). Currently, in Yellowstone County, there are 363 patients for every mental health provider (CHR, 2016). Even so, Yellowstone County is offering more services than most. This “healthcare organization” offers outpatient services including the Crisis Center, the HUB, the Program for Assertive Community Treatment, Rainbow House, and the Mental Health Center. Despite these services, the “healthcare organization” inpatient, adult psychiatric unit continues to have an increase in readmissions. Ironically, part of the reason may be that the “healthcare organization” offers outpatient services. The CHNP (2014) conducted an interview that expressed that other areas of the state are sending people with mental illnesses to access outpatient services, thus oversaturating the service area. Montana State University has recognized the lack of services in the state and has created a psychiatric nurse practitioner program to increase the supply of mental health providers.

### The READMIT Tool

There is evidence to show that a tool to predict readmission after discharge from an acute psychiatric unit is effective. Vigod et al. (2015) performed a study that predicts those that are most likely to be readmitted within 30 days. Vigod et al. (2015) developed the READMIT tool that has a scoring system that ranges from zero to 41. The study found that, the higher an individual scored, the greater the chance for readmission. The purpose of this scholarly project is to implement the READMIT tool to improve identification of those most likely to be readmitted.

The following PICO has been proposed: In adults admitted to an inpatient unit, how would the implementation of an evidence-based screening readmission instrument, compared to the standard admission assessment currently being conducted, improve identification of those most likely to be readmitted?

## CHAPTER TWO

## EXAMINATION OF THE EVIDENCE

Search

Guided by the PICOT question, an extensive search of the literature was performed. Excluding the grey literature, all literature for this DNP project was obtained from the Montana State University Library. The databases searched were PsychInfo, UpToDate, and Cochrane. The inclusion criteria for journal articles was that they were peer reviewed, current, and also included mental health information on adults 18 and older. Excluded criteria were mental health information on children and adolescents. Key terms and vocabulary included the following terms: adult mental health statistics (1556 results in PsychInfo, two results in Cochrane Library), adult readmission rates to acute psychiatric facilities (three results in PsychInfo, two results in Cochrane Library), psychiatric admission of adults through the emergency department (five results in PsychInfo, two results in Cochrane Library), psychiatric readmission screening (19 results in PsychInfo, eight results in Cochrane Library), psychiatric readmission tool (17 results in PsychInfo, three results in Cochrane Library), causes for readmission to psychiatric hospital (40 results in PsychInfo, two results in Cochrane Library), and most common causes for readmission (17 results PsychInfo, five results from Cochrane Library). Search terms used in UpToDate were: depression, bipolar disorder, schizophrenia, substance abuse, ECT, psychotherapy, and treatment methods for each of

the specified disorders. Mental Health texts from MSU Bozeman DNP-PMHNP were also searched for this study.

### Common Causes for Readmission

The diagnoses schizophrenia, depression, and bipolar disorder are among the most common causes for readmission to a psychiatric hospital. All of the disorders listed have the potential to be chronic (Langdon et al., 2001). Substance abuse is placed in this section because it frequently accompanies patients with these disorders and can exacerbate symptoms. The most commonly abused substances for readmission are alcohol, marijuana, and methamphetamine. Substance abuse also has the potential to be chronic. Studies show individuals with a chronic mental illness are more likely to be readmitted to a psychiatric hospital (Byrne et al., 2010). Depressive disorders are perhaps the most common psychiatric diagnoses. Those with depressive disorders most often readmitted by diagnoses are major depressive disorder, dysthymic disorders, and depressive disorder not otherwise specified. In order to discuss readmission, it is important to understand the patient demographics if schizophrenia, depression, bipolar disorder, and substance abuse. Those that fit certain criteria may be more inclined to develop one of these disorders. There is a neurobiology to each of the mentioned disorders that is paramount to understanding why readmissions to a psychiatric hospital occur. In most cases, patients are readmitted because they are still experiencing the problems from the first admission. While there are specified treatments for all of the

mentioned disorders and their subtypes, remission rates remain insufficient (Perese, 2012).

### Mood Disorders

Depressive disorders are one of the most frequently seen psychiatric illnesses in a primary-care setting and also remain an unresolved treatment challenge for many providers and patients (Maletic et al., 2007). Difficulties providing and receiving treatment offer a good explanation for frequent readmissions to an acute inpatient setting. Private psychiatric hospitals have also reported that depressive disorders are the problem for which most patients are frequently admitted (North & Yutzy, 2010). While on the surface depressive disorders can seem mild, they are actually capable of causing a great amount of suffering. One physician described depression by saying it is probably more unpleasant than any disease with the possible exception of rabies (North & Yutzy, 2010). Depressive disorders also include thoughts of and, in some cases, actions of self-harm and suicidal ideation. Perese (2012) identified that depressive disorders are linked to many medical comorbidities including cerebrovascular disease, cardiac disease, cancer, diabetes, and substance abuse, among many others. The three most common forms of depression that lead to readmission are major depressive disorder, dysthymic disorder, and depressive disorder not otherwise specified (Perese, 2012).

One of the more debilitating forms of depression is known as major depressive disorder. It is characterized by depressed mood most of the day, markedly diminished interest or pleasure in all or most activity during the day, significant unintended weight loss or gain (5% of body weight), insomnia or hypersomnia, psychomotor agitation or

retardation, fatigue or loss of energy, feelings of worthlessness, excessive or inappropriate guilt, diminished ability to think or concentrate, and recurrent thoughts of death or suicidal ideation (American Psychiatric Association, 2013). The American Psychiatric Association (2013) further specifies an individual must have at least five of these symptoms for at least two weeks and must contain either a depressed mood or loss of pleasure. Depressive disorders are long term, relapsing conditions that affect many. Depression is a widespread psychiatric disorder presenting a lifetime risk of 20% and is linked to high rates of morbidity and mortality (Palazidou, 2012).

Dysthymic disorder is another version of depression and is characterized by depressive symptoms that are present for most of the day for two years or more (Perese, 2012). The American Psychiatric Association (2013) discusses the diagnostic criteria for dysthymia or persistent depressive disorder as follows: poor appetite or overeating, insomnia or hypersomnia, low energy or fatigue, low self-esteem, poor concentration or difficulty making decisions, and feelings of hopelessness. The criteria for diagnosis are that, while the patient is depressed, he or she will present with two or more of the symptoms listed for at least two years. While dysthymia is regarded as less severe than major depression it tends to be longer lasting (Stahl, 2013). Therefore, dysthymia is considered a milder version of depression, but does share a functional impairment that is similar to major depressive disorder.

Depressive disorder not otherwise specified is a class of depression that is not uncommon. The diagnosis, depressive disorder not otherwise specified, includes features that do not meet criteria for major depressive disorder or dysthymia (Perese, 2012).

Clinicians who choose this diagnosis do not identify the reasons the criteria are not met for a specific depressive disorder (American Psychiatric Association, 2013). In an acute setting, such as the ED, the patient may be unwilling or unable to provide any information that would make a more specific diagnosis possible. Key features of unspecified depressive disorders are depressive disorders that cause significant distress or impairment in social, occupational, or other essential areas of functioning, but, again, do not meet criteria for other forms of depression (American Psychiatric Association, 2013). While depression in all types is a prevalent psychiatric disorder, there are groups that are more prone to it than others.

Roughly twice as many women as men are diagnosed with depression (Leach et al., 2008). Some of the reasons for woman being more at risk can be related to socioeconomic status and biology. However, depression is linked across multiple age groups throughout the life span. Approximately 5% to 10% of children and adolescents have symptoms of MDD and will go on to experience substantial, psychosocial impairment (Dulcan, 2016). Older adults are also more susceptible to depression. Increased depression in older adults is commonly related to changes in lifestyle including the death of loved ones, change in living conditions, medical conditions, medications, and a loss of identity (Brenes et al., 2008). There are also numerous other factors that can make one predisposed to depression and these include genetic, medical, environmental, and social influences, including prior depressive episode, family history, substance abuse, serious medical illness, and poor social support (Williams & Nieuwsma, 2016). There is also significant evidence that stressful life events, such as child abuse, can make one

predisposed to suffer from depression (Stahl, 2013). These predispositions are thought to be related to biological changes in the brain.

Depression is thought to be related to a deficiency in brain neurotransmitters: serotonin, dopamine, and norepinephrine. Brain-derived neurotrophic factor (BDNF) plays a crucial role in neuronal growth, survival, and synaptic plasticity in the brain (Palazidou, 2012). When a person is stressed at a young age through child abuse, brain circuits can be sensitized making him or her less resilient to future stressors (Stahl, 2013). A stressed brain also contains higher levels of cortisol and elevated levels of cortisol are linked to the dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis (Perese, 2012). Studies show excessive cortisol levels in the brain lead to a decrease in the production of BDNF. A postmortem analysis of suicide subjects also showed a decrease in BDNF in the prefrontal cortex and hippocampus (Higgins and George, 2013). It is thought that the decrease in BDNF causes atrophy and likely apoptosis in the hippocampus and the prefrontal cortex (Stahl, 2013). Also, the atrophy of the hippocampus and prefrontal cortex is shown to cause a reduction in gray matter of the brain.

Nonetheless, there are many effective treatments for depressive disorders. In cases of unipolar depression, evidence shows the best course of treatment is from a dual approach. For the initial treatment of depression, randomized trials indicate that the combination of pharmacotherapy and psychotherapy is highly effective (Simon & Ciechanowski, 2016). There are numerous classes of drugs capable of treating depression, such as selective serotonin reuptake inhibitors (SSRIs), serotonin and

norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), among numerous others (Stahl, 2013). The preferred drug classes are the SSRIs and SNRIs. They are effective, have a low potential for severe side effects and are rarely fatal in an overdose. However, not all patients respond to SSRIs and SNRIs, with only a third finding relief from depression on their first antidepressant and, after a year of treatment with a regimen of four different antidepressants, only two thirds of individuals were able to find relief (Stahl, 2013). In cases of treating those with resistant depression, TCAs such as amitriptyline have shown success (Hirsch & Birnbaum, 2016). Other non-medication interventions that are effective in treating depression are psychotherapies, such as cognitive behavioral therapy and dialectical behavioral therapy, and ECTs (Perese, 2012).

Depressive disorders are widespread, being linked to 15% of the population, and contribute to lifelong disabilities with increased healthcare costs (Collins et al., 2011). Innes, Lewsey, and Smith (2015) conducted a study observing 550 individuals with MDD, 118, or 22%, were later readmitted to a psychiatric hospital. In another study, individuals with MDD had a readmission rate of 24.7% within 30 days. Zang et al. (2011) found that, in a 12- month period, the readmission rate for those with depression was 23%. MDD, like schizophrenia, is a chronic condition that can lead to further hospitalizations. Individuals that have a chronic course of mental illness are more prone to relapsing and more likely to be readmitted to a psychiatric hospital six months after an admission (Byrne, 2016).

## Bipolar Disorders

Bipolar disorders are a complex, chronic, long-term psychiatric disorder defined by instability of mood and disturbances of cognition, perception, and behavior (Perese, 2012). It is also one of the most common reasons for psychiatric hospitalizations and readmission. However, a timely diagnosis and efficient treatments remain daunting clinical challenges (Maletic & Raison, 2014). Bipolar disorder can be difficult for an undertrained clinician to diagnose because diagnosis is based on a set of symptoms and probable medical explanations for those symptoms, and it should be noted there is no biological marker for the disorder (Miller, Johnson, & Eisner, 2009). The symptoms of bipolar disorder are reviewed in an unstructured manner. In order to accurately diagnose bipolar disorder, a provider must be familiar with the disorder and its presentations. Bipolar disorder is a mood disorder that can present itself through episodes of mania, hypomania, and major depression (Suppress & Cosgrove, 2016). Among the more common forms of bipolar disorder in an acute clinical setting are bipolar I disorder, bipolar II disorder, and unspecified bipolar disorder.

When one thinks of the classical presentation of bipolar disorder, it is usually presented as bipolar I disorder. Bipolar I disorder is characterized by one or more manic episodes or mixed episodes with the onset of mania often having sudden onset (Perese, 2012). The American Psychiatric Association (2013) describes one piece of bipolar I disorder as mania, which is described as a period of abnormally and persistently expansive or irritable mood and increased goal-directed activity lasting at least one week, most of the day, every day. One must also have three of the following symptoms, or four,

if the mood is only irritable: inflated self-esteem or grandiosity, decreased need for sleep, more talkative than usual, flight of ideas, distractibility, and excessive involvement in activities that have a high potential for painful consequences. The American Psychiatric Association (2013) also specifies that the symptoms must be severe enough to cause marked social impairment, impaired occupational functioning, require hospitalization to prevent harm to self or others, or have psychotic features, and the episode must not be related to drug use, other treatment, or another medical condition.

Bipolar II disorder is often perceived as a more mild form of bipolar disorder compared to bipolar I disorder. Historically, researchers thought bipolar II disorder was more mild than bipolar I; however, it has been found that the morbidity of bipolar II disorder is equal to or exceeds that of bipolar I disorder (Rabasseda, 2010). Bipolar II disorder is classified by one or more major depressive episodes and by at least one hypomanic episode; hypomania differing from mania by length of time symptoms are present and degree of functional impairment (Perese, 2012). The American Psychiatric Association (2013) further defines a hypomanic episode as a period of abnormal, persistently elevated, expansive, or irritable mood and a persistent increased activity or energy lasting at least four days, every day. This must be accompanied by three of the following symptoms, or four, if the mood is only irritable: inflated self-esteem or grandiosity, decreased need for sleep, more talkative than usual, flight of ideas, distractibility, and excessive involvement in activities that have a high potential for painful consequences (American Psychiatric Association, 2013). The episode must be associated with a change in function that is uncharacteristic of the individual, meaning,

the disturbance in mood and change of functioning must be observable by others; the episode is not severe enough to cause marked impairment of social or occupational functioning or to require hospitalization (during a hypomanic phase), and the episode is not related to a substance such as treatment or a drug (American Psychiatric Association, 2013). Altered brain structures also appear to contribute to bipolar disorder.

Bipolar disorder not otherwise specified is a common diagnosis in an acute setting. Bipolar disorder not otherwise specified is given to disorders that do not meet the standards for defined bipolar disorders (Perese, 2012). The clinician may not have a substantial enough history or the patient may be unable or unwilling to provide adequate information. There are times when bipolar disorder is present, but it is unable to be determined if it is bipolar I or bipolar II or if the condition is related to a medical condition or substance (American Psychiatric Association, 2000). The American Psychiatric Association (2013) further clarifies unspecified bipolar disorder by clarifying it causes clinically significant distress or impairment in social, occupational, or other areas of functioning, but, again, can't be attributed to any other defined bipolar disorder.

Bipolar disorders are multifactorial diseases that are attributed to many different causes. Most experts agree that no one factor is likely to cause bipolar disorder; rather, cause is commonly based on three factors: genetic high risk, environmental high risk, and peripheral biomarkers (Brietzke et al., 2012). Bipolar disorder is found equally in men and women, with men being more prone to manic episodes while women are more prone to depressive episodes (Perese, 2012). The peak onset of first symptoms of bipolar disorder usually occurs between the ages of 15 and 19 years old (Bauer & Pfennig, 2005).

North and Yutzy (2010) discuss that the average age of onset for bipolar disorder is in the third decade of life. It is also known that children with bipolar disorder, who have parents with bipolar disorder, developed symptoms five years earlier than their parents.

Childhood abuse and trauma are also associated with an increased risk for developing bipolar disorder (Stahl, 2013). Other factors associated with developing bipolar disorder are the use of drugs, alcohol, stressful events, and a lack of sleep (Duckworth, 2008). Higgins and George (2013) identify that individuals with bipolar disorder were found to have reduced gray matter in the prefrontal cortex. While the potential causes of bipolar disorder are vast, the impacts on its diminished quality of life are not. There is a definite alteration of functioning in the brain in one with bipolar disorder.

Similar to depression, the symptoms of mania can be associated with an alteration of circuits in the brain and affect monoamines: serotonin, norepinephrine, and dopamine (Stahl, 2013). Increased activity of the amygdala is found in manic episodes of those with bipolar disorders (Maletic & Raison, 2014). The amygdala was also found to be enlarged in patients with bipolar disorder (Higgins & George, 2013). Decreased BDNF, increased cortisol production, and atrophy of the hippocampal area of the brain are also thought to be prominent in bipolar disorder. It is also thought that abnormalities of the endocrine system can contribute to the cause of bipolar disorder. One of the most common endocrine disorders linked to mania is hyperthyroidism, while hypothyroidism is linked to the depressive side of the disorder (Perese, 2012). Cushing's disease has also been associated with bipolar disorder. In Cushing's disease, the adrenal gland secretes

excessive cortisol, which can contribute to a labile mood, depression, elevated mood, and psychotic symptoms (Price, Goetz, & Lovell, 2010).

The treatment of bipolar disorder is complex because, oftentimes, both depression and mania require treatment. Approximately 40% of those diagnosed with bipolar disorder meet criteria for both depressive and manic features, otherwise known as mixed episodes (North and Yutzy, 2010). Other sources provide similar statistics. In a study of 2308 patients with bipolar disorder, major depression was found in 54%, mania in 22%, and mixed episode in 24% (Kupfer et al., 2002). Unfortunately, incorrect treatment can worsen the course of bipolar disorder. Certain classes of antidepressants, such as SSRIs, can induce a manic state in a person with bipolar disorder (Stahl, 2013). The most effective medications for treating bipolar disorder need to be capable of treating both depressive and manic phases of the disorder. The two drugs that are perhaps the most capable of providing a balanced treatment for bipolar disorder are lithium and valproate (Post, 2016). For patients who are prone to relapse, the addition of another drug, such as risperidone or quetiapine, may be necessary (Post, 2016). Other treatments, such as ECTs and psychotherapy, have also been found to be effective (Perese, 2012).

Bipolar disorders affect individuals' functioning in many areas, including parenting, occupation, social, financial management, and the maintenance of personal safety (Perese, 2012). Like the other diagnoses mentioned, bipolar disorder is a lifelong disease that requires treatment compliance. Bipolar disorder is a complex and chronic brain disease that encompasses many dimensions, including hyperactivity, impulsivity, depression-anxiety, psychosis, irritability, and grandiosity (Lin, Kuo, Liu, Huang, &

Chen, 2009). Lin and colleagues (2009) found the readmission rate for patients with bipolar disorder was 50.2%. Vigod et al. (2015) also found that 15.9% of these with a bipolar disorder were readmitted within 30 days.

### Schizophrenia and Other Psychotic Disorders

Schizophrenia is a severe mental disorder that typically onsets in adolescence and young adulthood that has chronic features (Mestdagh & Hansen, 2014). Perese (2012) describes schizophrenia as the most chronic and disabling of the severe mental disorders, causing psychotic symptoms, social withdrawal, and bizarre behavior that affect multiple areas of functioning. These symptoms explain why schizophrenia results in hospitalization and frequent readmission. Schizophrenia frequently develops in three stages. The first phase, known as the prodromal phase, may take place over several months to years with the most common changes being subtle, such as the withdrawal from social activities, less affect or emotion, and strange to unusual thinking (Tusaie & Fitzpatrick, 2013). Tusaie and Fitzpatrick (2013) next describe the second phase as active: this is when the individual begins to present the classical signs of schizophrenia such as hallucinations, delusions, and bizarre behaviors. The third and final phase is known as the residual phase and stage when one is actively being treated with therapy and medications. In the residual phase there are some impairments that are generally seen as the negative symptoms of schizophrenia, or a reduction of the positive symptoms (Tusaie & Fitzpatrick, 2013).

Individuals diagnosed with schizophrenia generally present with positive or negative symptoms and sometimes both. Positive symptoms of schizophrenia are

dramatic, evident, and are what is often described a psychotic break from reality. Positive symptoms consist of delusions, hallucinations, distortions or exaggerations in language and communication, disorganized speech, disorganized behavior, catatonic behavior, and agitation (Fischer and Buchanan, 2016). The positive symptoms in schizophrenia are thought to be related to the mesolimbic pathway. The theory is that there is too much dopamine going through the mesolimbic pathway, which causes or contributes to the positive symptoms of schizophrenia (Stahl, 2013). Many of the drugs used to treat schizophrenia are dopamine antagonists, which reduce dopamine levels in the brain. The negative symptoms of schizophrenia are more subtle, but often just as impairing as the positive symptoms. The negative symptoms of schizophrenia consist of blunted affect, emotional withdrawal, poor rapport, passivity, apathetic social withdrawal, difficulty with abstract thinking, alogia, avolition, anhedonia, and attentional impairment (Fischer & Buchanan, 2016). The negative symptoms of schizophrenia are thought to be associated with the mesocortical pathway. The belief here is that there is a lack of dopamine to stimulate the mesocortical pathway, which leads to the negative symptoms of schizophrenia. Ironically, many dopamine antagonists that are used to treat positive symptoms of schizophrenia may make the negative symptoms of schizophrenia more prominent. The three forms of schizophrenia, or psychosis, most commonly seen at the “healthcare organization” during readmissions are schizophrenia, schizoaffective disorders, and other specified schizophrenia spectrum psychotic disorder.

Schizophrenia is a psychotic disorder that must last at least six months and display positive symptoms (Perese, 2012). The American Psychiatric Association (2013)

discusses that, in order to diagnose one with schizophrenia, certain criteria must be present: delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, and negative symptoms. A patient must display at least two of the above criteria for a significant portion of the time for one month and at least one of the criteria must include delusions, hallucinations, or disorganized speech. For a significant portion of time since the disturbance, the level of functioning in occupation, self-care, or interpersonal relations has become impaired (American Psychiatric Association, 2013). Schizoaffective disorder, depression with psychotic features, and bipolar disorder must be ruled out.

Schizoaffective disorder is diagnosed when mood symptoms (depression, bipolar) co-occur with psychotic symptoms (Perese, 2012). Schizoaffective disorder has many similarities to schizophrenia. The American Psychiatric Association (2013) specifies that schizoaffective disorder, like schizophrenia, includes at least two of the following symptoms: delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, and negative symptoms. Again, at least one of the symptoms must contain delusions, hallucinations, or disorganized speech. The delusions or hallucinations must occur for two or more weeks in the absence of depression or mania during the duration of the illness (American Psychiatric Association, 2013). There must also be symptoms for a mood disorder for the majority or total duration during the active and residual portions of the illness. The illness must not be attributed to the effects of a substance, such as a treatment or medication, and must also not be related to another medical condition (American Psychiatric Association, 2013).

Other specified schizophrenia spectrum and other psychotic disorders are also common in an acute setting and do frequently require readmission. While psychotic symptoms are the cardinal sign for schizophrenia, many other physical and psychiatric disorders can also cause psychotic symptoms (Perese, 2012). The American Psychiatric Association (2013) identifies that criteria for other specified schizophrenia spectrum and other psychotic disorder, an individual must display: persistent auditory or visual hallucinations, delusions with significant overlapping mood episodes, attenuated psychosis syndrome, or delusional behavior. Self-deficit in personal and occupational activities may also be present. Other specified schizophrenia spectrum and other psychotic disorder are also frequently diagnosed in the ED because the provider may not have enough information to make a more specific diagnosis.

Schizophrenia is treatable with medications. Unfortunately, these medications have numerous side-effects that can make them undesirable to take. Research shows that discontinuation or non-adherence to medication treatment combined with previous psychiatric hospitalizations are the strongest predictors to readmission in the schizophrenia population (Boaz, 2013). Only a third of patients diagnosed with schizophrenia are fully compliant with treatment while another third are only partially compliant with treatment (Samalin, Blanc, & Llorca, 2010). This amounts to a large portion of patients diagnosed with schizophrenia not receiving proper treatment. Making matters worse is that a relapse in treatment generally leads to a relapse in psychotic features and progression of the disease (Emsley, Oosthuizen, Koen, Niehaus, & Martinez, 2013). Just as significant, poor compliance with treatment leads to frequent

hospitalizations. Of all mental health diagnoses, schizophrenia has among the highest readmission rates. Non-adherence with agreed treatment is among the most prominently expressed risk factors associated with early readmission (Mgutshini, 2010).

Schizophrenia is a multifactorial disease that has multiple potential causes. There is no one single diagnostic feature of schizophrenia, and symptoms widely vary amongst the approximately 2.2 million people in the United States diagnosed with schizophrenia (Perese, 2012). Schizophrenia occurs throughout the world with an incidence of about 1%, and slightly more males are diagnosed than females, with the women being diagnosed later in life than men (Fischer and Buchanan, 2016). Fischer and Buchanan further discuss that some risks for schizophrenia are drug use, difficult childbirth, living in an urban area, advanced paternal age of conception, having a family member with schizophrenia, having an autoimmune disease, birth during the late winter or early spring, and being under stressful conditions. Altered brain structure may also contribute to schizophrenia. Postmortem brains of patients with schizophrenia show decreased brain tissue in the temporal lobe and some of its structures (North & Yutzy, 2010).

Schizophrenia does not affect a specific brain area, but rather represents a dysfunction of circuits in the brain, which represents a neurodevelopmental disruption (Higgins & George, 2013).

Chi et al. (2016) identifies 60-70% of patients diagnosed with schizophrenia, who are under treated, relapse within one year. The study further showed that 70.5% of the experimental group was readmitted within ten years. In another study, 60.2% of patients with schizophrenia and psychosis were readmitted to a psychiatric hospital within 12

months (Zhang, Harvey, & Andrew, 2011). Hodgson, Lewis, and Boardman (2001) conducted yet another study that showed 42% of patients diagnosed with schizophrenia and 49% of patients with psychosis were readmitted to a psychiatric hospital within a six-year period. Evidence also shows multiple hospitalizations of patients diagnosed with schizophrenia do not necessarily translate into good health. In fact, persons with schizophrenia have over three times the mortality rate in respiratory disease and diabetes than that of the general population (Miller, et al., 2012).

### Substance Abuse

Addiction is a chronic or relapsing condition for many patients, lasting several years after a diagnosis is made (McKay, 2016) Substance abuse is commonly associated with psychiatric disorders such as depression, bi-polar disorder, and schizophrenia (Perese, 2012). Many individuals are cross-addicted to more than one substance and may have one or more psychiatric diagnosis (American Psychiatric Association, 2000). Substance abuse is also a common cause for readmission to hospitals. Many studies have found that 40% to 60% of patients treated for alcohol and other drug dependence disorders return to regular use within a year (McKay, 2016). One of the reasons for a high relapse rate is the lack of outpatient services. A large service gap in the care for substance abuse disorders is getting patients to a treatment or rehabilitation center after detox (Spear, 2014). Another reason for the lack of services is that the overburdened U.S. healthcare system is not producing enough new providers to keep up with current needs (Perese, 2012). One of the most commonly abused substances is alcohol. Alcohol

dependence is also chronic and is a relapsing disorder that leads to frequent readmission to inpatient facilities (Van den Berg, Van den Brink, Kist, Hermes, & Kok, 2015).

Substance abuse is a disorder that affects a wide variety of the population. Many of those with a substance abuse disorder also have a psychiatric disorder, which is also known as co-occurring disorder (COD) (Perese, 2012). Perese (2012) identifies that individuals with COD are more likely to be male, younger, less stable, unemployed, and diagnosed with at least one psychiatric disorder. Those that do develop substance abuse disorders typically begin using at a younger age. Many factors influence substance abuse disorders, such as culture, gender, individual personal resilience, genetic vulnerabilities, and personal stressors (Wheeler, 2014). Wheeler (2014) also dissertates that 15% to 20% of users develop frequent use of alcohol or drugs like marijuana and cocaine to cope with stress. Research has continued to observe that individuals with a family history of alcoholism and/or drug addiction have an increased chance of becoming addicted (Tusaie & Fitzpatrick). Neurological, metabolic, and psychosocial causes have been suspected of contributing to substance abuse (Tusaie & Fitzpatrick, 2013). There are numerous causes for addiction that lead to questioning the neurobiological causes for the disorder.

There are various theories for the causes of addiction with a majority of them focusing on dopamine. Dopamine is a neurotransmitter that is essential to feelings of wellbeing and joy (Tusaie & Fitzpatrick, 2013). All drugs that lead to addiction cause an increase of dopamine in the ventral striatum, which is also called the nucleus accumbens (Stahl, 2013). Craving and obsession also play crucial roles in substance abuse and addiction. The prefrontal cortex (PFC) has a direct relationship with craving and

obsession, and functional imaging studies show enhanced PFC activity in addicts (Higgins & George, 2013). Impulsivity and compulsivity tie into the PFC and dysfunction of the brain. Impulsivity is defined as acting without forethought and compulsivity is defined as actions inappropriate to the situation, but nonetheless continue to persist. Stahl (2013) describes impulsivity and compulsivity as drives that come from bottom up, tying into the ventral striatum. Stahl (2013) further discusses that the PFC is supposed to suppress the bottom-up drive of impulsivity and compulsion with a top-down drive suppressor. In addictions, it is theorized that the top-down suppressor is dysfunctional.

Addiction is defined as a behavioral pattern of drug use characterized by an overwhelming need to use a drug, secure its supply, and a high tendency to relapse after discontinuation (Stahl, 2013). Tusaie and Fitzpatrick (2013) further define addiction disorder as the inability to stop using a substance or engaging in a behavior in spite of the negative consequences. Addiction can be broken down into two separate realms. The first is known as physical dependence in which the user, after repeated administrations, experiences physical withdrawals after the particular drug of abuse is removed (North & Yutzy, 2010). Physical addiction is eventually accompanied by physical tolerance. Stahl (2013) defines tolerance as the phenomenon in which repeated administration of the given dose of a substance produces a decreased effect causing the user to take larger doses to obtain the effects seen with the original use. The good news about physical withdrawal is that it is usually short-lived and, with medical treatment, has a good prognosis. The second type of addiction is psychological. Psychological addiction is

defined as a behavior pattern including compulsions characterized by the overwhelming involvement with the use of a drug or substance (North & Yutzy, 2010). Psychological addiction can take years to overcome.

The American Psychiatric Association (2013) categorizes alcohol, cannabis, and stimulant-related use disorder as a problematic pattern of substance use causing a significant amount of stress within a 12-month period accompanied by two of the following: substance is taken over a longer period than was intended, persistent and unsuccessful attempts to cut down or control substance use, a great deal of time is spent obtaining the substance, using the substance, and recovering from the effects of the substance, craving or strong desire to use the substance, substance use results in failure to fulfill major role obligations, continued substance use despite negative consequences, important social, occupational, or recreational activities are given up or reduced because of substance use, substance abuse continues when it is physically hazardous, substance use continues despite the knowledge that it is causing persistent physical and psychological problems, an increased tolerance develops, and the user will go into withdrawal if the substance use is abruptly stopped. In an acute setting, it may be difficult for a clinician to develop an accurate diagnosis. Therefore, a urine drug screen is often used to identify any drugs that have been used.

There are many types of treatment for substance abuse disorders. The four most common methods of treatment for substance abuse are inpatient treatment centers, psychotherapy, medications, and self-help groups. However, an important aspect to consider is the intensity of care the individual will require. The intensity of care is based

on the patient's substance abuse disorder, risk of relapse, and willingness to participate in treatment (McKay, 2016). McKay (2016) discusses that low-intensity patients may only require monitoring, while high-intensity patients require inpatient treatment to address withdrawal, intensive outpatient treatment three times per week for one to two months, outpatient treatment one to two times per week for an additional four to six months, and then monthly check-ins for an additional six months. Spear (2014) identifies that 50.5% of patients were readmitted after only being provided detox services while patients that received both detox and outpatient services had an 8.8% admission rate. Treatment for patients with a COD contains phases of recovery in an integrated treatment program. The first phase is acute stabilization, the second phase is engagement and motivational enhancement, the third phase is active treatment to maintain stabilization, and the fourth stage is rehabilitation and recovery (Perese, 2012). Regardless whether the patient has a substance abuse disorder or a COD, the patient must have a genuine desire to make a recovery before any kind of treatment can be successful.

Substance abuse is a common cause for readmission to a psychiatric hospital. Like the other disorders mentioned, substance abuse is a chronic disorder that can lead to psychiatric hospitalization (Zhang et al., 2011). It is estimated that 47% to 86% of individuals diagnosed with a psychiatric disorder also have a substance abuse disorder (Perese, 2012). Zhang et al. (2011) also reported that those that misused alcohol had multiple previous admissions. Patient-level factors associated with readmissions show alcohol as the primary drug problem (Spear, 2014). Hodgson et al. (2001) found that those abusing alcohol and drugs had a readmission rate of 29.6% during the study period.

In a recent study of older alcohol-dependent inpatients, it was found that 50.8% were readmitted to inpatient care within one year (Van den Burg et al., 2015). There is also evidence that shows the abuse of stimulants, such as amphetamine and methamphetamine, may lead to readmission. Psychosis induced by the use of amphetamine or methamphetamine does cause dramatic symptoms that lead to readmission (Medhus, 2013). Medhus et al. (2013) also found that, of the 285 patients being readmitted to a psychiatric hospital, 13% (or 37) of them tested positive for methamphetamine. Marijuana use can also be indirectly connected to readmission. There is extensive evidence showing that patients with schizophrenia who smoked marijuana have an earlier age of onset and, when marijuana use is continued after developing schizophrenia, outcomes are significantly worsened (Delisi & Wolfgang, 2015). Vigod et al. (2015) provide evidence that shows 34.4% of persons abusing substances were readmitted within 30 days.

#### Treatment Failures Leading to Readmission

There are many treatment options for those with mood disorders, schizophrenia, and substance abuse and yet those in these categories continue to be readmitted to inpatient care. There are many reasons for continued readmission for these groups. The first is that the patients in these categories are very sick and may not be able to take care of themselves, let alone participate in treatment. Successful treatment and goal attainment requires a collaborative effort between the provider and the patient (King, 1981). As previously discussed, treatments for mood disorders, schizophrenia, and bipolar disorders

are medications, ECTs, and psychotherapy. While all of them can be helpful, they do have limitations.

Medications have served a vital role treating patients in psychiatry. They have been used in depression since the 1950s. While TCAs have been shown to treat treatment-resistant depression, they have many unpleasant side effects. In cases for treatment-resistant depression, TCAs, such as amitriptyline, are used with success (Hirsch & Birnbaum, 2016). Amitriptyline comes with many unpleasant side effects, including sexual dysfunction, weight gain, and drowsiness (Stahl, 2014). Amitriptyline, along with all other TCAs, can be fatal in an overdose. MAOIs are also effective alternative medications for depression, but can cause fatal cardiovascular reactions if tyramine is ingested (Simon & Ciechanowski, 2016). While lithium and valproate are excellent choices for treatment for bipolar disorders, they do come with some drawbacks. These drugs require frequent monitoring of drug levels that needs to be done by lab draw throughout treatment. They also can be harmful to the fetus, have numerous side effects, and can be harmful or fatal if drug levels get too high (Stahl, 2014). Frequent lab monitoring can be costly for a patient without insurance. Some patients with bipolar disorder are transient and may not stay in an area where they are able to provide labs regularly. Medications that treat schizophrenia are referred to as antipsychotics. In many cases, they effectively treat schizophrenia, but cause many unfortunate side effects. Some of the older medications known as typical antipsychotics come with side effects such as sedation, extrapyramidal side effects (EPS), weight gain, and tachycardia (Stahl, 2014). The newer atypical antipsychotics, while rarely causing EPS such as TD, may cause

significant weight gain, hyperlipidemia, and diabetes (Stahl, 2013). These side effects do discourage medication adherence.

While there is treatment available for those with COD, the course is often difficult. Perese (2012) notes that caring for patients with COD offers among the most clinically challenging clinical situations that will confront a psychiatric advanced practice nurse. Because COD includes both a substance-use disorder and a psychiatric disorder, there is much debate on how to treat it. There is little debate that those with a substance-abuse disorder should be placed in a treatment program. The placement of patients into a substance-abuse treatment facility is complicated by limited availability, medical insurance, and having a COD (Spear, 2014). Psychotherapy and medications have also been proven to be effective in patients with a substance-abuse disorder (Mckay, 2016). The problems with psychotherapy are being able to commit the time to it and the high cost of the treatment. Medications, like disulfiram, can be helpful in alcohol dependence, but do require labs and also require that the patient take it daily (Stahl, 2014). Unfortunately, when patients with COD abuse substances, their symptoms often increase, which leads to hospitalization (Perese, 2012).

ECTs have been used in psychiatry since the 1930s and work by inducing a seizure. While ECTs have been shown to be effective, they do have their limitations. One limitation is the inability to determine how many ECT treatments one will need in order to experience a remission in symptoms (Kelner, 2016). One patient may require six treatments while another could require 20. Kelner (2016) also discusses that patients with coronary heart disease may be at risk for cardiac ischemic events because the seizure

increases cardiac workload and oxygen demand. There are also some transient cognitive effects, such as amnesia, that follow ECT treatment. Some evidence suggests that ECTs may not effectively reduce readmission. One study examined 122 patients after ECT treatments and found that 36% of them were readmitted within six months. ECTs are also not very popular and it can be very difficult for a patient to find a provider that utilizes them. ECTs require the assistance of an anesthesiologist, a psychiatrist, and specialized nursing staff, which makes them expensive. It is essential to remember that adults aged 18-64 with psychological distress have a medically uninsured rate of 30.4% (Weissman et al., 2015).

Psychotherapy has been used in psychiatric treatment with success over the years. Lebow (2016) describes psychotherapy as an interpersonal treatment based on psychological principles that is individualized to the patient, helping with a psychiatric disorder, problem, or adverse circumstance. Psychotherapy can be extensive and require many visits. Therapists in the Yellowstone County area charge \$150 per session. This can be quite costly if one does not have medical insurance or lacks steady employment. There is also evidence showing that psychotherapy may have a limited impact on readmission. In a study examining readmission after 90 days among patients taking antidepressants and receiving psychotherapy, there was no decrease among readmission rates (Pfeiffer et al., 2012).

### Readmission Screening Tools

Screening tools that examined psychiatric readmissions alone were sparse. Ultimately, three tools that assessed hospital readmissions were identified from the available, published literature examined. The 8P Screening tool and the LACE tool examine readmissions in hospitals. These two tools would be appropriate for patients being readmitted to both medical and psychiatric hospitals. The READMIT tool was the third examined. The READMIT tool is designed exclusively for patients that are readmitted to a psychiatric hospital. The 8P Screening tool, the LACE tool, and the READMIT tool all have value and are in use.

#### The 8P Screening Tool

The 8P Screening tool was designed by the Society of Hospital Medicine as part of project Boost. The intent was to identify and understand a patient's risk for adverse events after hospital discharge that would be potential causes for readmission (Society of Hospital Medicine, 2016). The risk for readmission was divided into eight risk factors (The 8P Screening tool) that were determined to be common causes for readmission. The first risk factor is problems with medications. It was determined that patients with polypharmacy, those taking more than ten routine medications, or those that were on high-risk medications, such as warfarin, heparin, insulin, oral hypoglycemics, digoxin, and narcotics, were most at risk for readmission. The second risk factor was psychological. Patients that were positive for depression or had history of depression were more likely to be readmitted. Those that have anxiety and substance abuse are also

included in this category. The third risk factor is principle diagnosis. Patients that were diagnosed with cancer, stroke, diabetic complications, COPD, or heart failure had an increased risk for readmission. The fourth risk factor was physical limitations. Patients that have difficulty with mobility, ADLs, and falls are more likely to be readmitted. The fifth risk factor is poor health literacy. Patients having a poor understanding of diagnosis and plan of care are more likely to be readmitted. The sixth risk factor is poor social support. Patients that live alone or don't have access to a care giver are more likely to be readmitted. The seventh risk factor is prior hospitalization. Patients that have had unplanned hospitalizations within the last six months were more likely to be readmitted. The eighth risk factor is palliative care. Patients that are likely to die within a year or have an advanced or progressive illness are more likely to be readmitted.

The 8P Screening tool consists of the eight factors listed. Each section that a patient is positive for makes them more likely for readmission. The 8P Screening tool is designed to identify those most at risk for readmission so that treatment and options can be utilized that will reduce the likeliness of readmission. One of the weaknesses of the 8P Screening tool is that it is based on a risk identification system rather than a risk score (Alper, O'Mailey, & Greenwald, 2016). There were also no studies available on the 8P Screening tool. The only information about this tool is given by the company that implemented it.

### The LACE Tool

The LACE tool was designed by the University of Ottawa and the University of Calgary. The LACE tool is implemented to identify patients at risk for early death or unplanned readmission after discharge from a hospital (Science News, 2010). The LACE tool is divided into four sections. The first section is Length of Stay. The more days that a patient spends in the hospital, the more likely readmission will occur. The second section is Acuity of Admission. The more sick a patient is, the more likely readmission will occur. The third section is Comorbidities. Comorbidities vary on a point scale. For example, a patient with a previous myocardial infarction scores a +1 while a patient with a metastatic solid tumor scores a +6. The higher the comorbidity score, the more likely readmission will occur. The fourth section is Emergency Department Visits. The more visits to the ED that a patient has during a six-month period increase the chance for readmission.

The LACE tool is based on a points system. Each section has the potential for a patient to score points. Points are added for a total in each of the four sections. Patients that score ten or more points are deemed at high risk for readmission. The LACE tool was designed to identify patients most at risk for premature death or readmission so treatment could begin to address these issues (Science Daily, 2010). The LACE tool's weaknesses are that it does not specifically address any psychiatric issues and the length of stay cannot be calculated accurately until the last day of hospitalization, limiting its real-time use (Alper et al., 2016).

Both the 8P Screening tool and the LACE tool are used by hospitals across the nation to help predict the likeliness of readmission. UpToDate discusses that, while no tool will be perfectly accurate, the 8P Screening tool and the LACE tool are able to provide fairly accurate information on those more likely to be readmitted (Alper et al., 2016). Though both tools use different methods to get information, they do agree on one key point. If a patient has been previously admitted to the hospital for an unplanned stay, there is an increased chance for readmission. While both the 8P Screening tool and the LACE tool do have their strengths, they were not selected for study in this project. Both instruments emphasize medical problems.

#### The READMIT Tool

The READMIT tool (See Appendix A) is an instrument designed to determine the probability of readmission to a psychiatric hospital within 30 days. To date, the READMIT tool is the only instrument that provides a method to quantify risk assessment for readmission at the patient level for general psychiatric inpatients (Bender, 2015). Dr. Simone Vigod, a psychiatrist, spearheaded a team that designed the READMIT tool. Dr. Vigod discussed that the goal was to design a tool for clinicians to identify patients at risk for readmission after being discharged from a psychiatric hospital (Vigod et al., 2015). An essential part of creating the READMIT tool was to make it user friendly. The aim was to create a tool that was practical for clinicians to use in multiple jurisdictions by using routinely collected information (Bender, 2015).

The READMIT tool does share some of the same features as the LACE and 8P assessment tools. For instance, all three tools indicate that previous unplanned admissions

and acuity of illness on initial admission to a hospital are good indicators for readmission. There are further examples where the READMIT tool has similarities to either the 8P assessment or LACE tool. The READMIT and 8P assessment tool both include psychological factors of depression and substance abuse as flags for increased risk for readmission. The LACE and READMIT tools both have recent visits to the ED and medical comorbidities as risks for readmission. Like the LACE tool, the READMIT tool is also based on a point system with a higher number indicating an increased risk for readmission. It is important from an evidence standpoint that the READMIT, LACE, and 8P assessment tools do incorporate some of the same assessments into screening for readmissions to hospitals. The similarities strengthen and solidify the READMIT tool. The READMIT tool separates itself from the LACE and 8P assessment tools in that it is much more specific to psychiatric patients.

The READMIT tool is divided into seven sections that assess a patient for readmission to a psychiatric hospital. The R section examines repeat admissions. The more previous admissions a patient has had to a psychiatric hospital, the greater the risk for readmission. The E section examines emergent admissions. Patients that are a threat to themselves, others, or are unable to take care of themselves are at a greater risk for readmission. The A section examines the age of the patient on admission. The younger the age group when first admitted to a psychiatric hospital correlates with a greater risk for readmission. The D section examines the primary diagnosis on admission. Patients diagnosed with depression, bipolar disorder, or psychosis all represent an increased risk for readmission. The M section examines medical comorbidity upon admission. The

more medical comorbidities a patient has increases the risk for readmission. The I section examines the intensity of care a patient has received in the past year. The more a patient utilizes outpatient and ED services, the higher their risk for readmission. The T section examines the time spent in the hospital. Patients that have longer hospital stays are also at increased risk for readmission.

Patients will have scores that range from zero to 41 that quantify risk of 30-day readmission after discharge (Vigod et al., 2015). Patients with a score of 0-3 fall into the low-risk category for readmission, those with a score of 4-6 are at a moderate risk for readmission, patients scoring a 7 or higher signal a high risk for readmission (Brooks, 2015). The evaluation of patient risk for readmission helps to apply interventions efficiently while identifying patients that would benefit most from them (Vigod et al., 2015). The ability to identify individuals at high risk for readmission is a crucial factor to help reduce avoidable and costly early psychiatric readmissions. Vigod et al. (2015) designed the READMIT tool to achieve three goals. The first was the READMIT tool could be used to flag at-risk individuals for additional assessment by inpatient or outpatient transitional care teams; the second was the READMIT tool could be used in a research setting to help identify target populations for transitional and post-discharge interventions designed to reduce early readmissions; the third was the READMIT tool could be used by hospitals and policy makers to organize resources for prevention of readmissions within the areas of greatest need.

Vigod et al.'s (2015) aim was to create a clinically useful risk index (READMIT tool) that would be administered prior to discharge to determine the possibility of

psychiatric readmission within 30 days of hospitalization for general psychiatric patients. To determine the validity of the READMIT tool, a population-based cohort study using sociodemographic and health administrative data was implemented. The study was conducted among individuals who were discharged from acute-care, psychiatric units from 2008 to 2011 in Ontario, Canada. During this period, the READMIT tool was used retroactively to examine 32,749 individuals. All subjects were aged 18 or older, half the cohort was female, the average age of admission was 44 years, 89% lived in urban areas, and one-quarter of the cohort was employed at the time of admission. Of this group, 3022 were readmitted to an acute-care, psychiatric unit within 30 days. The expected probability using the READMIT tool was 2% at a score of 0 and 49% at a score of 41. The performance of the READMIT tool was found to be moderate during this study.

In a pilot trial study, six social workers used the READMIT tool for one month at three adult, inpatient, psychiatric units examining 108 patients (Brooks, 2015). Of the patients, 30% were in a low-risk category, 33% were in the moderate-risk category, and 37% were in the high-risk category. The study found that there was a statistically significant ratio of patients readmitted to an acute psychiatric hospital by risk category. Within 60 days, 6.5% of the low-risk population, 8% of the moderate-risk, and 17.5% of high-risk patients were readmitted. Therefore, the READMIT tool was found to be effective in identifying readmissions based on level of patient risk (Brooks 2015; Vigod et al., 2015).

To date, these are the only two studies that have examined the READMIT tool. The READMIT tool is still new to identifying patients that are likely to be readmitted to

an acute psychiatric hospital. This factor was one of the reasons that the READMIT tool was chosen for this DNP project. Permission was obtained from Dr. Vigod to use the READMIT tool in the examination of data that will be conducted in this project.

Research from this study will be added to Dr. Vigod's data to help further determine the accuracy of the READMIT tool. The data also has the potential to make a significant contribution to psychiatry.

### Theoretical Model

King's Theory of Goal Attainment to answer the PICOT question, "In adults admitted to an inpatient psychiatric unit, how would the implementation of an evidence-based, screening readmission instrument in the emergency department, compared to the standard admission assessment currently being conducted, improve identification of those at risk for readmission during a six-month time-frame?" has been selected to guide this project. The selected theory is appropriate for this question because it centers on goal attainment. When individuals are readmitted to an inpatient psychiatric unit they are not achieving their goal of health. The nurse is also not meeting the goal of successfully treating the patient.

### Theory Identification

Imogene King's Theory of Goal Attainment has been chosen to guide this DNP project. King's Theory of Goal Attainment will provide the project with guidance and clarity. Nursing theory provides structure to nursing by defining the goals of nursing

actions and by providing a framework in which to implement interventions (Zaccagnini & White, 2014).

The Theory of Goal Attainment is a middle-range theory. Middle-range theories are best described as having a more narrow scope than a grand theory and are better suited to clinical practice (Masters, 2015). Though middle-range theories have a limited scope, they are used for nursing practice and to answer questions about specific phenomena (Havenga, Poggenoei, & Myburgh, 2014). The ultimate goal is to improve patients' mental health. Imogene King's Theory of Goal Attainment provides a vehicle to accomplish this task. "Clinical nurses, nurse researchers, and nurse administrators may learn much from King's focus on the nurse-client dyad as central to the attainment of goals" (Caceres, 2015, p. 155).

#### Theory of Goal Attainment Defined

King began to develop the Theory of Goal Attainment by asking questions. The immediate questions related to the scope of nursing practice, the setting that nurses performed their functions in, the dimensions of practice and nursing focus, and the current goals of nursing (Masters, 2015). This starting point led King to develop a conceptual framework. The components of King's conceptual system include personal, interpersonal, and social (Caceres, 2015). These components provide a gateway to several concepts. King (1991) describes concepts as representing ideals which help one understand how individuals interact with groups and environments. The goal of the interacting systems is overall health for the individual, family, community, and the world (King, 1995). Understanding interaction is an essential part of goal attainment.

King's Theory of Goal Attainment is founded on nursing process including the stages of assessment, diagnosis, planning, implementation, and evaluation (Caceres, 2015). This system allows the nurse to utilize the concepts in the Theory of Goal Attainment, which paves the way for the patient to attain the desired goal (Masters, 2015). Mutual goal setting is a standard that is used when the nurse and patient collaborate to set goals, explore means, and come to an agreement to attain goals (King, 1991). To ensure success, the patient is at the center of goal attainment and involved in every stage of the interaction-transactions process (Caceres, 2015).

#### Rationale for Theory Selection

King's description of the of the four metaparadigm concepts of person, environment, health, and nursing fits well with the nursing ideals and intended project. The person is described as the personal system that interacts with interpersonal and social systems (Masters, 2015). Each person is subject to their own needs and desires. Every person has a different set of goals and not all of these individuals want the same roles in life (Caceres, 2015). The Theory of Goal Attainment distances itself from the one-size-fits-all approach to healthcare, which the author finds favorable. The environment is broken up into both external and internal areas.

King (1981) describes the external environment as the place where human beings grow, develop, and perform daily activities. King (1981) further describes the internal environment as a place where human beings adapt to constant, external, environmental changes. The two environments are connected and must be viewed as parts of a whole to ensure successful treatment (Masters, 2015). King's description of health includes the

dynamic life experiences of a human being while adjusting to the stressors in both the external and internal environments through the use of one's resources to reach the utmost potential for daily living (King, 1981). Health of persons and communities remains the priority for nursing, though health and illness are as a linear continuum by King (Masters, 2015). King's definition of health is not overly specific as individuals have different perceptions of health. King describes the nursing metaparadigm concept as a continuous process of interaction to help the patient achieve desired goals (Masters, 2015). King further points out that, when transactions are made between the nurse and patient, goals are usually attained (King, 1981).

The Theory of Goal Attainment was also chosen because it relies so heavily on the nurse and patient working together collaboratively to achieve goals. King is precise when describing the nurse and patient relationship. The nurse is licensed to practice professional nursing and the patient is in need of services provided by the nurse (Masters, 2015). King (1991) further describes the relationship between the two as persons coming together in the healthcare system with each of them making mental judgments and engaging in a mental action. By engaging in this behavior, the nurse and patient define their roles. Once roles are defined, actions take place. When a nurse and patient have devised a way to achieve the desired goal, both then display behavior that helps the patient achieve goal attainment (King, 1981). Only through a collaborative effort can patient care be successful.

### How Theory Will Guide the Project

The PICOT question, “In adults admitted to an inpatient psychiatric unit, how would the implementation of an evidence-based screening readmission instrument in the emergency department, compared to the standard admission assessment currently being conducted, improve identification of those at risk for readmission during a 30-day time frame?” is treatment specific and requires a mid-range theory to test the hypothesis (Havenga et al., 2014). Mid-range theories are specific, consisting of fewer concepts, and can be tested in a clinical setting (Zaccagninni et al., 2014). The Theory of Goal Attainment will be used to assist the author in all aspects of the project.

The Theory of Goal Attainment will guide this project by helping to answer the READMIT tool’s validity. Evidence shows adults most likely to be readmitted to an inpatient psychiatric unit have a certain set of characteristics (Innes, Lewsey, & Smith, 2014). Patients that are single, female, in the 18-24 age group on first admission, are a threat to themselves and others, have alcohol and substance-abuse disorders, are diagnosed with schizophrenia or psychosis, are noncompliant with medications, have a longer hospital stay, are seeing an outpatient psychiatrist more than two times per year, and have medical morbidities have a higher probability for readmission (Vigod, Kurdyak, Seitz, Herrmann, Fung, Lin, Perlman, Taylor, Rochon, & Gruneir, 2015). During admission screening, special attention will be given to patients that present with the characteristics above. The components of the Theory of Goal Attainment will be used to establish a relationship with patients in the emergency department by interaction. Through this interaction, an interpersonal relationship will develop. “If nurses with

special knowledge and skills communicate appropriate information to clients, mutual goal setting and goal attainment will occur” (King, 1981, p. 149).

The Theory of Goal Attainment is in every phase of the DNP project. The chairperson and committee will be informed of the author’s choice to use the Theory of Goal Attainment to guide the DNP project. The components of the theory will help define the steps necessary to answer the author’s PICOT question.

### Component Identification

The components chosen for this project are related to mutual goal attainment. The nurse’s goal is the ability to identify those at high risk for readmission. The patient’s goal is to get the necessary treatment to obtain optimum health and thus avoid being readmitted to an inpatient psychiatric unit. “Concepts are each person’s abstractions of the environment. They represent the knowledge which helps one understand individuals interacting with groups in a variety of environments” (King, 1992, p. 19). The concepts are focused under the interpersonal system for this project. The interpersonal system solidifies the significance of the relationship between the nurse and the patient. The three concepts that will be used to guide this project are perception, interaction, and communication.

### Rationale for the Selection of Theory Components

The components selected from the Theory of Goal Attainment all enhance the transactions between the nurse and patient. Concept development and validation provide approaches to building nursing knowledge (King, 1987, p. 24). “The nurse is crucial to

transactions since King views goal attainment as the purpose for the nurse-client relationship” (Caceras, 2015, p. 153).

The first concept, perception, is a component that is a centerpiece of King’s notion of transactions, where exchange occurs between individuals in the environment (Caceres, 2015). Perception includes how the patient and nurse see one another. Masters (2015) points out that the patient has information about perceptions of the problem and, when shared with the nurse, it will lead to mutual goal setting.

Interaction is the process of persons exchanging information with each other and then experiencing perceptions of these encounters (King, 1981). Interaction is constant between a patient and nurse. For instance, when admitting a patient to an inpatient psychiatric unit, the psychiatric mental health nurse practitioner (PMH-NP) is interacting with the patient to identify any possible causes for readmission. “Transactions lead to goal attainment, and goal attainment is a measure of effective nursing care.” (Masters, 2015, pg 95). The nurse and patient are in one another’s presence interacting with the purpose to achieve goals (Masters, 2015).

Communication establishes relationships. It can be verbal or nonverbal, working by tying one another together (King, 1981). Communication occurs between the nurse and patient; nonverbal communication can be more telling than verbal communication. As nurses become more experienced, they become adept at assessments and are able to decide when their patient is functioning at the fullest potential (Caceres, 2015).

The three components above were selected because they are key elements in a nursing assessment. When done correctly, they overlap and are often used concurrently. No one component has more value than the other. They all assist in goal attainment.

### How the Selected Components Will Guide the Project

Perception will guide this project as it will be used to examine how the patient perceives health. What are the patient's expectations of the hospitalization? Is the patient being readmitted because the goal of health is not being attained? The DNP project is also going to use perception, according to the Theory of Goal Attainment, to compile the causes of adults being readmitted to an inpatient psychiatric unit. These perceptions, or causes for readmission, will be compiled in a screening tool. When the patient presents to the emergency department, the tool will be implemented. Determining the causes for readmission will allow for a more proactive treatment in patients at risk for readmission.

Communication will guide this project as it encourages a stronger relationship between the nurse and patient. For Instance, a DNP-PMHNP will investigate the chief complaint of the patient in the emergency department. Through this communication, information will be gathered, perceptions and concerns will be addressed, and trust will be established (Masters, 2015). Ultimately, communication will determine those most at risk for readmission.

Interaction will occur between the DNP-PMHNP, nurses, and the patients in the emergency department. Through these interactions, an accurate assessment will develop. By examining the potential causes for readmission, a determination can be made on which goals will best serve the patient's interests (Masters, 2015).

## CHAPTER THREE

## METHODS

Setting of Interest

The setting of interest for this pilot quality-improvement project was a hospital emergency department (ED) located in south-central Montana. This hospital offers inpatient psychiatric services for both adult and youth patients. Currently, the hospital has 32 inpatient beds assigned to adult patients and 12 beds assigned to youth patients. All patients who are admitted to the adult and youth psychiatric inpatient hospital are admitted through the ED.

Mental health clinicians in the ED evaluate adults and children for admission to the hospital's psychiatric inpatient units as part of the usual and customary care. Currently, there is no formalized assessment of adults or children as at-risk for readmission. Readmission is defined as returning to the inpatient unit within 30 days. Therefore, the focus of the pilot project was implementation of a readmission instrument developed to identify adults at risk for returning to the hospital for psychiatric inpatient care.

PICOT: In the ED, how would implementation of an evidence-based readmission screening instrument (READMIT) compared to the current standard psychiatric evaluation, improve identification of adults most likely to be readmitted within 30 days?

### Project Design

The original project design underwent changes at the request of one of the two, required, institutional review boards. Initially, the project was designed so that the DNP student, under the supervision of a psychiatric mental health nurse practitioner (PMHNP), would use the READMIT tool live in the emergency department during the course of the standard and customary psychiatric evaluation. Paperwork was submitted to the Montana State University Institutional Review Board (IRB) (See Appendix C) on 2/27/2017, and full approval was granted on 3/20/2017.

The “healthcare organization” IRB (See Appendix B) required that certain aspects of the project change so that full approval could be granted. On 6/09/17, the DNP student met with the “healthcare organization” IRB. The institutional review board had some concerns that needed to be addressed for the project to continue. The initial concern was that having individuals sign a consent form acknowledging that they were taking part in a quality-improvement project might add stress to a psychiatric crisis. To comply with this request, electronic medical records with waivers of patient consent was implemented. It was also a requirement that electronic medical records be accessed retrospectively and that they be at least one-year-old. It was also required to submit the changes in project to the Montana State University Institutional Review Board who approved the project changes on 6/06/2017. Once these changes were agreed to and met, project approval was granted on 8/14/2017.

In order to access electronic medical records from the “healthcare organization,” a data-use agreement had to be implemented and signed (See Appendix D). In addition to

the Montana State University and the “healthcare organization” institutional review board requirements, the “healthcare organization” data agreement specified that all electronic data be maintained and transmitted using encryption technology approved by the “healthcare organization,” and that the “healthcare organization” only be identified as a “healthcare organization in a western state.” Once the terms of the data agreement were agreed to, permission to collect data was granted on 9/06/17.

#### Participant Inclusion Criteria

The READMIT tool was implemented by using electronic medical records of individuals aged 18 years and older who were admitted to the psychiatric inpatient unit for adults from the emergency department. Participants for the study were selected by reviewing electronic medical records of individuals who were admitted to the psychiatric adult treatment unit through the emergency department. Individuals who were admitted voluntarily as well as involuntarily were included in the project. Those adults included in the project were diagnosed as having a psychiatric disorder that caused them to be admitted to the adult inpatient psychiatric treatment unit.

#### Participant Exclusion Criteria

Those patients less than 18 years of age were not eligible for this project. Adults who were screened for having a psychiatric disorder or personality disorder, and not admitted to the hospital’s inpatient psychiatric unit, were excluded. Adults who were admitted to the psychiatric inpatient adult unit within one year of 9/07/17 (the date on

which data collection began), were also excluded to meet the requirements of the “healthcare organization” Institutional Review Board.

### The READMIT Tool

The READMIT tool was designed to predict readmission to an acute psychiatric hospital within 30 days. The READMIT tool was developed in 2014 by Dr. Simone Vigod and her team. The READMIT tool was used in a study of 65,499 individuals with reasonable accuracy. The variables independently associated with readmission were: (R) Repeat admissions; (E) Emergent admissions (harm to self or others); (D) Diagnoses (psychosis, bipolar, and/or personality disorder), and unplanned discharge; (M) Medical comorbidity; (I) prior service use or Intensity; and (T) time in hospital (Vigod et al., 2015). The READMIT tool is based on a score system that ranges from 0-41. In theory, the higher the score, the greater the chance for readmission to an acute psychiatric hospital within 30 days.

### Data Analysis

Data were analyzed using the Statistical Package for the Social Science R version 3.4.1 with the assistance of the Montana State University Statistics Department. Data were collected using a retrospective review of 50 electronic medical records (EMRs) that were at least one year old. The data were collected on the retrospective dates of 06/24/17, 7/01/17, and 7/08/17. The dates were selected close together so that treatments, providers, and care would be relatively similar, thus having less of a chance to skew the data. The

sociodemographic data collected included participant's age, education level, marital status, lifetime admissions to an acute psychiatric hospital, outpatient mental health visits within one year, emergency mental health visits within one year, Charlson score (mortality for a patient who may have a range of comorbid conditions), threat to self, threat to others, unable to care for self, primary diagnosis, personality disorder, planned and regular discharge, length of stay, stressful life events, positive symptoms scale, negative symptoms scale, aggressive behavior scale, self-care capacity, interpersonal conflict capacity, and control interventions capacity.

## CHAPTER FOUR

## OUTCOMES

Charts of 50 patients were retrospectively examined from patients admitted to the “healthcare organization” inpatient psychiatric unit. Each of the 50 patient charts was examined and each was given its own separate score generated by the READMIT tool. The READMIT tool was developed so a higher score indicates a higher probability of being readmitted to a psychiatric hospital within 30 days. The primary response variable implemented a 1 to represent a readmitted patient and a 0 to represent a patient that was not readmitted within 30 days. The primary predictor of interest is the READMIT score and its correlation with readmission to a psychiatric hospital within 30 days. Other covariates considered for this study were diagnosis, age, and gender. These covariates were accounted for in the index and will be considered for the model to validate that the index is indeed accounting for these factors.

Results

The 50 observations of patient charts that were collected using the READMIT scores ranged from 11 to 31, which makes it difficult to assess the quality of index scores that are outside of this range. Of the 50 patients examined for this study, 14 (28%) of them were readmitted within 30 days. The mean READMIT score for patients that were readmitted was 23.21 compared with a mean of 17.78 for the group of patients that were not readmitted. Using an equal variance two-sample, t-test showed that the means of

these groups were different with a p-value of .00025. We were able to determine, with 95% confidence, that the true mean READMIT score of the group readmitted is between 2.67 and 8.20 points higher than the true mean of the group not readmitted. A boxplot of the READMIT score for patients that were readmitted versus those that were not does show patients that were readmitted generally have a higher score than those that were not readmitted.

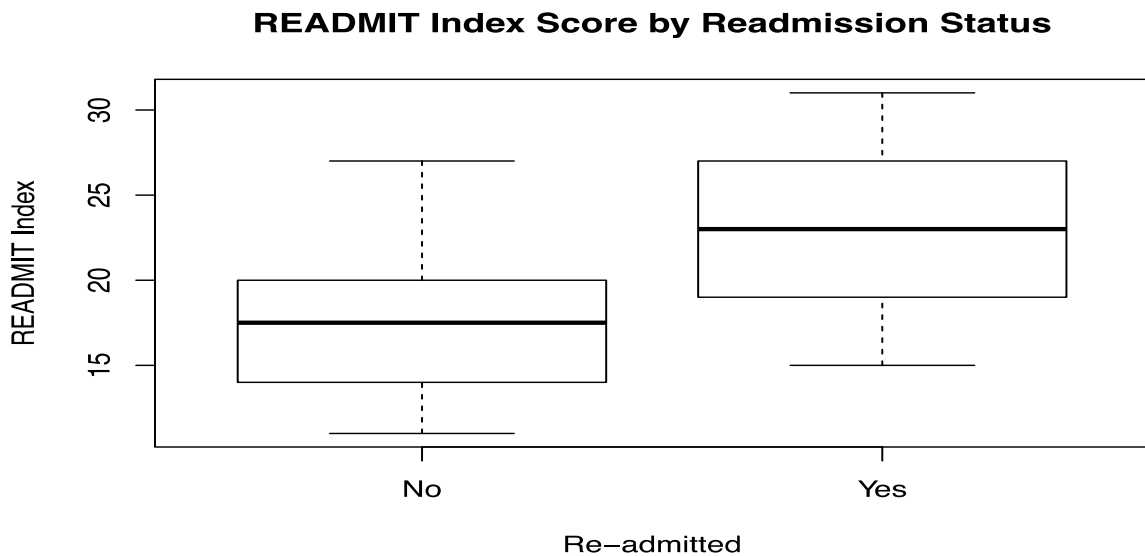


Figure 1. READMIT Index Score by Readmission Status

To explore the question of interest, a logistic regression model using the READMIT index of gender, age, and diagnosis was utilized. Logistic regression determined that the READMIT index score was the most important predictor in the model. It accounted for a drop in deviance of 12.67 with one degree of freedom when compared with the null model. Diagnosis also slightly improved the fit of the model accounting for a drop in deviance of 19.33 on 11 degrees of freedom. Neither gender nor age provided any meaningful improvement in the fit of the model. AIC comparison

showed that the best model was the model using only the READMIT index and that is the model that will be used going forward.

The models were fit using R version 3.4.1. The R code that was run to generate this model can be found in the appendix. The drop in deviance test gives a drop in deviance of 12.675 on 1 degree of freedom and a p-value  $<.001$  using a chi-squared drop in deviance test indicating that there is very strong evidence that the READMIT index is an important predictor of readmission rates among patients. By exponentiation of the READMIT index, coefficient in the model data can be interpreted with this coefficient in the following way. The student is 95% confident that, for 1 unit increase in the READMIT index score, the true probability of being readmitted increases between 11.2% and 54.2%. Due to the small sample size, the confidence interval was very wide. For instance, an individual with a READMIT score of 31, had a 50% chance of readmission on the lower end and a 97% chance of readmission on the higher end. While the chance for readmission rises as the READMIT score rises, the point spread is very wide. A larger sample size would have been necessary to help narrow the confidence interval to see if

there truly was a different value than that of the original authors.

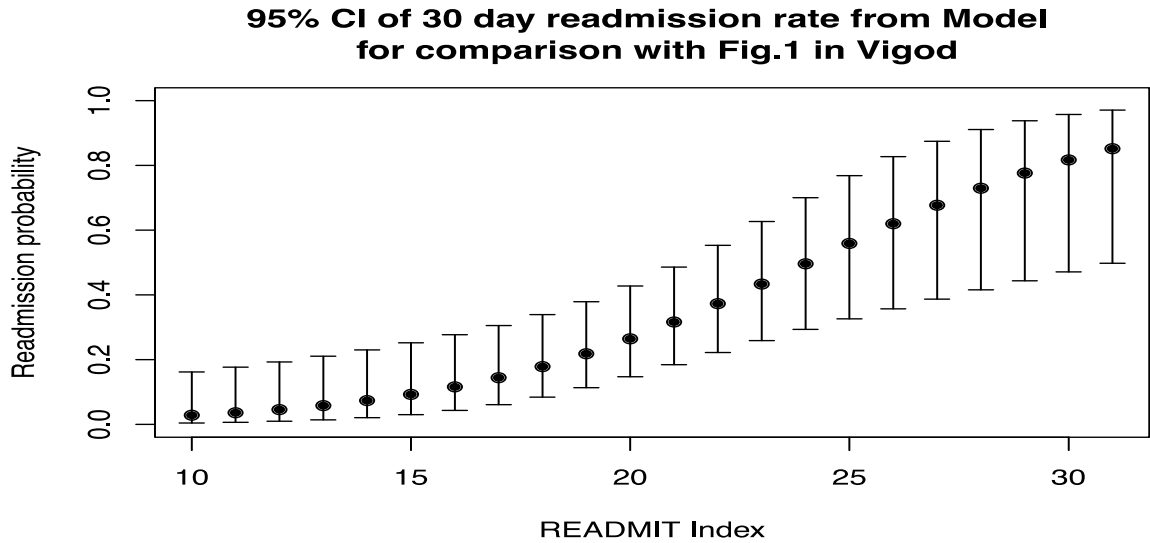


Figure 2. 95% CI of 30 Day Readmission Rate

The READMIT tool was able to show a correlation between increased score and readmission. The following is a table of the estimated readmission rates with a 95% confidence interval for READMIT scores from 10 to 31 as represented in Figure 1. It was unreasonable to estimate probability of readmission beyond a score of 31 due to a lack of observations in the sample. Likewise, there was also a lack of observations on the lower end of the scale (below 11) as these estimates would also not be supported by data.

READMIT Index	Probability of readmission	Lower	Upper
10	0.03	0.00	0.16
11	0.04	0.01	0.18
12	0.05	0.01	0.19
13	0.06	0.01	0.21
14	0.07	0.02	0.23
15	0.09	0.03	0.25
16	0.12	0.04	0.28
17	0.14	0.06	0.31
18	0.18	0.08	0.34
19	0.22	0.11	0.38
20	0.26	0.15	0.43
21	0.32	0.18	0.49
22	0.37	0.22	0.55
23	0.43	0.26	0.63
24	0.50	0.29	0.70
25	0.56	0.33	0.77
26	0.62	0.36	0.83
27	0.68	0.39	0.87
28	0.73	0.42	0.91
29	0.78	0.44	0.94
30	0.82	0.47	0.96
31	0.85	0.50	0.97

Table 1. Estimated Probability of Re-admittance with 95% Confidence Intervals for Each READMIT Index Score

## CHAPTER FIVE

## DISCUSSION

The group that was readmitted scored higher than the group that was not readmitted. The characteristics of the group readmitted were found to have a higher READMIT index score and were younger than the group not readmitted. Sex did not make much difference in readmissions as both groups had similar statistics (readmitted group: 57% female, 43% male; group not readmitted: 58.3% female, 42% male), though females represented a higher proportion in both groups. The logistic regression model determined that the overall READMIT index score was the most important indicator as it accounted for: repeat admissions, emergent admissions, age, diagnosis and discharge, medical morbidity, intensity, and time in the hospital. The only indicator that may have had some correlation with admission when taken on its own was diagnosis. Further study will have to be conducted to compare diagnosis and its impact on readmission.

Vigod Study Comparison

There were some similarities between this pilot project and the Vigod et al. (2015) study. The Vigod et al. (2015) study, using logistic regression, showed the readmission rate for an individual with an index score of 0 was 2% while an individual with an index score of 41 had a 49% probability of being readmitted within 30 days. These data show that the higher the index score, the higher the probability for readmission. The data in this pilot project also showed that the higher index score an individual achieved, the

greater his or her chance for readmission would be. In the Vigod et al. study, there was also no significant difference in sex in readmitted versus not readmitted groups. Similar to this pilot project, Vigod et al. also found that the group that was readmitted was younger than the group not readmitted. Vigod et al. were also not able to do extreme index scores on the lower and upper ends of the spectrum with most scores ranging from 5 to 32. Index scores in this pilot project ranged from 10 to 31. Both Vigod et al. and this pilot project determined that the most common diagnoses for readmission were major depression and psychotic disorders. The groups accounted for over 50% of readmissions in the Vigod et al. study and 57.2% of readmissions in this pilot project.

There were also many differences between this pilot project and the Vigod et al. study. The most glaring was the size of the samples. Vigod et al. had a sample size of 65,499 while this pilot project had a sample size of 50. Due to the size of the Vigod et al. study, they were able to have much more precise confidence intervals than this pilot project. Vigod et al. were also able to get much more distinct information such as job status, marital status, previous divorce (if applicable), and what areas individuals lived in. Due to the retrospective design of this pilot project, this information was not always accessible. Vigod et al. found a readmission rate of 11% while this pilot project showed a readmission rate of 28%. Could Canada's socialized medicine program have contributed to a lower readmission rate? Despite the United States spending twice as much on healthcare when compared to Canada, Canadians have longer life expectancies and lower disease rates (Krell, 2017). Krell (2017) further identifies that Canadians also live healthier, as obesity and smoking rates are less than that of the United States. Clearly,

reasons for the higher readmission rate in Billings, Montana, than Ontario, Canada, present opportunities for further study and research.

### Weaknesses

A significant weakness in this pilot project was participant size. While a sample of 50 was able to provide some useful data, a larger sample size would have been more validating. A larger sample size would have given a better indication of the READMIT index. The limited sample size showed very wide confidence intervals with some ranging nearly 50%. The retrospective design of the study also added some limitations to this pilot project. This pilot project was originally supposed to be conducted in the ED where individuals could be conducted live and the READMIT index could have been scored more accurately. The retrospective chart review was limited in that it only showed information from the “healthcare organization.” So if an individual was visiting a physician or went to the ED at the “healthcare organization,” that information was accurately recorded. However, if an individual was seeing a physician or visited an ED elsewhere, that information was not accurately recorded. Therefore, the accuracy of index scores likely suffered due to the retrospective chart review’s inability to capture that information. Individuals could have also been readmitted to other psychiatric hospitals not affiliated with the “healthcare organization.”

### Strengths

There were also strengths in this pilot project. One of the strongest points of the study is that the 50 samples were selected at random. There was no bias or preference when selecting the samples. All samples were collected over a consecutive two-week period to limit any negligible variables. It was essential that all samples be subjected to the same healthcare providers and treatments so that the data would be as accurate as possible. The sample was only one year old, ensuring that the data would be as up to date as possible. The data were also collected at the “healthcare organization,” which provides the largest, adult, acute psychiatric hospitalization in the surrounding areas. Stakeholder involvement was also a significant strength in the development of this pilot project.

### Conclusion

Much like the Vigod et al. study, this pilot project was able to determine that the READMIT tool is able to moderately predict readmission to a psychiatric hospital within 30 days. This pilot project was also able to provide an interesting question for future study. In this pilot project, 28% of the sample was readmitted while in the Vigod et al. study only 9% of the sample was readmitted. Vigod et al. conducted their study in Canada while this pilot project was conducted in the United States. The READMIT index did show that the higher an individual scores, the more likely he or she will be readmitted. The READMIT tool has the potential to enhance psychiatric treatment as it can identify individuals more likely to be readmitted.

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APPENDICES

APPENDIX A

READMIT SCORING TOOL



**READMIT scoring tool (Quantifying risk for 30-day readmission after discharge)**

Adapted from: Vigod SN, Kurdyak PA, Seitz D, Herrmann N, Fung K, Lin E, Perlman C, Taylor VH, Rochon PA, Gruneir A. READMIT: a clinical risk index to predict 30-day readmission after discharge from acute psychiatric units. *J Psychiatr Res.* 2015 Feb;61:205-13.

Risk Factor	Category (Circle as appropriate)	Points* (Circle as appropriate)
"R" - Repeat Admission (choose 1)	1-2 previous admissions	2
	3-5 previous admissions	5
	6 or more previous admissions	7
"E" - Emergent Admission	Threat to Others	1
	Threat to Self	1
	Unable to Care for Self	2
"A" - Age group in years (choose 1)	18-24	8
	25-34	7
	35-44	6
	45-54	5
	55-64	4
	65-74	3
	75-84	2
"D" - Diagnosis	85-94	1
	Primary psychotic or bipolar disorder diagnosis	4
	Primary depressive disorder diagnosis	2
	Primary substance disorder diagnosis	0
	Primary other diagnosis (none of above)	3
	Any personality disorder diagnosis	2
"M" - Medical morbidity (choose 1)	Unplanned discharge (e.g. against medical advice)	5
	Charlson Comorbidity Score (see below) 1-2	1
"I" - Intensity	Charlson Comorbidity Score (see below) 3 or more	2
	More than 2 outpatient physician visits (past year)	2
"T" - Time in hospital (choose 1)	More than 1 emergency department visits (past year)	3
	Length of stay ≤ 14 days	4
Total:	Length of stay 15-28 days	3

**\*Charlson Comorbidity Score**

Condition	Score (circle as appropriate)
Previous myocardial infarction	+1
Cerebrovascular disease	+1
Peripheral vascular disease	+1
Diabetes	+1
Heart failure	+2

If the TOTAL score is 1-2, circle the

APPENDIX B

INSTITUTIONAL REVIEW BOARD

“HEALTHCARE ORGANIZATION IN A WESTERN STATE”

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INSTITUTIONAL REVIEW BOARD OF [REDACTED]

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SERVING

August 14, 2017

Heath Shomate RN, Principal Investigator

[REDACTED]

Dear Mr. Shomate,

**NEW MINIMAL RISK PROTOCOL**

We have received revised documents, that include locally required changes to meet contingencies for new protocol approval. The following new protocol to review medical records with waivers of patient consent and authorization was approved by the Institutional Review Board of [REDACTED] on August 14, 2017:

[REDACTED] / Heath Shomate RN, Principal Investigator  
NURSING RESEARCH  
MONTANA STATE UNIVERSITY-BOZEMAN COLLEGE OF NURSING— [REDACTED] CAMPUS  
*Co-Investigator and Faculty Sponsor (for student):* Julie Pullen DNP GNP NP-C  
Geriatric Nurse Practitioner, Associate Clinical Professor  
Graduate Nursing Program: Doctor of Nursing Practice (DNP)  
*Study Site:* [REDACTED]

**17.19** (BC/MSU-Boz Coll of Nursing HS032017) Implementation of a Pilot Study to Improve Identification of Patients at High Risk for Psychiatric Hospitalization

*Materials reviewed include but are not limited to :* Curriculum Vitae for Principal Investigator Shomate; Complete Protocol, including MSU-Bozeman College of Nursing HS032017 IRB memo of approval and graduate student research application; READMIT Tool; and IRB of [REDACTED] Waivers of Consent and Privacy Authorization (*for patient medical records*)

No deviations from or changes to the above-named protocol(s) should be initiated without prior written IRB approval, except to eliminate an apparent immediate hazard to subjects. Please notify the IRB of the occurrence of any adverse event that is serious and unexpected and associated with a protocol procedure. **The approval period is one year. A periodic review for the above-named and numbered protocol is due on or before August 10, 2018.** *Please note this date on your calendar:* Compliance with periodic review is the responsibility of the Principal Investigator. Research approved by the IRB may be subject to further institutional review, for approval or disapproval. For federally funded research, the research organization is responsible for determining compliance with federal regulations, including Federalwide Assurance (FWA), at <http://www.hhs.gov/ohrp/policy/engage08.html><sup>7</sup>. Provide any required IRB approval notification to oversight authorities or protocol sponsors.

Sincerely,



James A Patten, Attorney-at-Law, Chairman

Copy: Jeannine M Brant PhD APRN AOCN FAAN, [REDACTED] Nursing Research Council  
[REDACTED] Inpatient Cancer Center (*Required notification for new nursing research*)

Copy: Darlene L. Wolcott, Technical Assistant

[REDACTED] Corporate Compliance (*Required notification for new research at [REDACTED]*)

The Institutional Review Board of [REDACTED] is in compliance with the regulations of the Food and Drug Administration, effective July 27, 1981, and all amendments thereto, contained in Title 21 of the Code of Federal Regulations, Parts 50 and 56  
The Institutional Review Board of [REDACTED] is registered as DHHS OHRP/FDA Nos IRB00003499 and IORG0002899.

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[REDACTED]

APPENDIX C

INSTITUTIONAL REVIEW BOARD MSU



**INSTITUTIONAL REVIEW BOARD**  
**For the Protection of Human Subjects**  
**FWA 00000165**

960 Technology Blvd. Room 127  
 c/o Microbiology & Immunology  
 Montana State University  
 Bozeman, MT 59718  
 Telephone: 406-994-6783  
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 E-mail: cherylj@montana.edu

*Chair:* Mark Quinn  
 406-994-4707  
 mquinn@montana.edu

*Administrator:*  
 Cheryl Johnson  
 406-994-4706  
 cherylj@montana.edu

**MEMORANDUM**  
 .....

**TO:** Heath Shomate and Julie Pullen

**FROM:** Mark Quinn *Mark Quinn CJ*  
 Chair, Institutional Review Board for the Protection of Human Subjects

**DATE:** March 20, 2017

**SUBJECT:** *"Implementation of a Quality Improvement Project to Improve Identification of Patients at Risk for Psychiatric Rehospitalization"* [HS032017]

The above proposal was reviewed by expedited review by the Institutional Review Board. This proposal is now approved for a period of one-year.

Please keep track of the number of subjects who participate in the study and of any unexpected or adverse consequences of the research. If there are any adverse consequences, please report them to the committee as soon as possible. If there are serious adverse consequences, please suspend the research until the situation has been reviewed by the Institutional Review Board.

Any changes in the human subjects' aspects of the research should be approved by the committee before they are implemented.

It is the investigator's responsibility to inform subjects about the risks and benefits of the research. Although the subject's signing of the consent form, documents this process, you, as the investigator should be sure that the subject understands it. Please remember that subjects should receive a copy of the consent form and that you should keep a signed copy for your records.

In one year, you will be sent a questionnaire asking for information about the progress of the research. The information that you provide will be used to determine whether the committee will give continuing approval for another year. If the research is still in progress in **5 years**, a complete new application will be required.

APPENDIX D

DATA USE AGREEMENT

**DATA USE AGREEMENT**

Data Recipient: Heath Shomate  
Project Title ("Project"): Implementation of a pilot study to improve identification of patients at risk for psychiatric hospitalization

This Data Use Agreement ("Agreement") is made and entered into as of August 24, 2017 (Date) by and between Heath Shomate ("Data Recipient") and [REDACTED] ("Covered Entity").

**A. SCOPE AND PURPOSE**

This agreement sets forth the terms and conditions pursuant to which Covered Entity will disclose to the Data Recipient certain medical information ("Data Set") consisting of:

1. Sampling method for the study's subjects will be by a random sample, obtained from the electronic medical records within Cerner. The database(s) will provide the data parameters: age, gender, and diagnosis for adult psychiatric patients. The study will be examining the incidence of adult psychiatric readmission within 30 days and to test the predictive value of a tool called READMIT that was developed in 2015. The information gathered from the medical record will be de-identified and patients will be referred to by number within the study.
2. The Data Recipient will proceed with the study under Keri Cross, the Hospital Nurse Manager, Psychiatric Support Services. Keri will monitor the Data Recipient's access to the data in Cerner.
3. The Data Recipient shall have the right to use the Data Set provided to it by the Covered Entity for research activities related to the Project.
4. The Data Recipient will not disclose any patient identifiers (including, but not limited to, name, medical record number, social security number, address, or other piece of information that could identify the patient) to any third party.

**B. RESPONSIBILITIES OF DATA RECIPIENT**

With regard to its use and/or disclosure of the Data Set, Data Recipient agrees to do the following:

1. Use appropriate safeguards to prevent use or disclosure of the Data Set other than as provided for by this Agreement.
  - a. All electronic Data must be maintained and transmitted using encryption technology approved by [REDACTED].
  - b. All paper copies of Data must be maintained in strict confidence.
  - c. No Data containing patient identifiers may be removed from [REDACTED] premises or computer systems.
  - d. Data Recipient will show department manager all de-identified information and data that Data Recipient desires to remove from [REDACTED] premises or systems (on paper or electronically) and may only remove information and data after receiving specific approval from the department manager.

2. Not use or further disclose the Data Set other than as permitted by this Agreement or as required by law.
3. Ensure that any agent, including subcontractor, to whom it provides the Data Set agrees in writing to the same restrictions and conditions that apply through this Agreement to the Data Recipient with respect to such information.
4. Agree not to use the Data Set to identify the information or contact the individuals in the Data Set. Results of analyses performed on the Data Set will reported only in aggregate and will not disclose names or characteristics of [REDACTED] other than as a "health care organization in a Western state" in any reports or publications.
5. Indemnify, defend and hold harmless Covered Entity, and its trustees, officers, directors, employees and agents ("Indemities") from and against any claim, cause of action, liability, damage, cost or expense (including, without limitation, reasonable attorney's fees and court costs) arising out of or in connection with any unauthorized or prohibited use or disclosure of the Data Set or any other breach of this Agreement by Data Recipient or any subcontractor, agent or person under Data Recipient's control.

#### C. Term and Termination

The provision of this Agreement shall be effective as of the Effective Date and shall terminate when the Data Set provided by the Covered Entity to the Data Recipient is destroyed. Data Recipient agrees to destroy and keep no copies of the Data Set after Data Recipient's report or publication is completed. Covered Entity may terminate this Agreement if it knows of a pattern of activity or practice of Data Recipient that constitutes a material breach or violation of this Agreement. Upon such termination, Data Recipient will return the limited Data Set and retain no copies thereof.

#### D. Publication

Recipient shall obtain permission from [REDACTED] prior to any publication or proposed publication of papers or other writings using the Data Set. Recipient shall not identify [REDACTED] or any [REDACTED] physician, employee, or agent without [REDACTED]'s express written consent. All references to [REDACTED] will be removed and replaced with "A healthcare facility in a Western state" or similar language approved by the department manager.

#### E. Miscellaneous

1. The parties agree to take such action as is necessary to amend this Agreement from time to time as is necessary for Covered Entity to comply with the requirements of the Privacy Rule and HIPAA.
2. The confidentiality obligations of Data Recipient shall survive termination of this Agreement.
3. No provision of this Agreement may be waived except by Agreement in writing signed by the waiving party. A waiver of any term or provision shall not be construed as a waiver of any other term or provision.
4. The persons signing below have the right and authority to execute this Agreement and no further approvals are necessary to create a binding agreement.