2019

Predicting Educational Attainment Based on Forensic Psychiatric Patients' Age at First Hospitalization

Malinda Marie Lawson
Walden University

Walden University

College of Education

This is to certify that the doctoral study by

Malinda Lawson

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. William McCook, Committee Chairperson, Education Faculty
Dr. Marianne Borja, Committee Member, Education Faculty
Dr. Kelly Hall, University Reviewer, Education Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Abstract

Predicting Educational Attainment Based on Forensic Psychiatric Patients' Age at First Hospitalization

by

Malinda Lawson

MA, Towson University, 2012

MA, McDaniel College, 2005

BS, University of Maryland University College, 1998

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

May 2019

Abstract

Education during recovery could impact a forensic psychiatric patient's community reintegration; however, individual education goals for patients can be difficult due to the lack of available parameters. The purpose of this study was to test whether age at first hospitalization is predictive of educational attainment among forensic psychiatric patients and to determine which ages of first hospitalization best predict 8 levels of educational attainment. Cattell's intelligence theory served as the theoretical framework for this study because mental illness requiring early hospitalization may affect education and learning. This quantitative, nonexperimental study involved a predictive design with data from the Canadian Institute for Health Information database. The sample of patients from 2011–2016 consisted of 16,639 diagnosed with schizophrenia or other psychotic disorder and 2,227 diagnosed with mood disorder. Multinomial logistic regression analysis indicated age at first hospitalization to be a predictor of educational attainment among both categories of diagnoses. Odds ratio analyses identified which ages of first hospitalization best predict 8 levels of educational attainment. Increased rates of education levels were indicated when age at first hospitalization increased. Patients were more likely to attain a high school diploma than drop out between 9th to 11th grade unless first hospitalized at age 14 or under. Based on the results from this study, completion of a general equivalency diploma or a life skills program may provide additional opportunities for independent living and employment, which can improve the lives of patients and those in the community. Therefore, this project can lead to social change by encouraging changes through the results and recommendations presented in a white paper.

Predicting Educational Attainment Based on Forensic Psychiatric Patients' Age at First Hospitalization

by

Malinda Lawson

MA, Towson University, 2012

MA, McDaniel College, 2005

BS, University of Maryland University College, 1998

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

May 2019

Dedication

To my children, Zach and Marissa, for all the love and encouragement you have shown me along the way and for reminding me that sometimes the lesson learned is not always the lesson intended.

Acknowledgments

I would like to thank my parents, Tom and Brownie Barber, along with my children for their support and encouragement throughout the years and mostly for encouraging me to finish this final degree. Thank you for believing in me from the very beginning, always encouraging me to spread my wings, try new things, and most of all, believe in the idea that I could do anything that I set my mind to. Thank you for traveling along with me on this journey among the many others throughout the years!

I would also like to thank Dr. McCook. There were times I struggled to see an end in sight, but you were always there to calm the waters and help me continue to focus on the finish line.

Table of Contents

List of Tables

List of Figures

Section 1: The Problem

The Local Problem

Clairmont [a pseudonym] is the only maximum security forensic psychiatric facility in a state system in the United States. Education services is one aspect of the rehabilitation department that can be better utilized as part of the overall treatment plan. Education may often be thought of as academics in the traditional classroom setting; however, education can also provide a variety of transition services to support forensic psychiatric patients' community reintegration and engagement including life skills, daily activities, supported education, health, and basic work skills (Easden & Sakdalan, 2015; Parks, Radke, & Haupt, 2014). If the treatment team feels it is an appropriate rehabilitation service while the patient is being held at Clairmont, a team member sends a referral to education services. Upon receiving the referral, the teacher collects the data from the treatment team and patient's medical record. But individuals diagnosed with mental illness often experience difficulty in achieving education goals (Arbesman & Logsdon, 2011). With limited research available and no predictive measure, the teacher must make a subjective determination for each patient's placement in an appropriate education group based on available data provided by the treatment team and the patient's medical record. Based on communication with a Clairmont education provider, the patient's education goals are then standardized according to the class in which the patient is placed (see also Teich, 2016).

Forensic psychiatry has many similarities throughout the United States and Canada. In both systems, placement in a forensic psychiatric bed is court ordered by a

judge (Livingston, 2006). Length of stay is based on the need for a secure therapeutic environment. When the hospital clinical forensic review board determines the individual is clinically and behaviorally ready for release into the community, formal clinical recommendations are given to the court for the final decision (Livingston, 2006; Parks et al., 2014). Due to a lack of available forensic psychiatric data in the United States and the similarities between the U.S. and Canadian forensic mental health care systems, data for this study were acquired from the Ontario Mental Health Reporting System (OMHRS) consisting of data collected from Canadian forensic psychiatric patients—those with a mental disorder who have engaged in unlawful behavior (Canadian Institute for Health Information [CIHI], 2017; Criminal Code, 1985; Livingston, 2006; Teich, 2016). Ontario, as well as Clairmont's state, currently has multiple state facilities with three levels of security and an evidence-based approach toward treatment planning (Parks et al., 2014; Rice et al., 2005). The United States is making an effort to improve mental health data, and state laws involving the placement and services for forensic psychiatric patients in mental health facilities and correctional institutions are being evaluated, but currently no data are available in the United States for this study (NRI, 2014; Parks et al., 2014; Center for Behavioral Health Statistics and Quality, 2018).

Treatment focused solely on recovery from a mental illness is no longer the standard of acceptable care in modern forensic psychiatric facilities. Individual symptoms of mental illness and criminogenic thinking of forensic psychiatric patients needs to be recognized for treatment planning (Schaufenbil, Kornbluh, Stahl, & Warburton, 2015). For instance, forensic psychiatric patients are typically characterized

by a history of poor academic and social achievement; substance abuse, criminal, and psychiatric problems as adults; pathological results on psychometric testing; serious psychiatric diagnosis; and violent crimes (Hornsveld, Bulten, de Vries, & Kraaimaat, 2008; Rice et al., 2005). The standard of treatment in U.S. and Canadian forensic psychiatric facilities is now evidence-based, patient centered care with a focus on meeting discharge criteria, reducing violence, and returning these patients to continuing mental health recovery environments within the community (Cannon Design, 2012; Livingston, Nijdam-Jones, & Brink, 2012; Parks et al., 2014; Schaufenbil et al., 2015). The most promising treatments are evidence-based and are designed to reduce the risk of violent recidivism as well as target aggression, anger, institutional management problems, social withdrawal, and life skill deficits (Burgess, Curtis-Downes, & Gibson, 2013; Parks et al., 2014; Rice et al., 2005). Lack of education or vocational skills may lead to social withdrawal and life skills deficits due to the reduced occupational opportunities and inability to accumulate social capital (Easden & Sakdalan, 2015; Isohanni et al., 2001). Therefore, during their course of treatment at Clairmont, the maximum security forensic psychiatric facility, patients are often referred to education services with the expectation of completing their general equivalency diploma (GED).

Treatment that involves education is important because mental illness often disrupts and hinders educational attainment (Burgess et al., 2013; Ennals, Fossey, Harvey, & Killackey, 2014). Educational attainment may have a greater impact on those younger in age, but those with the most severe mental illnesses may not be able to reach the lower levels of educational transitions, hindering them from attaining future education

levels (Mojtabai et al., 2015). The age at first hospitalization of various mental illnesses is correlated with ability to fulfill educational goals. Adolescents who were hospitalized for their first episode of nonaffective psychosis have had a 44% high school dropout rate and those hospitalized for first episode schizophrenia, paranoid type, have had a high school dropout rate of 45.8% compared to the national dropout rate, which have decreased from 12.1% to 7.4% (Esch et al., 2014; National Center for Education Statistics, 2017). Additionally, individuals diagnosed with schizophrenia who dropped out of high school had an earlier age at first hospitalization than those who received their high school diploma (Goulding, Chien, & Compton, 2010). Deterioration in academic functioning accelerates from childhood to late adolescence and may be a unique developmental characteristic of schizophrenia (Allen et al., 2013). Affective disorders and anxiety disorders typically have less functional disability than psychotic disorders (Minichino et al., 2017).

The lack of predictive measures creates a problem when determining appropriate class placement and setting appropriate educational goals for this population. There is an overall lack of mental health data in the United States, which inhibits research on those with severe mental illnesses (Teich, 2016). There is also a gap in practice, as there is no current predictor of educational attainment that considers the effects of mental illness, and there is a lack of research on the return to education following a disruption due to a mental disorder (Mojtabai et al., 2015). Currently, when a patient is referred for education services, the teacher reviews the patient's medical chart, consults with various members of the treatment team including therapists who lead other rehabilitative groups

which the patient attends, and a patient interview is conducted to gather data including but not limited to the following:

- educational goals in relation to the treatment plan
- the highest year of education completed
- the length of time since the patient attended education-based training
- psychological testing data including IQ and subtest results
- special education services received
- academic attainment levels
- ability to remain focused in a learning environment
- current mental status
- behavior stability
- safety considerations

Individualized, attainable goals are a requirement for each rehabilitation service provided to the patient. According to a Clairmont education provider, education goals are determined, and the patient is then placed in an appropriate group. Another important factor to consider when setting attainable education goals are the recent changes made to GED tests. In 2014, the GED test was changed to align with the common core standards (Common Core State Standards Initiative, 2010) and focus more on what are called career and college-readiness indicators. According to the GED Testing Service website (2015): "The GED test can help solve this economic need by opening the doors for millions of adult learners to college courses, apprenticeships, and job training—the pathway adults need to gain skills and knowledge, fill these jobs, and care for their

families" (p.1). Another change that made the GED test more difficult for some patients was the transition from paper-based testing to computerized testing (Miller et al., 2016).

Rationale

The problem of educational placement for forensic psychiatric patients is not unique to Clairmont. There are a variety of mental health facilities that provide the necessary 24-hour security and treatment of the tens of thousands of forensic psychiatric patients in the United States (Charles, 2010; NRI, 2014). Similar facilities can be found worldwide (Rice et al., 2005; Teich, 2016). Throughout the United States and Canada, there has been a shift in mental health treatment to recovery-oriented services with an emphasis placed on evidence-based practices, and it is expected that all patient activities and services have measurable goals with real-world significance rather than a focus only psychiatric symptom remission (Cannon Design, 2012; Hogan, 2003; Livingston et al., 2012; Mental Health Commission of Canada, 2009; Schwartz et al., 2013; U.S. Department of Health and Human Services, 2009). The forensic psychiatric facilities across the United States and Canada are facing similar issues. Due to the comparable forensic patient populations, identical evidence-based practices, and approaches to treatment, it is likely the empirical findings that involve planning and evaluating services in one facility or jurisdiction will be useful in others (Rice et al., 2005).

Mental illness often affects educational attainment (Ennals et al., 2014). Mental illnesses that have initial hospitalizations during school-age years affect growth opportunities and prevent progress to higher education to receive treatment (Esch et al., 2014; Isohanni et al., 2001). Younger age groups diagnosed with a mental disorder in

their most formative years demonstrate a more significant impact on their educational attainment (Allen et al., 2013; Jayakodya, Danziger, & Kessler, 1998; Mojtabai et al., 2015). The younger the age at first hospitalization among patients for the first episode of nonaffective psychosis, the more significant the impact is on their ability to fulfill educational goals (Goulding et al., 2010). The age at which the individual first experiences symptoms influences the cognitive symptoms and executive dysfunction of individuals differently (Richard-Devantoy, Deguigne, Annweiler, Letourneau, & Beauchet, 2013). However, age at onset is often subjective and dependent on the ability of the patient, a family member, or close friend to remember dates or signs and symptoms, which may or may not have been noticed. Hospitalization of individuals also depends on the family support, willingness, and understanding, the availability of space at facilities, the ability to recognize symptoms that require psychiatric treatment, and the inclination for dangerous and violent behaviors. For example, bipolar disorder may present without mania and initially be diagnosed as depression during the first hospitalization (Medalia, 2013). However, the age at first hospitalization is still considered the most reliable evidence of age at onset (DeLisi, 1992; Medalia, 2013).

Given the relationship between cognition and real-world functioning (Harvey, Wingo, Burdick, & Baldessarini, 2010), rehabilitation efforts need to consider an individual's cognitive deficits (Goldberg, Rollins, & Lehman, 2003; Meesters et al., 2013). Individuals with schizophrenia are limited in rehabilitative areas like education (Green, Kern, Braff, & Mintz, 2000; Rajji, Miranda, & Mulsant, 2014; Watzke & Brieger, 2004) and demonstrate a cognitive decline over time (Harvey et al., 1999).

Bipolar disorder disrupts educational attainment at all levels and may contribute to later functional disability (Mojtabai et al., 2015; Glahn, Bearden, Bowden, & Soares, 2006). Additionally, older patients with early signs and symptoms as well as those with late initial signs and symptoms of schizophrenia have significantly different education levels due to the differing impact on cognitive abilities (Smeets-Janssen et al., 2013). Cognitive deficits continue to worsen after patients diagnosed with bipolar disorder become clinically stable, and patients diagnosed with schizophrenia often test cognitively on average 1.3 to 2 standard deviations lower than the average for nonpsychiatric testers (Medalia, 2013). Many individuals diagnosed with severe mental illness have had difficulty completing high school or secondary school, which may have resulted in a lack of basic knowledge; a stunting of interpersonal skills, which could have led to poor social outcomes; and poor physical health because of poor mental health. Many of these characteristics may occur at the onset age at mental illness before the individual seeks treatment (Goulding et al., 2010).

Despite the issues with mental illness and educational attainment, mental health data in the United States is limited. The National Survey on Drug Use and Health is the United States federally funded large-scale self-reported household survey, which provides data on some mental health issues and trends in illegal drug use but does not collect data from institutions. Additionally, the Substance Abuse and Mental Health Services Administration provides data on treatment facilities, demographic characteristics, and substance abuse information about admissions and discharges to treatment facilities but has limited data available for individuals receiving mental health

services in the United States (National Alliance on Mental Illness, 2013; Center for Behavioral Health Statistics and Quality, 2018). Therefore, no data are collected on the population having the most severe mental illness—individuals in psychiatric hospitals, correctional institutions, and those who are homeless (Teich, 2016).

No national comprehensive mental health database exists within the United States (Teich, 2016); however, the CIHI collects mental health data upon admissions, discharges, and quarterly while individuals are inpatients (CIHI, 2016, 2017; Livingston, 2006). The data collected relevant to this study include age at first hospitalization, educational attainment level, and forensic status (CIHI, 2017). In the Canadian forensic mental health system, similar to the U.S. forensic mental health system, there are federal laws governing the rights of the patients, but the provincial/state governments are the ones responsible for providing the patient's care in the least restrictive setting as possible, which keeps society safe yet does not infringe on individual rights. The patients are assigned to forensic psychiatric beds through the courts, but the state/province department of health must ensure there are enough beds for court-ordered assessments and the patients are being provided appropriate treatment services (Parks et al., 2014). The goal for each patient is to be reintegrated back into the community for those who have been judged "not criminally responsible on account of mental disorder" in Canada or "guilty but not criminally responsible" in the United States (Livingston, 2006; Parks et al., 2014). However, individuals can be ordered to a forensic psychiatric placement in order to receive a psychiatric or competency evaluation, competency restoration for those who have been found "unfit to stand trial" in the Canadian system or "incompetent to

stand trial" in the United States, or to receive psychiatric treatment for those patients who have already been adjudicated not criminally responsible on account of mental disorder or not criminally responsible (Livingston, 2006).

Investigating a predictive relationship between the age at first hospitalization of a mental illness and educational attainment provided additional data such as a predictor, which could be used when placing patients in education classes and setting more appropriate individualized education goals. By examining the predictive relationship between these variables along with other factors impacting an individual's treatment, more realistic and attainable goals may be determined on an individual basis. Therefore, the purpose of this study was to test whether age at first hospitalization is predictive of level of educational attainment among forensic psychiatric patients, and if so, to determine which ages of first hospitalization best predict each of eight levels of educational attainment.

Definitions

Age at first hospitalization: Indicates the person's approximate age at first admission for mental health services (CIHI, 2017; OMHRS, 2017).

Educational attainment level: The highest level of education completed which differs from the highest education level attended, as defined by the U.S. Census Bureau (2016) and OMHRS in Canada (CIHI, 2017).

Forensic psychiatric patient: An individual who has a serious mental illness and comes in contact with the law as a result of committing a crime in the United States (American Psychological Association, 2015; Ontario Review Board, 2012).

Psychotic disorders: Defined in the Diagnostic and Statistical Manual of Mental Disorders, 5th Ed. (DSM-V) as schizophrenia, (not including schizotypal personality disorder or schizoaffective disorder) and other psychotic disorders (American Psychiatric Association, 2013).

Mood disorder: As defined in the DSM-V, consists of bipolar and related disorders and depression disorders (American Psychiatric Association, 2013).

Significance

This study will address a problem by focusing specifically on predictive value of age at first hospitalization to estimate level of educational attainment. This project is unique because it addresses an under-researched area of persons who have been diagnosed with a severe mental illness and who have forensic involvement. There are a limited number of studies involving education and this particular population, and current research primarily focuses on balancing the appropriate mental health treatment with the forensic setting and legal needs of the patients (Schaufenbil et al., 2015). Much of the focus remains on returning patients to the community, but recidivism and conditional release are still factors that must be considered (Cohen, Spodak, Silver, & Williams, 1988; Marshall, Vitacco, Read, & Harway, 2014). Failure to complete education continues to have consequences such as reduced occupational opportunities, social opportunities, financial opportunities (Isohanni et al., 2001; Lloyd, 2010; Waghorn, Still, Chant, & Whiteford, 2004; Waghorn et al., 2012), and may also be associated with higher levels of risky behaviors resulting in poorer health and earlier mortality (Molla, Madans, & Wagener, 2004). Therefore, the results of this study may provide much-needed insight

that will aid in providing more appropriate education services and setting more appropriate education goals for the forensic psychiatric patients residing at Clairmont. If the study finds age at first hospitalization of mental illness predicts level of educational attainment, then age at first hospitalization can be used as another data point in addition to those already used in current practices when evaluating each patient referred for education services.

Research Questions

This study provides further information about the predictive value of age at first hospitalization for mental illness to estimate level of educational attainment. To more thoroughly understand the gap in practice and provide deeper insights into the population of individuals with a mental disorder, two categories were examined based on those used by the judicial systems when considering the possibility of a "Not Criminally Responsible" defense (Comer, 2013). The categories of disorders are psychotic disorders and mood disorders. For this study, psychotic disorders are defined as schizophrenia (not including schizotypal personality disorder or schizoaffective disorder) and other psychotic disorders (American Psychiatric Association, 2013). The category of mood disorders consisted of bipolar and related disorders and depression disorders as defined in the DSM-V (American Psychiatric Association, 2013).

Research Question 1: Can the age at first hospitalization predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders) from 2011 to 2016?

$H_0$1: Age at first hospitalization does not predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders).

H_a1: Age at first hospitalization does predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders).

Research Question 2: If the age at first hospitalization is predictive of the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders) from 2011 to 2016, which ages of first hospitalization best predict each of eight levels of educational attainment?

Research Question 3: Can the age at first hospitalization predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders) from 2011 to 2016?

$H_0$3: Age at first hospitalization does not predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders).

H_a3: Age at first hospitalization does predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders).

Research Question 4: If the age at first hospitalization is predictive of the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders) from 2011 to 2016,

which ages of first hospitalization best predict each of eight levels of educational attainment?

Review of the Literature

The purpose of this literature review was to provide an exhaustive and critical analysis of the current research available involving a predictive relationship between age at first hospitalization of mental illness and educational attainment level. Initial searches were conducted in the education and psychology databases. To locate articles, searches were executed through Walden University's library databases including Academic Search Complete, Education Source, ERIC, SAGE Premier, and PsychInfo. Keywords used in the search for relevant literature included various combinations of: *academic attainment, educational attainment, academic achievement, educational achievement, age at first hospitalization, age at first episode requiring hospitalization, mental illness, severe mental illness, mental disorder, schizophrenia, bipolar, mood disorder, fluid intelligence, crystallized intelligence, maximum security hospital, forensic psychiatric facility, not criminally responsible, criminally insane, mentally disordered accused person, forensic mental health, cognitive ability, cognitive decline, cognitive impact, educational impact, academic impact, intelligence impact, and learning ability.* Searches were initially limited to peer-reviewed research published within the last 5 years with the exception of the theoretical information. However, due to the lack of available research, articles published more than 5 years ago were also reviewed. References of the articles were also evaluated in order to find additional relevant sources. Google Scholar was used to search for a specific journal article or to search for specific authors' works.

In this section, literature related to the theoretical foundation will be discussed including the general intelligence theory and the division of intelligence into fluid and crystallized intelligences. A more broadened view of the problem will be revealed through a discussion of the lack of available literature involving forensic psychiatric patients in the United States, the adverse effects of severe mental illness on educational attainment when the age at onset occurs in the formative years, and the lack of predictors for educational attainment for patients that may lead to inappropriate placements.

Theoretical Foundation

This study was based on the theoretical framework of general intelligence as defined by Cattell (1943) and further researched by Horn (1965). Educational attainment level may be impacted by the age at first hospitalization of a mental illness if the onset occurs at an age that disrupts either education or experiences thereby truncating the increase of the crystallized intelligence (Horn & Cattell, 1967; Isohanni et al., 2001). Also, when considering the cognitive impairments associated with some mental illnesses either due to the effects of the age at onset, the actual illness, or the medication used to treat the illness (Keefe, Eesley, & Poe, 2005; Rajji, Ismail, & Mulsant, 2009), fluid intelligence may decline faster in those who had an earlier age at first hospitalization. Cattell (1943) states that the same intelligence performances including speeded tasks, abstract problem-solving, and unfamiliar performances, which commonly decline in individual's with schizophrenia are the same as those that decline with age.

According to Cattell (1963), the theory concludes that intelligence can be divided into two categories: fluid intelligence and crystallized intelligence. Fluid intelligence is

the ability to perceive relationships from various independent experiences and abstractly apply knowledge in order to solve new problems (Cattell, 1971). Although it involves the intellectual capabilities such as associative memory, abstracting, and inductive reasoning, fluid intelligence is thought to be completely independent of learning, experience, and education (Horn, 1965). However, crystallized intelligence is directly dependent on education and experience and involves the ability to adapt and solve unfamiliar problems (Cattell, 1971). It is believed that crystallized intelligence continues to increase during the aging process, unlike fluid intelligence that begins to decline as early as mid-adulthood, gradually decreasing at first before rapidly decreasing after the age at 70 (Horn & Cattell, 1967). Therefore, if age at first hospitalization of mental illness affects either crystallized intelligence or fluid intelligence, there may be an overall effect on one's ability to attain education levels.

Review of the Broader Problem

There is limited research that examines the possibility that the age at first hospitalization may be a predictor for educational attainment of individuals diagnosed with a mental illness. However, it has been concluded that an earlier first hospitalization for mental illness affects individuals in their developmental and most impressionable years; therefore, having negative effects on their ability to obtain educational attainment levels (Jayakodya et al., 1998). An individual's maximum fluid intelligence, the ability to reason, adapt, and apply logic to resolve problems in unfamiliar situations, and use out-of-the-box thinking, is typically attained by 14-15 years old (Blanch, 2015). Although believed to be independent of education, these fluid abilities were found to have a

significant impact on the rate of learning (Blanch, 2015). On the other hand, crystallized intelligence is one's ability to make use of acquired knowledge and information, or book smarts (Horn & Cattell, 1967). Crystallized intelligence may increase beyond 28 years old and, when assessed at the end of an instructional activity, was found to have a significant impact on the educational attainment (Blanch, 2015). However, mental illnesses that cause first hospitalizations during school-age years truncate the growth opportunities of crystallized intelligence due to the disruption of schooling and prevention of the progression to higher education in order to receive treatment (Isohanni et al., 2001). Studies have produced conflicting results with some studies previously finding no significant relationship between educational attainment and onset age at mental illness (Rajji et al., 2009); however, more recent studies have concluded there is a relationship between age at onset of schizophrenia and cognitive deficits (Mutica, Marinescu, & Pirlog, 2013). Also, several studies evaluated the relationship from an alternative perspective and concluded that educational attainment may be a predictor of schizophrenia disorders (Allen, Frantom, Strauss, & van Kammen, 2005; Allen et al., 2013; Isohanni et al., 2005; Jones, Murray, Rodgers, & Marmot, 1994); however, in a study of Asian males involving mood disorders, personality disorders, and schizophrenia, it was concluded that educational attainment was only a predictor for schizophrenia (Chong et al., 2009). Han Chinese women with lower educational attainment were also found to have significantly more episodes of major depressive disorder, and major depressive disorder appears to vary with the degree of educational attainment whereas higher educational attainment correlates with fewer episodes of major depressive disorder

(Shi et al., 2014). This study builds on the more recent research that indicated there is a relationship between the educational attainment level and the onset age at mental illness which could be further investigated (Mutica et al., 2013; Shi et al., 2014).

A nationwide study explored the harmful effects of mental illness on an individual's abilities and functioning (Breslau, Miller, Chung, & Schweitzer, 2011). Age at onset and diagnosis was self-reported for 17 disorders using the Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR (American Psychiatric Association, 2000) criteria. Mental disorders were found to be significantly associated with the termination of education milestones categorized as primary school graduation (3.8%), high school graduation (10.2%), college enrollment (4.4%), and college graduation (2.6%) (Breslau et al., 2011). Another study made an attempt at measuring the hardship placed on society due to the decreased educational attainment of individuals with a mental disorder (Stoep, Weiss, Kuo, Cheney, & Cohen, 2003). Chong et al. (2009) found significantly poorer academic performance among those with schizophrenia spectrum disorders, and truncated educational attainment was found to be a probable adverse consequence of early onset mental illness (Kessler, Foster, Saunders, & Stang, 1995). Students with a mental illness are more likely to discontinue their education due to a variety of issues associated with their mental illness including the course of the illness, medication effects, thinking difficulties, and lowered self-confidence (Ennals et al., 2014; Miller & Nguyen, 2008; Hartley, 2010).

Although studies have been completed predicting the outcome of forensic psychiatric patients, most of these focus on the conditional release aspect of the judicial

system (Cohen et al., 1988; Marshall et al., 2014). One study looked at predicting voluntary and involuntary readmissions to forensic hospitals and used individuals from the same facility who had been placed on conditional release back into the community (Marshall et al., 2014). This study did not include education or educational attainment as a variable in the study. Reininger-Rogers (2014) examined the education policy in prisons and concluded that when funding is available, inmates participate in various levels of education including literacy, GED classes, English as a second language (ESL) classes, parenting skills, or occupational training. Although prisoners are encouraged to utilize the education opportunities, prisoners with a mental illness were not analyzed and no predictive measure was mentioned for determining an appropriate level of education other than participant choice (Reininger-Rogers, 2014).

This study builds on current research involving various aspects of educational attainment, mental illness, and the forensic psychiatric patients by examining the relationship between the educational attainment and the age at onset of various mental illnesses of individuals who are forensic psychiatric patients.

Implications

This study provides additional information that could be used to implement a new method when evaluating forensic psychiatric patients for educational services. A policy recommendation based on the study's findings will be presented in the form of a white paper. The white paper provides insight into the relationship between the age at first hospitalization of mental illness and the educational attainment level among forensic psychiatric patients and how that relationship can be used to improve the quality of

education services already provided. Based on the outcome of the study, the recommendation involves several aspects of the program. For example, the first changes begin with the way the patient is evaluated after the initial referral is received, the placement within a class, the length of class time before re-evaluation, and the teaching methods used within the classroom. Patients should be placed in appropriate education groups based on research-based evidence in addition to the information gathered from the treatment team and the patient's medical record. Individual goals could be more appropriate and individually based for each patient as well as written based on the data obtained from this research in addition to those factors already in place at Clairmont. The findings also indicate the need for expanded educational services at Clairmont. Educational services may need to coordinate with the Developmental Disabilities Administration Coordinator or Occupational Therapist in order to provide more groups involving education targeted at life skills rather than obtaining a GED certificate. If a patient is not appropriate for one of the available education groups such as GED, Adult Basic Education group, or Literacy, they should be referred to either a Developmental Disabilities group or an Occupational Therapy group. It could also be possible that many patients may not be mentally capable of passing the GED and an alternative program may need to be considered to demonstrate their strengths and capabilities. Special education style learning environments and transition services may need to be considered as an alternative. A curriculum plan was also considered as a potential project deliverable. A curriculum plan may entail aspects that were not analyzed in this study and would require

additional research, in-depth understanding of the facility, security measures, and allowable content and manipulatives.

This study potentially presents a number of implications for social change beyond Clairmont. Patients who are struggling in other areas of the hospital with regular expectations placed upon them may begin to show success in education with appropriate accommodations. If they can demonstrate a consistent ability to be successful in education with appropriate accommodations, perhaps those same accommodations can be applied to other areas within the hospital. This may show that they could be successful in a less restrictive environment with the proper supports that could enable their reintegration into the community in the future.

Summary

Overall treatment plans for forensic psychiatric patients in maximum security forensic psychiatric hospitals have changed to place the emphasis on evidence-based treatment practices. These practices require measurable goals with real-world significance (Parks et al., 2014). Education is one area that can be improved upon to positively impact patient reintegration back into society.

The purpose of this study was to test if age at first hospitalization is predictive of level of educational attainment among forensic psychiatric patients, and if so, to determine which ages of first hospitalization best predict each of eight levels of educational attainment. The investigation assists in determining if the age at first hospitalization for mental illness can be used as a predictor for the educational attainment

level among the forensic psychiatric patients who have been diagnosed with a psychotic disorder mood disorder.

The research methodology will be detailed in Section 2. This will include the research design and approach, a description of the setting and sample, the instrumentation and materials which were used for the study and details on how the data was collected and the analysis performed. In Section 2, the assumptions, limitations, scope, and delimitations of the study are also described. A summary of the human subjects' protection measures and institutional review board approval was the final aspect of the study provided in Section 2. The project chosen to address the problem is reviewed in Section 3 including a description and goals of the project, a rationale for choosing the project, and a review of the literature of the project genre. Next steps that would involve implementation, evaluation, and local and far-reaching implications are discussed. Reflections and conclusions of the project are reviewed in Section 4.

Section 2: The Methodology

In Section 1, a gap in practice was identified regarding predictors of educational attainment that involve mental illness diagnosis. This gap in practice is why I tested whether age at first hospitalization is predictive of level of educational attainment as well as which ages of first hospitalization best predict each of eight levels of educational attainment among individuals admitted to Canadian hospitals for psychiatric treatment. A literature review was conducted related to mental illness, age at first hospitalization, educational attainment, mental disorders, cognitive decline, fluid intelligence, crystallized intelligence, and forensic psychiatric facilities. In this section, the design, methodology, and procedures for this study are presented, as I discuss the research approach and design, the setting and sample, instrumentation, and data collection and analysis procedures.

Research Design and Approach

This nonexperimental quantitative research study was an investigation of the relationship between variables to determine whether age at first hospitalization of mental illness can be used as a predictor of educational attainment level. Quantitative research is a way to describe the real world (McCusker & Gunaydin, 2015), which I used to describe age as a predictor of educational attainment with predictive design using multinomial logistic regression (Christensen, Johnson, & Turner, 2014). In this study, both variables (age at first hospitalization and educational attainment) had already occurred and were recorded in the patients' charts upon being admitted to a hospital and archived in the OMHRS database (CIHI, 2017). Variables were not manipulated for this study but were analyzed using multinomial logistic regression analyses. The multinomial logistic

regression model allowed for one dependent variable, educational attainment, and one independent variable, age at first hospitalization. Multinomial logistic regression was used to evaluate age at first hospitalization of specific mental illnesses for the potential to be a statistical indicator for the predictability of educational attainment levels among forensic psychiatric patients. If age at first hospitalization of a specific mental illness was found to be a statistically significant predictor of educational attainment levels among forensic psychiatric patients, odds ratios were used to determine which ages of first hospitalization best predict each of eight levels of educational attainment.

Setting and Sample

Data from the CIHI (2017) were requested through the OMHRS per their requirements. Although statistical information and a minimal amount of aggregate level data are available to the public, record-level data were not available because the CIHI agreements with individual hospitals do not provide permission for exporting record level data internationally (CIHI, 2017). However, CIHI agreed to run the analyses required to calculate statistics for the aggregate level data if I provided all the SAS coding for their system.

The Resident Assessment Instrument 2.0 (RAI-2) is the standardized clinical instrument that is used to collect comprehensive data from individuals receiving inpatient mental health care in Ontario. Participants for this study were chosen based on known characteristics that were relevant to the research questions; therefore, the sampling method for this study was purposive (see Ritchie & Lewis, 2003). All participants had the common characteristics of a diagnosis of psychotic disorder or mood disorder and

being admitted as forensic psychiatric inpatients in Canada during 2011–2016. Choosing participants within this category represents a homogeneous group, so I used a homogeneous purposive sample for this study. All participants were admitted to a forensic psychiatric bed in various facilities throughout Canada; however, not all forensic psychiatric patient data could be utilized for this study due to diagnoses, such as personality disorders, which do not fit within one of the research categories: psychotic disorders and mood disorders.

Multiple experts' recommendations were reviewed to determine the appropriate sample size for multinomial logistic regression. For example, Hosmer, Lemeshow, and Sturdivant (2013) suggested an appropriate sample size of 10 participants per independent variable to achieve significance ($p < .05$) at medium power (.80). Using one independent variable, age at first hospitalization, for the categories of mental illness would require only 30 participants. However, I chose a minimum sample size of 30 per independent variable, which was suggested by Leblanc and Fitzgerald (2000), to achieve significance ($p < .05$) at medium power (.80). Thus, a minimum of 60 participants were required for mood and psychotic disorders, and the data requested produced a sample containing 27,470 participants. According to the Office of the Auditor General of Ontario (2016), 33% of forensic patients admitted are diagnosed with psychotic disorders, and 28% are diagnosed with mood disorders. However, the data reflected 60% (16,440) of patients diagnosed with psychotic disorders and 8% (2,230) diagnosed with mood disorders. Patients diagnosed with a mental illness that did not fit in one of the categories and an additional 8,596 patients who had missing data were excluded from the

study. Because forensic psychiatric patients do not have a predetermined length of stay in the hospital and not every patient was discharged each year, 5 years was an appropriate number of years to ensure the minimum number of patient records were available from each category to have an appropriate sample size per diagnostic group. The first analyses were completed using data from only patients diagnosed with schizophrenia or other psychotic disorders, which totaled $N = 16,639$. The second analyses involved patients diagnosed with a mood disorder with $N = 2,227$. Therefore, both sets of data exceeded the required sample size of 30 per independent variable.

Instrumentation and Materials

I had originally gained information about CIHI data from OMHRS, but after reviewing the clinical coding used on the Resident Assessment Instrument (RAI-2), I needed to make several changes in my approach. Mental illness diagnosis is defined by the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–5*), which provides criteria used in both the United States and Canada in the diagnosis, treatment, and research to define and classify mental disorders (American Psychiatric Association, 2013; CIHI, 2017). For the data provided in this study, facilities reported mental illnesses based on categories from the DSM, and schizoaffective disorder was grouped within the other category containing schizophrenia and other psychotic disorders. Therefore, I was not able to perform the analyses on the third category of mental illness (schizoaffective disorder).

The independent variable, age at first hospitalization, was categorical. Age at first hospitalization indicated approximate age at first inpatient admission for mental health

services involving one or more overnight stays but does not include an overnight stay in the emergency room. This information may be self-reported or may be cross-referenced from previous hospitalization records and is reported upon admission (CIHI, 2013, 2016). According to the Clinical Coding Manual (CIHI, 2013), approximate age groups were estimated in categories as:

- Code "1" if the age at first hospitalization was between 0 and 14.
- Code "2" if the age at first hospitalization was between 15 and 24.
- Code "3" if the age at first hospitalization was between 25 and 44.
- Code "4" if the age at first hospitalization was between 45 and 64.
- Code "5" if the age at first hospitalization was 65 or older

Educational attainment level, as defined by the U.S. Census Bureau (2016), is the highest level of education completed, which differs from the highest education level attended. Educational attainment level is self-reported when the patient is admitted to the hospital or may be cross-referenced from previous hospitalization records. Educational attainment level is an OMHRS mandatory data element identified as: BB5, Education (CIHI, 2016). Upon reviewing the nine categories of educational attainment described in the clinical coding manual (CIHI, 2013), only eight categories could be used for the study. It was necessary to discard data if the ninth category titled "unknown" was reported. The categories reported were:

1. No schooling: The person received no formal schooling at all.

2. Eight grades or less: The person attended eight grades or less of school. This includes persons with an intellectual disability diagnosis who have received special education services.
3. Nine to 11 grades: The person left school having completed nine to 11 grades.
4. High school: The person obtained a high school diploma and completed school through the 12th grade or through an adult education program.
5. Technical or trade school: The person received a non-degree certificate in any technical occupation or trade (for example, carpentry, plumbing, acupuncture, baking, secretarial, practical/vocational nursing or computer programming).
6. Some college or university: The person completed some college courses at a (community) college, an associate degree or an incomplete bachelor's degree.
7. Diploma or bachelor's degree: The person completed an undergraduate bachelor's degree or college diploma.
8. Graduate degree: The person completed a master's degree or higher (MSc, PhD, MD, etc.).
9. Unknown: To be used only when the assessor has been unsuccessful in determining the person's educational level.

Data Collection and Analysis Strategy

The nature of this study was a quantitative study with secondary analysis of data that was previously collected upon admission into a general hospital or mental health facility in Ontario, Canada. Informed consent was not required because there was no direct contact with the patients at any of the facilities. Multinomial logistic regression

was used to determine the predictive relationships between educational attainment level and age at first hospitalization of mental illness among forensic psychiatric patients who were admitted to a maximum security forensic psychiatric facility from 2011 to 2016. Multinomial logistic regression best fit this study because it provided the analysis ability to test whether age at first hospitalization is predictive of level of educational attainment and which ages of first hospitalization best predict each of eight levels of educational attainment among individuals admitted to Canadian hospitals for psychiatric treatment (Hosmer et al., 2013).

Assumptions, Limitations, Scope, and Delimitations

Assumptions

There were four assumptions that informed the study: (a) patients understood the questions asked on the Resident Assessment Instrument-Mental Health (RAI-MH), which is the instrument used to collect the data (CIHI, 2016); (b) patients were able to give accurate and reliable answers when providing responses; (c) patient responses were recorded accurately by the intake administrators; and (d) diagnoses assigned to each patient are accurate.

Limitations

One limitation to consider is that individuals who receive special education services are not always academically on the grade level they are considered for reporting purposes. For example, when a patient reports that they completed 10th grade, they may have only achieved a seventh grade education depending on their modifications, accommodations, and Individualized Education Plan (IEP).

Another limitation is that age at first hospitalization for treatment of a mental illness is self-reported. Self-reported responses have increased error rates with longer recall periods, but less information is provided with shorter recall periods, causing researchers to choose from gathering more data or more accurate data (Kjellsson, Clarke, & Gerdtham, 2014; Seidl et al., 2016). The forensic psychiatric patients in Canada are 85% male, which creates an additional limitation of an expected lack of female forensic psychiatric patient data (Livingston et al., 2012). Human error may have also occurred during the data collection process such as committing a transcription error, which may affect the accuracy of the results established from the study (Creswell, 2013).

Scope of the Study and Delimitations

Delimitations determine the "who, what, where, and when of a study" (Beins, 2005, p. 138). Delimitations were used to establish the boundaries of this study, influencing the ability of the generalization of the results. The scope of this study was four specialized forensic psychiatric hospitals located in one Canadian Province. It was delimited to other forensic psychiatric patients admitted to treatment facilities, such as Clairmont, designed for forensic patients diagnosed with a mental illness (e.g., schizophrenia, bipolar disorder, mood disorder, or schizoaffective disorder). The forensic psychiatric patients and the facilities in Canada from which the data were collected have similarities with other forensic psychiatric patients and facilities across Canada and throughout the United States (Rice et al., 2005); therefore, the results from this study may be generalized to other North American forensic psychiatric settings.

Protection of Participant's Rights

Due to the protected class of the participants and the sensitivity of the data to be collected, no personal identifiers were requested from CIHI for this study and provided data were free from any personal identifiers. No adverse effects or consequences of the study are possible because the data for both variables (educational attainment level and age at first hospitalization) were previously collected for other purposes. Due to the data collection method and the secondary analysis method, informed consent was not required to be given by the patients.

Data Analysis Results

Descriptive Statistics

Descriptive statistics, including frequency distributions and measures of dispersion, summarize the sample. The dependent variable for this study was educational attainment. The distribution of educational categories by diagnoses for the years 2011–2016 is shown in Figure 1. Educational attainment varied by diagnosis. The most common education level achieved by patients diagnosed with schizophrenia or other psychotic disorders was ninth-11th grade. However, the most common education achievement level of patients diagnosed with mood disorder was high school graduate. For this study, high school graduate was chosen as the reference for each of the two categories of mental illness due to the importance of attaining a high school diploma.

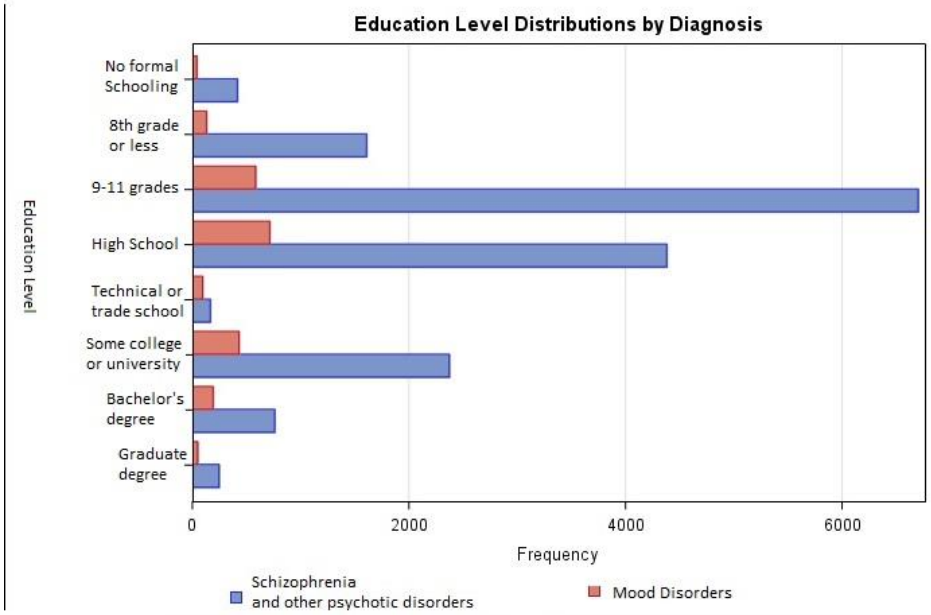


Figure 1. Education level distribution by diagnosis.

The age at first hospitalization distributed by education level is shown in Figure 1 and Table 1. The most frequent age category for first hospitalization of patients with schizophrenia or other psychotic disorders was 15-24 years. The most frequent grade level completed by patients aged 0-14, 15-24, 45-65, and 65+ with schizophrenia or other psychotic disorders was ninth -11 grade education. For patients aged 25-44 years, a high school diploma was the most frequent education level. Patients aged 15-24 with ninth - 11th grade education represented the largest group at 47.94%.

Table 1

Age at First Hospitalization by Education Level for Schizophrenia or Other Psychotic Disorder

Age	Education Level								
	No schooling	8 grades or less	9-11 grades	High School Graduate	Tech or Trade School	Some College	Bachelor's Degree	Graduate Degree	Total
0-14	72 7.12%	203 20.08%	426 42.14%	213 21.07%	3 0.30%	77 7.62%	15 1.48%	2 0.20%	1011 6.62%
15-24	180 1.96%	819 8.92%	4401 47.94%	2317 25.23%	63 0.69%	1132 12.33%	201 2.19%	67 0.73%	9180 55.17%
25-44	139 2.55%	457 8.37%	1612 29.53%	1637 29.99%	75 1.37%	943 17.28%	456 8.35%	139 2.54%	5458 33.80%
45-64	21 2.33%	108 11.96%	237 26.25%	196 21.70%	24 2.65%	209 23.15%	70 7.75%	38 4.21%	903 5.43%
65 or older	2 2.30%	19 21.84%	23 26.44%	14 16.09%	0	11 12.64%	18 20.69%	0	87 0.52%

Patients who were diagnosed with a mood disorder are shown in Table 2. The most frequent age category for first hospitalization of patients with mood disorders was 25-44 years of age. The most frequent grade level completed by patients aged 0-14, 15-24, and 65+ with mood disorders was ninth-11th gradeeducation. A high school diplomas was held by most 25-44-year-old patients and 45-64-year-old patients. The highest percentage (40.00%) of the education categories completed by each age category was ninth-11th grade education for the 65 and older patients.

Table 2

Age at First Hospitalization by Education Level for Mood Disorders

Age	Education Level								
	No schooling	8 grades or less	9-11 grades	High School Graduate	Tech or Trade School	Some College	Bachelor's Degree	Graduate Degree	Total
0-14	1 1.11%	10 11.11%	33 36.67%	25 27.78%	2 2.22%	13 14.44%	4 4.44%	2 2.22%	90 4.04%
15-24	15 1.73%	40 4.60%	297 34.18%	290 33.37%	23 2.65%	157 18.07%	32 3.69%	15 1.73%	869 39.02%
25-44	15 1.61%	55 5.92%	180 19.38%	301 32.40%	52 5.60%	199 21.42%	103 11.08%	24 2.58%	929 41.72%
45-64	9 3.01%	21 7.02%	56 18.73%	87 29.10%	15 5.02%	59 19.73%	45 15.05%	7 2.34%	299 13.43%
65 or older	1 2.50%	4 10.00%	16 40.00%	9 22.50%	1 2.50%	2 5.00%	7 17.50%	0 0	40 1.80%

Although, there is no evidence to suggest that any potential correlation between age at first hospitalization of a mental illness and educational attainment relevant to this study would be impacted by gender, graphs that show the variation among genders for this study can be found in Appendix B.

Assumptions of Multinomial Logistic Regression

Appropriate sample size. The first of the five assumptions of multinomial logistic regression is an appropriate sample size. As previously stated, using LeBlanc and Fitzgerald's (2000) more conservative model, a minimum sample size of 30 participants per independent variable is required to achieve significance ($p < .05$) at medium power (.80). With one independent variable per category of mental illness, this study required a total of 60 participants for the two disorders, and the data for this study produced 18,866 records from 2011 to 2016. Therefore, this study met the sample size minimum requirements and for sufficient statistical power to detect an effect if there is an effect to be detected.

Independence of irrelevant alternatives. According to Starkweather and Moske (2011), "this assumption states the choice of or membership in one category is not related to the choice or membership of another category (i.e., the dependent variable)" (p.1). Therefore, regardless of the availability or characteristics of other choices, they have no influence on the selection of choice of the nominal dependent category. The Hausman-McFadden test and the Small-Hsiao test are most often used to test this assumption (Cheng & Long, 2007). However, both the McFadden and Small-Hsiao tests perform poorly even in large samples such as the sample used in this study (Allison, 2012). Cheng & Long (2007) concluded that "tests of the IIA assumption that are based on the estimation of a restricted choice set are unsatisfactory for applied work".

No multicollinearity. This is the requirement that two or more independent variables may not be highly correlated. This study has only one independent variable and therefore, meets this assumption (Harrell, 2015).

Multinomial linearity. This assumption must be verified between any continuous independent variable and dependent variable (Laerd Statistics, 2018). The independent variable (age at first hospitalization) is categorical, and therefore, this assumption is not relevant. As explained by Lisic (2012), assessing linearity of categorical variables would essentially be implementing a one-way ANOVA without a way to measure the distance between categories leaving the linear relationship between the response variable and the regressors not well defined.

No significant outliers. The fifth and final assumption of multinomial logistic regression is having no significant outliers. Hawkins (1980) stated one of the most

widely accepted definitions of an outlier: “An outlier is an observation that deviates so much from other observations as to arouse suspicion that it was generated by a different mechanism”. Because this study uses a categorical independent variable with only 5 categories, no observations deviate beyond the acceptable limit of +/-3. Therefore, there can be no outliers identified.

Multinomial Logistic Regression Analyses

After verifying that the data met the assumptions, I implemented multinomial logistic regression analyses to investigate the predictive relationship between a forensic psychiatric patient’s age at first hospitalization and their educational attainment. I selected the category of ages 15 – 24 as the reference for age at first hospitalization based on the typical age at onset for the mental illnesses involved in this study (see Table 2). I also chose high school graduate as the reference category for educational attainment based on the societal norm of the high school diploma expectation.

The multinomial logistic regression analyses included 16,639 forensic psychiatric patients who had been diagnosed with schizophrenia or other psychotic disorder and 2,227 patients diagnosed with a mood disorder. I applied univariate analyses to determine a response for the first and third research questions as follows:

Research Question 1: Can the age at first hospitalization predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders) from 2011 to 2016?

$H_0$1: Age at first hospitalization does not predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders).

H_a1: Age at first hospitalization does predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders).

The criteria for model fitting show the calculations -2(log likelihoods, LogL) for the intercept-only model (also known as null model) versus full model (model including the only predictor) are shown in Table 3. The full model has a lower value of -2 Log L indicating a better fit over the intercept only model. The Wald chi-square test is commonly used to determine significance of a single predictor. As shown in Table 3, the Wald chi-square was found to be significant ($p < .0001$) indicating a rejection of the null hypothesis and supporting age at first hospitalization as a useful predictor of education attainment level for patients diagnosed with schizophrenia and other psychotic disorders (Hosmer & Lemeshow, 2000; Long, 1997; Newsom, 2010). Cramer's *V*, also in Table 3, was calculated to determine the strength of the relationship between the age at first hospitalization and educational attainment level. Values range from 0 to 1, and values closer to 1 show a stronger association. The value for schizophrenia and other psychotic disorders was calculated to be .1417 indicating a small effect for this predictor (Rea & Parker, 2005).

Table 3

Model Fitting Statistics for Null Versus Final Regression Models for Patients Diagnosed with Psychotic Disorders

	Model fitting criteria	Type 3 Analysis of Effects			Cramer's *V*
Model	-2 Log L	Wald χ^2	Df	Sig.	
Intercept Only	51975.583				
Final Model	50723.909	1195.6418	28	*P*<.0001	0.1417

Research Question 3: Can the age at first hospitalization predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders from 2011 to 2016?

$H_0$3: Age at first hospitalization does not predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders.

H_a3: Age at first hospitalization does predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders.

The criteria for model fitting show the calculations -2(log likelihoods, LogL) for the intercept-only model (also known as null model) versus full model (model including the only predictor) for patients diagnosed with mood disorders are shown in Table 4. The full model has a lower value of -2 Log L indicating a better fit over the intercept only model. As shown in Table 4, the Wald chi-square was found to be significant for patients diagnosed with mood disorders ($p < .0001$) demonstrating support for the age at first hospitalization as a useful predictor of education attainment level (Hosmer & Lemeshow, 2000; Long, 1997; Newsom, 2010); therefore, indicating a rejection of the null

hypothesis. Cramer's *V*, also in Table 4, was calculated to determine the strength of the relationship between the age at first hospitalization and educational attainment level. Values range from 0 to 1, and values closer to 1 show a stronger association. The value for mood disorders was determined to be .1244 indicating a small effect of age at first hospitalization as a predictor for patients diagnosed with mood disorders (Rea & Parker, 2005).

Table 4

Model Fitting Statistics for Null Versus Final Regression Models for Patients Diagnosed with Mood Disorders

	Model fitting criteria	Type 3 Analysis of Effects			Cramer's *V*
Model	-2 Log L	Wald χ^2	df	Sig.	
Intercept Only	7563.752				
Final Model	7421.269	126.7865	28	*P*<.0001	0.1244

Evaluation of the Multinomial Logistic Regression Model

Goodness of fit. Because the R^2 statistic cannot be calculated correctly for multinomial logistic regression, the pseudo-R^2 statistics were calculated to provide goodness of fit approximations for each diagnostic category model. Pseudo-R^2 must have a value greater than zero because zero indicates the slope coefficients are zero, and a value of one would indicate a perfect prediction. Therefore, pseudo-R^2 must be greater than zero but less than one with higher values closer to one indicating a better fit model (Hu, Shao, & Palta, 2006). The three most commonly used pseudo-R^2 statistics are

known as (a) McFadden, (b) Cox and Snell, (c) Nagelkerke (Tabachnick & Fidell, 2007). The SAS program calculated the Cox and Snell represented as the R-Square and Nagelkerke pseudo-R^2 statistics represented as the Max-rescaled R-Square shown in Table 5. The Cox-Snell pseudo R^2 is equivalent to 1 minus the ratio of the likelihoods with those values closer to one demonstrating a greater improvement of the fitted model over the null model (Allison, 2014). The extreme low Cox-Snell pseudo R^2 values in this study allows room to consider other factors that may influence education attainment levels. The Nagelkerke pseudo-R^2 is similar to the Cox-Snell but adjusts to allow for easier interpretation with a range of $0 < R^2 < 1$ (Walker & Smith, 2016).

Table 5

R-Square and Pseudo-R^2 Statistics

	Cox-Snell *R*-Square	Nagelkerke pseudo-R^2
Patients diagnosed with Schizophrenia and other psychotic disorders	0.0725	0.0758
Patients diagnosed with mood disorders	0.062	0.0641

Odds ratios analyses were calculated using multinomial logistic regression to provide interpretations such as if patients diagnosed with a mental illness in each diagnostic category increased the age at first hospitalization by one category, the multinomial log-odds of attaining a specific level of education over a referent level would increase or decrease by β units. β is the estimated regression coefficient for the predictive model. In SAS programming, the log odds represent the factor increase in the odds of

moving into a lower order category for each increase of 1 unit. Odds ratios equal to one would indicate that the likelihood of the outcome event (educational attainment level) was equal to the likelihood of the referent event outcome (high school diploma). Odds ratios with 95% confidence intervals including one would indicate failing to reject the null hypothesis that this particular regression coefficient is zero (Peng & Nichols, 2003).

Schizophrenia and other psychotic disorders. The odds ratios answer the following research question about which ages of first hospitalization best predict each of the eight levels of educational attainment.

Research Question 2: If the age at first hospitalization is predictive of the educational attainment level of forensic psychiatric patients diagnosed with schizophrenia and other psychotic disorders from 2011 to 2016, which ages of first hospitalization best predict each of the eight levels of educational attainment? Following are interpretations of relevant data.

- The odds ratios (complete table located in Appendix B) for patients first hospitalized with schizophrenia and other psychotic disorders prior to age 15 when compared to those first hospitalized between 15-24 were found to be 84.7% more likely to receive no schooling than achieve high school graduation and 72.9% more likely to attain less than eighth grade than a high school diploma.
- Compared to patients first hospitalized with schizophrenia and other psychotic disorders between the ages 15-24, those first hospitalized between 25-44 years of age are 26.5% more likely to attain a high school diploma than attain an

education level of eighth grade or less and 29.7% more likely to attain a high school diploma than only a ninth-11th-grade education.

- Those patients first hospitalized between 25-44 years of age indicated an increased likelihood to obtain the education level beyond high school in every education category when compared to those who were first hospitalized between the ages of 15 and 24: 68.5 % more likely to complete trade or technical school, 17.9% more likely to have some college education, 76.3% more likely to complete a bachelor degree, and 74.6% more likely to complete a graduate degree than attain a high school diploma.
- Patients first hospitalized with Schizophrenia and other psychotic disorders between the ages of 45 and 64 are 55.9% more likely to attain an eighth grade education or less when compared to those first hospitalized between 15-24 years old, but are 26.6% more likely to complete a high school diploma than attain only a ninth-11th grade education.
- Patients first hospitalized between the ages of 45-64 are also more likely to attain levels beyond the high school diploma in every category than those first hospitalized between 15 and 24 years of age: 81.8% more likely to complete trade or technical school, 68.6% more likely to have some college, 80.4% more likely to complete a bachelor degree, and 87.0% more likely to complete a graduate degree.
- Odds ratios indicate it is 79.8% more likely for those with a first hospitalization for Schizophrenia or other psychotic disorder at age 65 or

older to have less than an eighth grade education and 93.7% more likely to complete a bachelor's degree when compared to those first hospitalized between the age at 15 and 24.

The age at first hospitalization that bests predicts each level of educational attainment were determined by the highest odds ratio and are listed in table 6.

- The odds ratio for no schooling was statistically significant only for patients first hospitalized at age 14 and under indicating 84.7% more likely to have no schooling than complete a high school diploma.
- Patients who were first hospitalized at age 65 or older were 79.3% more likely to attain an eighth grade education or less than achieving a high school diploma indicating a first hospitalization age at 65 or older is the best predictor for attaining an eighth-grade education or less.
- This study did not produce any statistically significant age groups as a predictor for attaining a ninth-11th-grade education.
- An age at first hospitalization of 45-64 was found to be the best predictor for completing trade or technical school. An odds ratio of 4.503 indicates it is 81.8% more likely to complete trade or technical school than complete a high school diploma if a patient was first hospitalized between the ages of 45-64.
- It was 68.5% more likely for patients first hospitalized between the ages of 45-64 to attend some college than to attain only a high school diploma demonstrating this age group is the best predictor for attending some college.

- An age at first hospitalization at age 65 and older was the best predictor for attaining a bachelor's degree as it is 93.6% more likely than attaining only a high school diploma.
- Patients who were first hospitalized between 45-64 were 87.0% more likely to attain a graduate degree rather than a high school diploma indicating an age at first hospitalization of 45-64 is the best indicator for a graduate degree education level.

Table 6

Best Predictor by Education Level for Patients Diagnosed with a Psychotic Disorder

Education Level	Age at First Hospitalization	Exp(β)	95% Wald Confidence Limits	
No Schooling	14 and Under	4.351	3.2	5.916
Less than 8th grade	65 and older	3.839	1.916	7.693
9-11 grades	No predictor for attaining this education level			
High School	Chosen as the referent grade level			
Technical or trade school	45-64	4.503	2.753	7.367
Some college	45-64	2.183	1.774	2.686
Bachelor's degree	65 and older	14.821	7.264	30.241
Graduate degree	45-64	6.705	4.388	10.244

Mood disorders. The analyses were employed to determine a response to Research Question 4: If the age at first hospitalization is predictive of the educational

attainment level of forensic psychiatric patients diagnosed with mood disorders from 2011 to 2016, which ages of first hospitalization best predict each of the eight levels of educational attainment? Odds ratios for patients diagnosed with a mood disorder were dramatically different than those for patients diagnosed with Schizophrenia or other psychotic disorder. There were only seven found to be statistically significant ($p < .05$).

- Patients first hospitalized at age 14 or younger are 74.3% more likely to attain an education level of eighth grade or less than a high school diploma compared to those first hospitalized between the ages of 15-24. This model again supports the limitation of higher education levels due to the age at the participants.
- Patients who were first hospitalized with a mood disorder between the ages of 25 and 44 were 71.2% more likely to receive a high school diploma than attain an education level of ninth-11th grade when compared to patients who were first hospitalized between the ages of 15 and 24.
- Patients first hospitalized with a mood disorder between the age at 25 and 44 were 75.6% more likely to attain a university degree than a high school diploma.
- Patients first hospitalized with a mood disorder between the age at 45 and 64 were 82.4% more likely to attain either a university degree and 68.4% more likely to complete a technical or trade school than achieve only a high school diploma compared to patients first hospitalized between 15 and 24.

- Patients who were first hospitalized at age 65 or older were 87.6% more likely to complete a university degree than a high school diploma when compared to those first hospitalized with a mood disorder between the age at 15 and 24.

The age at first hospitalization that bests predicts each level of educational attainment was determined by the highest odds ratio and are listed in table 7.

- There were no statistically significant predictors for education levels “no schooling” and “some college”.
- The Less than eighth grade education level had a best predictor of age 14 and under.
- Grades 9-11 had two statistically significant age groups. Age at first hospitalization of 25-44 had an odds ratio of .584, and age at first hospitalization of 45-64 had an odds ratio of .629. These odds ratios are between 0 and 1 indicating a high school diploma was more likely than only attaining a ninth – 11th grade education. Therefore, there is no predictor that supports individuals attaining a ninth-11th grade education level.
- The best predictor for college degree levels increased in age as the degree level increased. The best predictor for bachelor’s degree is age group 25-44, and the best predictor for graduate degree is age group 65 and older.

Table 7

Best Predictor by Education Level for Patients Diagnosed with Mood Disorders

Education Level	Age at First Hospitalization	Exp(β)	95% Wald Confidence Limits	
No Schooling	No statistically significant age group			
Less than 8th grade	14 and under	2.9	1.297	6.483
9-11 grades	No predictor for attaining this education level			
High School	Chosen as the referent grade level			
Technical or trade school	45-64	2.174	1.087	4.348
Some college	No statistically significant age group			
Bachelor's degree	25-45	3.101	2.021	4.759
Graduate degree	65 and older	7.049	2.459	20.204

Summary

Using the quantitative design method, the data collected provided some additional insight to this unique population and will build on the limited research that is currently available. Considering the timelines and age factors of both fluid intelligence and crystallized intelligence, the effect of the age at first hospitalization of a mental illness could impact one's ability to attain education that may provide an additional piece of information to be used when determining placement upon the patient's referral to educational services.

Many of the best predictors per education level for patients diagnosed with schizophrenia and other psychotic disorders can be coordinated with the ages of which

individuals attend the various levels of schooling. For example, some participants could be current patients at an age younger than 14 years old thereby limiting their ability to attain further education levels such as a high school diploma or education beyond high school. However, this would not account for those older patients who were first hospitalized at an early age but were unable to achieve beyond an eighth grade level or received no schooling as they aged. Their ability to attain education appears to be truncated which could be an effect of their development of fluid and crystallized intelligence. As previously stated, the same intelligence performances including speeded tasks, abstract problem-solving, and unfamiliar performances, which commonly decline at a more rapid rate in individual's with schizophrenia are the same performances associated with fluid intelligence which decline with age.

Those individuals who were first hospitalized between the ages of 45-64 years of age would be older than the typical age at individuals who complete technical or trade school, some college and even those who complete a graduate degree. The college dropout rate can also account for those not completing their college degrees. Those who were not hospitalized prior to the age at 65, would have had enough years to complete a bachelor's degree. This is further evidence that when the education and experiences that increase crystallized intelligence are not interrupted, educational attainment is not truncated. The statistically significant age groups for education level ninth-11th grade were more likely to complete high school than dropping out in the ninth-11th grades. However, the referent age category of 15-25 years old covers a wide span including the typical years in which a person may graduate and go on to other education levels. There

could be a vast difference in the education levels for those hospitalized between 15-18 and those first hospitalized between 19 and 25. The one best predictor that appeared to be out of the ordinary was for the less than eighth grade education level. At first, the age at first hospitalization between the ages of 45-64 seemed to be a stark contrast of the same age group as the best predictor for most education levels beyond a high school diploma. However, upon further examination and additional research, the predictor makes more sense. The youngest person in that age range would have entered school in the year 1980. Prior to 1980, the minimum dropout age for schools was 15 years old or less in many provinces including New Brunswick, Quebec, Prince Edward Isle, and British Columbia (Oreopoulos, 2005). Many areas also had exemptions for children who had to work to sustain their families or for children who could pass a seventhor eighth grade equivalency test (Oreopoulos, 2005).

There were less participants who were diagnosed with mood disorders. In this study, the participants were found to have an increased rate of higher education levels when their age at first hospitalization increased which also matches with the development of fluid and crystallized intelligence. When the education and experiences were not interrupted at an early age, an increased crystallized intelligence was more likely leading to an increased educational attainment level. The exception was trade or technical schooling with a best predictor of age at first hospitalization of 45-64. However, this education attainment occurs beyond initial development allowing an increase in crystallized intelligence.

The most relevant education levels for this study's problem are those within the range of kindergarten through 12th grade. Although the effect is small, age at first hospitalization can be used as a predictor to assist in the appropriate placement of patients requesting education services especially GED classes. In both categories of mental illness, patients were more likely to attain a high school diploma than dropping out between the ninth to 11th grade unless first hospitalized at age 14 or under. In Section 3, I provide details of the final project found in Appendix A which evolved from the results of the research, and I discuss information about the project rationale, goals, implementation, and potential implications.

Section 3: The Project

Based on the findings of this study, a white paper, which includes an analysis of the data, is the project deliverable. The white paper is a document intended to present the findings of this study and recommendations based on the analyses supported by the literature review to the Clairmont director of education. The rationale for using the white paper format and a scholarly review of literature in support of the recommendations are included in this section.

Rationale

The lack of predictive measures and overall research on forensic psychiatric patient educational attainment is addressed by providing the findings of this research in a white paper, which can then be included in available research. Presentations in written formats that are suitable for policy and practice audiences is the most common strategy for the communication and dissemination of research results (Tseng, 2012). The findings of the study, presented in Section 2, indicated that the age at first hospitalization is a predictor of educational attainment as well as which age at first hospitalization is a best predictor of each level of education. The results of this study also provide insight into potential changes to educational placement procedures, which can lead to more appropriate placement of patients seeking their GED or other educational opportunities while receiving mental health treatment in a forensic setting. The intention behind choosing this study was to improve the procedure for placing forensic psychiatric patients in appropriate education classes to improve the overall education services provided at Clairmont. The goal of the white paper is to communicate the findings of the study and

propose changes in the educational placement practices based on the findings, as long-term changes in education are often initiated by academic policymakers using unbiased research (Kahn et al., 2009). Recommendations for additional educational opportunities that are more aligned with the appropriate placement of patients are also in the white paper.

A curriculum plan was also considered as a project deliverable. A curriculum plan requires learning goals, specific content, content sequences, instructional methods, and an evaluation approach (Lattuca & Stark, 2011). I did not choose a curriculum plan because additional research would be necessary to meet these requirements and develop curricula. Further, the study was intended to provide research on appropriate educational placement and creating a curriculum plan would not have been appropriate for presenting potential recommendations on educational placement. An evaluation report was also not an appropriate project deliverable because the study was not designed to provide research on a program evaluation. I also did not choose a professional development option because the research was designed to investigate the possible existence of a predictive relationship between age at first hospitalization and educational attainment among forensic psychiatric patients to provide more appropriate placement and setting attainable goals. A 3-day intensive training as required for the professional development project deliverable would not have been appropriate for communicating the results of this study to the limited number of staff who evaluate patients for educational placement and write educational goals. Therefore, I chose the white paper as the most effective means of

communicating the results of this study and highlighting the recommendations to the appropriate staff.

Review of the Literature

An analysis of the data suggested that the age at first hospitalization is a predictor of educational attainment among forensic psychiatric patients diagnosed with the two most common diagnoses: schizophrenia and other psychotic disorders or mood disorders (de Tribolet-Hardy & Habermeyer, 2016; Robertson et al., 2015). To include this predictor as part of the educational placement procedure for forensic psychiatric patients, it is important to gain an understanding of the best predictor identified for those education levels which are the focus of education services at Clairmont.

I reviewed the literature using keywords such as *white paper, position paper, grey literature, policy recommendations, age at first hospitalization and education placement or school placement, mental illness and education placement or school placement, educational predictors, schizophrenia and education, mood disorders and education, mood disorders, bipolar and education, bipolar and high school, bipolar and GED, psychosis and fluid and crystallized intelligence, schizophrenia and fluid and crystallized intelligence, mood disorders and fluid and crystallized intelligence,* and *adolescence and fluid and crystallized intelligence.*

A white paper was chosen to communicate results and present policy recommendations to administration, policy makers, and community stakeholders. White papers are a type of grey literature, which involves information produced on different areas in different formats where commercial publishing is usually not involved (Mering,

2018; White et al., 2013). White papers are frequently used in policy and practice settings (Nutley, Walter, & Davies, 2007). The stakeholders for this project primarily consist of health care professionals in a policy and practice setting whose primary function is not education related. Because a white paper can be created in a variety of formats and approaches (Lawrence, 2017), I was able to appropriately present recommendations for changes to an educational policy in a forensic health care setting. The literature review also produced results supporting a lack of research in education in the forensic psychiatric population, which makes a white paper an appropriate addition to the research.

Rationale

When considering the dynamic link between education and criminal behavior, increasing education can have long-term effects on reducing criminal behavior (Batchelder, O'Neill, Rodriguez, & Tibbs, 2018; Rud, 2015; Visher, Lattimore, Barrick, & Tueller, 2017). The best predictor for no schooling was an age at first hospitalization with a diagnosis of schizophrenia or other psychotic disorder at age 14 or under, and this diagnosis and age range were a statistically significant predictor of achieving less than an eighth-grade education for those diagnosed with psychotic disorders or mood disorders. The literature indicated that cognitive dysfunction is more prevalent in adolescents with an early onset diagnosis of schizophrenia than in individuals with a later onset (Teigset et al., 2018), and those diagnosed with early onset bipolar disorder, a prevalent diagnosis in the forensic setting (Fovet et al., 2015), are in multiple systems of care such as special education, child welfare, mental health services, and emergency psychiatric care, which

leads to poorer outcomes (Connor, Ford, Pearson, Scranton, & Dusad, 2017). Additionally, youth with disabilities involved with the juvenile justice system have poorer education outcomes than those not involved with the juvenile justice system (Cavendish, 2014). The disruption during development of young people caused by psychosis can hinder an individual's ability to achieve key milestones including education-based milestones (Bilaç, Ercan, Uysal, & Aydin, 2014; Fowler, Hodgekins, & French, 2017; Meservey & Skowyra, 2015). Adolescents and young adults with first episode hospitalization often become education dropouts (Bond, Drake, & Luciano, 2015; Cornaglia, Crivellaro, & McNally, 2015). Therefore, obtaining a GED is a priority for improving a patient's ability to function in the community by providing opportunities for higher hourly wages, higher number of hours worked, higher job satisfaction, and better fringe benefits from employers (Heckman, Humphries, & Veramendi, 2015; Schubert, Mulvey, Hawes, & Davis, 2018; Song, 2011).

Even though education opportunities like GED can improve patient outcomes, it is important to appropriately place patients. If the age at first hospitalization was at 14 years old or under, and the patient is diagnosed with either schizophrenia or a mood disorder, GED classes may not be the most appropriate placement, especially if the patient was involved in special education and/or was involved with the juvenile justice system. One aspect to consider in the education placement of patients is that the stability of crystallized intelligence increases with maintenance and improvements throughout adulthood, but fluid intelligence peaks in late adolescence or early adulthood followed by a steady decline (Horn, 2008; Schroeders, Schipolowski, & Wilhelm, 2015). Crystallized

intelligence is more sensitive to learning and formal education than fluid intelligence, but fluid intelligence is still sensitive to differentiation of learning environments (Becker, Lüdtke, Trautwein, Köller, & Baumert, 2012; Hunt, 2007). The course of crystallized intelligence throughout age depends on the knowledge acquired (Ackerman, 2000). If a mental illness is severe enough to require a first hospitalization prior to age 14 and under, crystallized intelligence may be affected due to lack of ability to attend formal education and ability to acquire knowledge through learning, and fluid intelligence may be impacted due to the difference in learning environments.

Results of this study and the literature further support the effect of age of first hospitalization on education attainment. There were two statistically significant odds ratios for patients first hospitalized with schizophrenia and other psychotic disorders for ninth-11th-grade; however, both statistically significant ages of first hospitalization (15-24 and 25-44) indicated that they are more likely to complete a high school diploma than attain a ninth-11th grade education. The age categories used by CIHI complicates these findings. Individuals typically graduate high school at age 17 in the United States and age 17-18 in Canada (Organisation for Economic Co-operation and Development, 2018). The age category used by CIHI includes 15 to 24-year-olds, the typical individuals who would have obtained a high school diploma, and the typical age at onset of schizophrenia for males is 15-25 (Schizophrenia Facts and Statistics, 2010). Individuals who are first hospitalized age at 15-17 may not have been able to complete their education, whereas others who are hospitalized between the ages of 18-24 may have already obtained their diplomas. Additionally, males with psychosis were found to have lower fluid and

crystallized intelligence, and females with psychosis were found to have lower fluid intelligence than those without psychosis (Ćosović, Todorović, Andrić-Petrović, & Marić, 2016). In schizophrenia, cognitive ability is affected by the dysfunction of a frontoparietal neural network, which is believed to support fluid intelligence (Joyce, 2013). Lower fluid intelligence is also associated with greater severity across disorders, and a lower mean IQ has been associated with past year bipolar episodes (Keyes, Platt, Kaufman, & McLaughlin, 2017). Moreover, changes in learning environments or inability to attend school may affect crystallized intelligence (Esch et al., 2014; Isohanni et al., 2001).

Consideration also needs to be given to older patients who ask for education services. At the adult level, individuals are now required to be involved in planning their own lives (Department of Health and Human Services, 2014). The research demonstrated that patients diagnosed with schizophrenia and other psychotic disorders who have their first hospitalization between 45-64 years old are more likely to obtain postsecondary education, and patients diagnosed with mood disorders who have their first hospitalization between 25-44 years old are more likely to obtain a bachelor's degree. However, cognitive impairment is more generalized and severe in patients who have chronic schizophrenia compared to first-episode patients (Expósito & Felipe-Castaño, 2018). Premorbid cognitive functioning, duration of illness, age, lack of educational milestone achievements, severity of symptoms, and being institutionalized are all contributing factors of cognitive decline or deficits (Expósito & Felipe-Castaño, 2018). Therefore, these factors should be considered when determining educational placement of

older patients who have been diagnosed with schizophrenia or other psychotic disorders but are not currently hospitalized for their first episode. Other consideration needs to be given to a reduction in brain volume in the hippocampus for patients with psychotic disorders, as this affects memory, cognitive performance, and fluid intelligence (Mathew et al., 2014; Zhu, Chen, Dang, Dong, & Lin, 2017). Therefore, older patients who have been diagnosed with schizophrenia and other psychotic disorders or psychotic bipolar disorder will have challenges obtaining a GED. Although there have been advances in treatment, less than 14% of patients diagnosed with schizophrenia are able to achieve sustainable symptomatic and functional recovery outcomes (Fowler et al., 2017; Jääskeläinen et al., 2012). Without sustainable symptomatic and functional recovery, patients are less likely to be successful in areas such as education (Fowler et al., 2017).

Patients who are not able to complete their GED need alternative educational opportunities. Adults who participated in a Life Skills program were found to have improved depression symptomology (Reddon, Hoglin, & Woodman, 2008). Life skills education refers to instruction focused on developing skills necessary to cope with challenges and demands that occur in daily life including communication, decision-making, and problem-solving skills (Baldo & Uzamugunda, 2000; Jordaan, Beukes, & Esterhuyse, 2018; Kirmayer, Boothroyd, Laliberté, & Simpson, 1999). Skills which are commonly referred to as Instrumental Activities of Daily Living (IADL) include budgeting or money management, shopping for groceries, and preparing meals (American Occupational Therapy Association (AOTA), 2014; Newcomer, Kang, Kaye, & LaPlante, 2002). Goal-focused programs are effective in supporting skill development

in these areas which increases successful transitioning to the community (Keenan, King, Curran, & McPherson, 2014). Life skills is a widely accepted intervention for increasing skills necessary for everyday life and have been found to show significant enhancement of mental health among adolescents who have been diagnosed with a mental illness (Das et al., 2016).

Project Description

A white paper was chosen as the project deliverable in order to communicate the findings and recommendations to the administration. The administration consists of research-oriented clinicians who practice an evidence-based approach. The white paper provides a visually-appealing professional presentation of the findings and recommendations which includes a detailed version of the literature review and the methodology used for the research. In addition to the recommendations for the inclusion of the age at first hospitalization as a predictor when determining educational placement, recommendations will be presented to address potential gaps in the current education programming which were identified by the research. Although this study researched only one potential predictor, the literature review and the findings together make a strong argument for the need for additional programming. For example, patients who were first hospitalized at age 14 and under are not appropriate for GED classes, but may be appropriate for a life skills class.

Roles and Responsibilities and Supports for the Project

The Director of Education would play a key role in incorporating the new predictor in the educational placement of patients. The procedure for educational

placement would require changes to include the addition of the newly identified predictor and would ensure the appropriate use as a predictor. The Director of Education would also be valuable in communicating the changes and encouraging the buy-in by all staff and patients involved. Social workers and rehab department staff who are responsible for writing patient referrals to various groups would play an important role in identifying appropriateness in potential classes. The teacher who receives the referral would be responsible for reading the medical chart, identifying the age at first hospitalization, and incorporating the findings in patient placement. As the project manager, I would be responsible for providing support/resources and monitoring progress of the project.

Potential Barriers and Solutions to Barriers

Not every patient has an accurate age at first hospitalization listed in their chart hindering the ability to use this predictor for every patient. Patients may not remember their age at first hospitalization. Another potential barrier could be a shortage of staff members or appropriately trained staff members which would hinder the ability to provide some recommended classes. Accepting the less subjective placement process may be met with varying levels of acceptance by staff and patients. It can be difficult to accept that an individual is not appropriate for GED classes when the patient is adamant in their request. Providing details of the placement process will be essential in encouraging the buy-in of the updated process. Offering available alternative classes may also assist in the acceptance of the project.

Proposal for Implementation and Timetable

Implementation of the proposed changes to the educational placement procedure would be a multi-step process. The first step would be to work with the Director of Education and the teachers responsible for making placement decisions in order to create a finalized standard procedure. The standard procedure, as described in the white paper project, includes a general statement, scope, and purpose along with the determined steps of the procedure. The proposed standard procedure would then need to be approved by the Director of Rehabilitation before making changes. Next, the process will be presented to the rest of the education department, the rehabilitation department, and the social work department. This should incorporate everyone who makes patient referrals to education. If any additional staff members are identified, they will be invited to any of the department meetings to attend the presentation. Upon completion of the presentations, the procedure will be utilized for all new referrals.

Patients who are currently struggling in a class would be re-evaluated as needed. Patients who are found to be inappropriate for any current class will be recorded in order to identify potential new classes. In the long term, integrating new classes will take approximately six months in order to create a class protocol and syllabus, research and adopt new curricula, obtain referrals, and place appropriate patients. I propose a launch of the project to take place in late July – early August 2019 in order to make appropriate placements for the fall semester.

Project Evaluation

In order to promote a dual-emphasis on accountability and program policy improvement, I chose an outcome-based evaluation (Schalock, 2001). The goal of the evaluation is to track educational goal progress, monitor accountability of the program and patients enrolled in educational services, and determine future changes to the program. The outcome-based evaluation will consist of monitoring patient progress through IEP goals, individual education goals, and GED pass rates. Outcome-based IEP goals are required by federal law to be updated annually for patients who are under the age at 21 and involved in special education (Kupper, 2000). "Goals should be SMART (specific, measurable, achievable, relevant, and time-bound)" and dependent upon the needs of the patient (Maryland Statewide IEP Process Guide, 2019). These goals are required to be assessed quarterly (COMAR 13A.05.01.09.B).

Patients who do not have an IEP or are older than 21 and participate in education classes, including GED classes, should have individualized education goals. These goals should also be SMART goals and assessed quarterly but will be recorded in the patient's progress notes in their medical chart rather than on an IEP. If additional classes, such as life skills, are added to the education programming, individual patient education goals will also follow these recommendations. Outcome based goals are frequently used in mental health settings and are used to create the goal, track progress, and at the end of the semester (or other pre-determined time) determine how close to the end goal the patient has achieved (Law & Jacob, 2015). Tracking these goals will allow for accountability of both the teachers and patients.

GED pass rates should be viewed as both length of time in class prior to passing the test and number of patients who pass the GED each year. Progress data should be used to determine possible changes to be made for program policy improvement. Key stakeholders include hospital administration, education services administration, teachers, and patients enrolled in education services. The evaluation will provide annual data to the hospital administration as well as quarterly data to the education services director, teachers, and patients.

Implications Including Social Change

The intent of the project was to communicate the findings of the research including the identification of age at first hospitalization as a predictor of educational attainment among forensic psychiatric patients, and to present recommendations for implementing the use of the predictor through changes to the placement procedure. Appropriate placement in education services has the potential to create social change for the patients and the facility as a local stakeholder. In a more far-reaching aspect, little research has been done in the area of education for forensic psychiatric patients. This project will add to the limited research, bring awareness to the lack of available research, and provide for the potential of application and social change in other forensic psychiatric facilities as well.

Local Community

Appropriate placement in educational programming improves the likelihood of patient success in the classroom. When appropriately placed, patients may earn their GED or may find themselves successful in other academic areas. Appropriate placement

will also reduce the likelihood of patient's dropping out of GED or feeling failure from remaining in a GED class without making progress. Completing a GED will increase the patient's ability to obtain a job in the community after being released, retain higher wages, and may reduce a patient's chance for recidivism thru higher job satisfaction and higher family income (Mardirossian, & Esmail, 2017; Song, 2011).

For the facility, success in the classroom can lead to higher graduation rates and improve overall recidivism rates (Mardirossian, & Esmail, 2017). The community is also impacted by increased success in the classroom. As patients who have earned their GED are released into the community, improved employability allows the patient to enter the workforce at higher wages and more hours (Song, 2011). Patients who complete life skills programming will have an increased chance of a successful transition to the community (King et al., 2018)

As the standard procedure for educational placement becomes more research based and less subjective, gaps in available programming can be identified and filled. One such gap for patients diagnosed with Schizophrenia and other psychotic disorders was identified in the research for the 65 and older age at first hospitalization were found to be a significant predictor of a less than eighth grade education.

Far-Reaching

In a larger context, the results from this study could generate more interest in adding to the very limited available educational research on this population. The results of this research could also generate interest from similar facilities throughout the country and enable changes to be made in their educational programming as well. Increasing

available educational opportunities could have a significant social impact by reducing recidivism and allowing former forensic psychiatric patients to enter the workforce at higher wage rates and more hours.

Summary

In Section 3, I described the white paper, discussed the literature review, and presented the rationale for choosing the white paper as the project study. A theoretical framework based on fluid and crystallized intelligence provided additional support for the recommendations for the improvement of the educational placement procedure. I presented potential social change which may be impacted by the educational success of patients as they re-enter the community and workforce. I also discussed the potential far-reaching social change which could take place if similar facilities use the updated educational placement procedure to improve patient outcomes across the country. In the next section, I detail my reflections on the project and draw conclusions. I will also discuss the strengths and limitations of the project and provide an analysis of my personal learning and growth. Implications and directions of future research will also be presented.

Section 4: Reflections and Conclusions

The purpose of this study was to test whether age at first hospitalization is predictive of level of educational attainment among forensic psychiatric patients and which ages of first hospitalization best predict each of eight levels of educational attainment. Many challenges arose throughout the process of the project study, but these provided further assurance of the value of the research and guided the development of the project deliverable. In this section, I discuss the project strengths, limitations, and recommendations for alternative approaches, and I present my personal reflections on my growth as a scholar, project developer, and practitioner. I also present implications, applications, and potential directions for future research.

Project Strengths and Limitations

I developed a white paper as the project deliverable based on the results of the study. A strength of the project was condensing the literature review, methodology, statistical results, and recommendations into an easy-to-read and understandable format that allows the white paper to be viewed as educational research for a population that has limited educational research. The term *white paper* has referred to a persuasive document used to generate interest in a particular subject, market a proposed change, present a new idea, or promote a social action (Malone & Wright, 2018). In more recent decades, white papers have transitioned to several areas including education (Thompson, 2008). Promoting change in the education practices in forensic psychiatric settings meets the design of a professional white paper, which builds support with a visually appealing persuasive intent (Powell, 2012).

The literature review revealed a gap in research of educational attainment of forensic psychiatric patients, and a search for a potential data pool revealed a lack of available data in the United States. This project study has the potential to create change on a larger scale if the interest of other forensic psychiatric facilities or researchers across the country can be captured. The data collection process and required elements has potential to be updated and improved creating more opportunities for researchers. The sample size of the data supports the strength of the project along with the data analysis and literature review, suggesting that providing appropriate education promotes the potential for social change through better outcomes when transitioned to the community.

Despite potential strengths of the project, a white paper also has a limitation in that it offers the recommendations, but the implementation is up to the facility, which can lead to potential misrepresentation or diversion from original intent of the project. Additionally, the white paper was written based on findings of a population in Canada. Although additional research was completed to ensure the similarities between the Canadian and American populations regarding education, forensics, and mental health, some practitioners may be hesitant to generalize the study and make changes to organizations globally.

Recommendations for Alternative Approaches

The white paper includes the results for this study, which indicated that age at first hospitalization is a predictor of educational attainment levels among forensic psychiatric patients, and recommendations for using this newly determined predictor in an updated educational placement procedure. An alternative approach could have been to

evaluate various diagnostic tests to determine if they could be a reliable predictor of educational attainment for the forensic psychiatric population. However, the access to diagnostic tests was not feasible for conducting a study.

A second alternative approach may have been to conduct a survey of patients who have passed the GED to find common predictors. However, due to the protected status of forensic psychiatric patients, completing a survey and attaining data from an appropriate number of patients who fit the criteria would have been difficult. Another approach could have been to focus on the GED program and investigating the attrition rates, GED pass/fail rates, and length of time in the program prior to passing or prior to a predetermined number of failed attempts. Although this would not have been a study that would require a patient-completed survey, obtaining access to data required to complete such a study did not appear feasible.

A professional development was also an alternative approach that would have allowed a presentation of the findings to a broader range of practitioners and provided details of the educational placement procedure changes to those placing the patients as well as those referring the patients. Considering the amount of time that a professional development would have taken staff away from patient programming, I chose to develop a white paper, which allows flexibility for staff members to read the document at a time that best fits their individual schedule.

Scholarship, Project Development, Evaluation, Leadership, and Change

Throughout the process of completing this study and developing the final project, I have learned about the process of the scholarship of teaching and learning, and I have

gained a better understanding of how various aspects of mental health affect education among the forensic psychiatric population. There were many struggles throughout the process such as using multinomial logistic regression, which I was not familiar with, and teaching myself SAS. But I was able to focus on research and discovery, objectivity and honor toward the process, and tenacity that I was taught while serving 4 years in the Marine Corps many years ago. Additionally, as I began developing the project deliverable, it became clear that I needed to present the findings in a manner that a variety of practitioners would find value in the results. Building a persuasive argument for making changes to a standard procedure that affects patients and requires understanding by patients and practitioners who were not all educators was important to elicit buy-in of the changes.

Analysis of Self as Scholar

As an educator in a forensic psychiatric setting, I often find myself reviewing research to bridge various gaps in practice. When I started working on my doctorate, I often questioned my ability to conduct research that could bridge education and forensic psychiatric practices. My role as an educator requires continuously adapting to meet the needs of the patients. I struggled with focusing on my doctoral study while investigating other gaps in research and practice taking place in my professional life. The revision process also became tedious at times, which affected my focus. However, the doctoral study process helped me grow as a scholar, giving me a newfound appreciation for research. I have learned how to better identify appropriate literature for review, present the information in a scholarly way, and identify gaps in practice for further research. As

a scholar I have grown to believe in myself and my abilities to complete research, create a white paper to present findings in a persuasive manner to gain buy-in from various practitioners, and provide quality research-based professional development designed to improve education through evidence-based practices.

Analysis of Self as Practitioner

I have often heard educators say, "If I can make a difference in just one person, my career will have been a success." As an educator in a unique setting, I have had to gain knowledge in other fields to make appropriate changes to educational programing in order to meet the needs of a complex population of individuals. I am provided with opportunities to make a difference to an individual both inside and outside the classroom. Inside the classroom, I continue to use evidence-based teaching practices to promote learning. Understanding the effects of mental illness on cognition and educational attainment continues to be a priority. Assisting individuals with life skills or providing GED based instruction can make a small social change for those individuals. Outside the classroom, I have opportunities to work with health professionals to make changes to current practices through evidence-based recommendations. As a practitioner, I am committed to creating social change in the education field to better accommodate and meet the needs of the forensic psychiatric population while also recommending changes to the mental health practices in order to better accommodate individuals with lower cognitive abilities and various other developmental disabilities hindering their treatment progression.

Analysis of Self as Project Developer

While developing the white paper for this project study, I found a renewed passion for learning and sharing knowledge with others. I have gained self-confidence in my ability to present myself professionally and take on new roles. I enjoy working with health care professionals in research and in practice. Throughout this project study, I have also learned the value of setting limits on other aspects of life in order to remain focused on a particular project.

The Project's Potential Impact on Social Change and Reflection on the Importance of the Work

As I reflect on the importance of the work and what was learned, I feel this project provides further insight to the struggle of education when mental illness plays a role. Understanding the impact of severe mental illness on fluid and crystallized intelligence has the potential to invoke changes in placement, programming, teaching methods, and educational outcomes. Appropriate placement, goals, and objectives are key to increasing educational success rates among forensic psychiatric patients. Educational success can be viewed as an increase in GED completion rates or an increase in life skills programming completion rates (Moeller, Day, & Rivera, 2004; Sheldon-Sherman, 2013). Patients who transition to the community with increased educational success, have an increase in a variety of opportunities, including employment, and have a decrease in recidivism (Iosifescu, 2014; Sheldon-Sherman, 2013). This social change on the local level has potential to have a broader impact because the findings of this study can be generalized to mental health patients, special education students, and inmate

populations. Although the participants for this study were forensic psychiatric patients, the same appropriate placement, goals and objects which increase their population's educational success may be used in non-forensic psychiatric settings, high schools, and correctional institutions to increase educational success. Non-forensic psychiatric facilities often face the same challenges when providing appropriate education due to the lack of research and predictors. Special education students diagnosed with schizophrenia and other psychotic disorders or mood disorders are similar to the participants in the study. When choosing appropriate placement for students, age at first hospitalization could be used as an additional predictor for educational attainment among those students with either Schizophrenia and other psychotic disorders or mood disorder diagnoses who are receiving special education services (Kidd et al., 2014). When a mental illness is severe enough to require first hospitalization prior to age 14, special education services in life skills programming may be more appropriate than the typical diploma track (Pavuluri, 2016). Students who were first hospitalized with Schizophrenia or other psychotic disorders while attending high school may benefit from continuing education or returning to education prior to the age at 21 using a special education IEP (Kidd et al., 2014; Ringeisen et al., 2017). Providing appropriate placement may have an impact on the reduction of drop-outs. Inmate populations also include individuals who have been diagnosed with mental illness seeking GED, college, or vocational classes (Beaudette & Stewart, 2016; Simpson & Jones, 2018; Simpson, McMaster, & Cohen, 2013). If the inmates were hospitalized for schizophrenia and other psychotic disorders or mood disorder prior to incarceration, age at first hospitalization could be used as a predictor for

placement in correctional system education programs. While the primary focus of the study was on high school or GED completion, the analysis included all levels of education which could be further utilized to determine appropriate placement of possible college classes and vocational opportunities as well.

Implications, Applications, and Directions for Future Research

Implications of this study can be considered on several levels. On an individual and local level, patients may have better, more appropriate opportunities for education during their treatment in forensic psychiatric settings. More appropriate education opportunities may increase a patient's employability and lower recidivism when transitioning to the community.

Applications of educational research on forensic psychiatric populations may have the potential to promote change for students diagnosed with mental illness prior to their dropping out of high school. Further educational research also has the potential to indicate changes in methodology or structure for other students in alternative settings.

On a broader range, there is a lack of data available to researchers interested in studying aspects of education within the forensic psychiatric population in the United States. This study may encourage facilities and systems to collect more data and make the data more easily accessible for research purposes. As data becomes more accessible, future research is necessary to determine the effectiveness of updated educational placement procedures. Future research could also be employed to investigate additional potential predictors of educational attainment levels such as special education involvement, IQ (prior to diagnosis or current), or age at first forensic involvement

(Oudekerk, Chauhan, & Reppucci, 2012; Sharlein, 2018). Studies could investigate the correlation between age at first hospitalization, current age, and length of time passed since attending school which could further assist in educational placement in older forensic psychiatric patients requesting GED classes. The cognitive effects of psychotropic medication or the effects of mental illness on cognitive abilities with or without medication would also be another area of interest (Kawachi, Adler, & Dow, 2010; Agency for Healthcare Research and Quality, 2014). Research could also be developed to investigate the effectiveness of different curricula in forensic psychiatric settings. On a national level, providing access to a rigorous education, including those with special needs, has long been the focus (Gagnon, 2008; Gagnon, Barber, Van Loan, & Leone, 2009). The number of patients with special education needs in forensic psychiatric facilities appear to be disproportionate to those numbers in public school systems (13%; U.S. Department of Education, National Center for Education Statistics, 2018). Patients are placed in forensic psychiatric facilities to receive treatment for mental health and to become competent to stand trial (Wik, Hollen, & Fisher, 2017). Patients in forensic psychiatric facilities are a unique population, and there are many obstacles to providing a rigorous education as required by the Individuals with Disabilities Education Act (2004) such as mental health status and mental health treatment which often includes medications (Yell, Shriner, & Katsiyannis, 2006). Therefore, an appropriate education for forensic psychiatric patients may not be the same as an appropriate and rigorous education in a public school system and could be considered as a possibility for future research.

Conclusion

In this section, I highlighted the project strengths and limitations, presented recommendations for alternative approaches, and provided analysis of self as a scholar, practitioner, and project developer. I discussed scholarship, the project's potential impact on social change, implications, applications, and directions for future research.

Mental illness has an impact on educational attainment and providing a recommended educational placement procedure is a step toward research-based educational opportunities for forensic psychiatric patients. Appropriate education opportunities may increase an individual's employability after being reintegrated into the community as well as contribute to the reduction of recidivism among forensic psychiatric patients.

References

Ackerman, P. L. (2000). Domain-specific knowledge as the "dark matter" of adult intelligence: Gf/Gc, personality and interest correlates. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 55*(2), 69-84. doi:10.1093/geronb/55.2.p69

Agency for Healthcare Research and Quality. (2014, June). National healthcare quality & disparities reports. Rockville, MD: Author.

Allen, D. N., Frantom, L. V., Strauss, G. P., & van Kammen, D. P. (2005). Differential patterns of premorbid academic and social deterioration in patients with schizophrenia. *Schizophrenia Research, 75*(2), 389-397. doi:10.1016/j.schres.2004.11.011

Allen, D. N., Strauss, G. P., Barchard, K. A., Vertinski, M., Carpenter, W. T., & Buchanan, R. W. (2013). Differences in developmental changes in academic and social premorbid adjustment between males and females with schizophrenia. *Schizophrenia research,146*(1), 132-137. doi:10.1016/j.schres.2013.01.032

Allison, P. (2012). How relevant is the independence of irrelevant alternatives? Retrieved from https://statisticalhorizons.com/iia

Allison, P. D. (2014). Measures of fit for logistic regression. Retrieved from https://statisticalhorizons.com/wp-content/uploads/MeasuresOfFitForLogisticRegression-Slides.pdf

American Occupational Therapy Association. (2014). Occupational therapy practice framework: Domain and process (3rd ed.). A*merican Journal of Occupational*

Therapy, 68 (Suppl. 1), S1-S48. Retrieved from https://www.aota.org

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

American Psychological Association. (2015). *APA college dictionary of psychology*. Washington, DC: Author.

Arbesman, M., & Logsdon, D. W. (2011). Occupational therapy interventions for employment and education for adults with serious mental illness: A systematic review. *American Journal of Occupational Therapy, 65*(3), 238-246. doi:10.5014/ajot.2011.001289

Baldo, M., & Uzamugunda, J. (2000). Evaluating adolescents' AIDS education: The experience of Uganda. *Journal of Health Management, 2*(1), 81-97. doi:10.1177/097206340000200104

Batchelder, J. S., O'Neill, A., Rodriguez, A. D., & Tibbs, R. (2018). Overcoming the barriers to successful completion of GED programs among prison and jail inmates. *International Journal of Social Science Studies, 6*(1), 1. doi:10.11114/ijsss.v6i1.2710

Beaudette, J. N., & Stewart, L. A. (2016). National prevalence of mental disorders among incoming Canadian male offenders. *The Canadian Journal of Psychiatry, 61*(10), 624-632. doi:10.1177/0706743716639929

Becker, M., Lüdtke, O., Trautwein, U., Köller, O., & Baumert, J. (2012). The differential

effects of school tracking on psychometric intelligence: Do academic-track schools make students smarter? *Journal of educational psychology, 104*(3), 682-699. doi:10.1037/a0027608

Beins, B. (2005). *Research methods: A tool for life.* Boston, MA: Pearson Education.

Bilaç, Ö., Ercan, E. S., Uysal, T., & Aydin, C. (2014). The prevalence of anxiety and mood disorders, and demographic characteristics in elementary school students. *Turkish Journal of Psychiatry, 25*(3). doi:10.5080/u7670

Blanch, A. (2015). Evaluating fluid and crystallized abilities in the performance of an educational process. *Instructional Science, 43*(3), 427-442. doi:10.1007/s11251-015-9345-x

Bond, G. R., Drake, R. E., & Luciano, A. (2015). Employment and educational outcomes in early intervention programmes for early psychosis: A systematic review. *Epidemiology and Psychiatric Sciences, 24*(5), 446-457. doi:10.1017/s2045796014000419

Breslau, J., Miller, E., Chung, W. J. J., & Schweitzer, J. B. (2011). Childhood and adolescent onset psychiatric disorders, substance use, and failure to graduate high school on time. *Journal of Psychiatric Research, 45*(3), 295-301. doi:10.1016/j.jpsychires.2010.06.014

Burgess, B., Curtis-Downes, D., & Gibson, R. C. (2013). Education and employment levels among Jamaican patients newly diagnosed with schizophrenia and bipolar disorder. *International Journal of Social Psychiatry, 59*(3), 247-253. doi:10.1177/0020764011433638

Canadian Institute for Health Information. (2013). Ontario mental health reporting system resource manual, 2013–2014: Module 1—Clinical coding. Retrieved from https://www.qhc.on.ca/photos/custom/OMHRS_Manual_Module_1_Clinical_Coding_2013_EN_web.pdf

Canadian Institute for Health Information. (2016). Ontario mental health reporting system: Assessment types and data elements, 2016-2017. Retrieved from https://www.cihi.ca/sites/default/files/omhrs_data_dictionary_2016-17_en.pdf

Canadian Institute for Health Information. (2017). Ontario mental health reporting system: Data quality documentation 2016–2017. Retrieved from https://www.cihi.ca/sites/default/files/document/omhrs-dq-external-report-2016-2017-en.pdf

Cannon Design. (2012). *Independent study on future demand for state-operated psychiatric hospital capacity*. Retrieved from http://dlslibrary.state.md.us/publications/JCR/2011/2011_72.pdf

Cattell, R. B. (1943). The measurement of adult intelligence. *Psychological Bulletin, 40*(3), 153-193. doi:10.1037/h0059973

Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology, 5*4(1),1-22. doi:10.1037/h0046743

Cattell, R. B. (1971). *Abilities: Their structure, growth, and action*. Boston, MA: Houghton Mifflin.

Cavendish, W. (2014). Academic attainment during commitment and postrelease education–related outcomes of juvenile justice-involved youth with and without

disabilities. *Journal of Emotional and Behavioral Disorders, 22*(1), 41-52. doi:10.1177/1063426612470516

Center for Behavioral Health Statistics and Quality. (2018). *2016 National Survey on Drug Use and Health Public Use File Codebook*. Substance Abuse and Mental Health Services Administration, Rockville, MD. Retrieved from https://datafiles.samhsa.gov/

Charles, C. E. (2010). Providing culturally competent care for the criminally insane inmate. *Issues in mental health nursing, 31*(6), 432-434. doi:10.3109/01612840903434597

Cheng, S., & Long, J. S. (2007). Testing for IIA in the multinomial logit model. *Sociological Methods & Research, 35*(4), 583-600. doi:10.1177/0049124106292361

Chong, S. A., Subramaniam, M., Lee, I. M., Pek, E., Cheok, C., Verma, S., & Wong, J. (2009). Academic attainment: A predictor of psychiatric disorders? *Social Psychiatry and Psychiatric Epidemiology, 44*(11), 999-1004. doi:10.1007/s00127-009-0027-3

Christensen, L. B., Johnson, R. B., & Turner, L. A. (2014). *research methods, design, and analysis* (12th ed.). Upper Saddle River, NJ: Pearson Education.

Cohen, M. I., Spodak, M. K., Silver, S. B., & Williams, K. (1988). Predicting outcome of insanity acquittees released to the community. *Behavioral Sciences & the Law, 6*(4), 515-530. doi:10.1002/bsl.2370060408

Comer, R. J. (2013). *Abnormal psychology*. New York, NY: Worth.

Common Core State Standards Initiative. (2010). *Common core state standards for mathematics.* Washington, DC: National Governors Association Center for Best Practices and the Council of Chief State School Officers.

Connor, D. F., Ford, J. D., Pearson, G. S., Scranton, V. L., & Dusad, A. (2017). Early-onset bipolar disorder: Characteristics and outcomes in the clinic. *Journal of Child and Adolescent Psychopharmacology, 27*(10), 875-883. doi:10.1089/cap.2017.0058

Cornaglia, F., Crivellaro, E., & McNally, S. (2015). Mental health and education decisions. *Labour Economics, 33*, 1-12.

Ćosović, V., Todorović, N., Andrić-Petrović, S., & Marić, N. P. (2016). Sex differences in fluid and crystalized intelligence focus on people with psychosis. *Psihijatrija danas*, *48*(2), 201-214.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Criminal Code , R.S.C. 1985, c.C-46, s.16.

DeLisi, L. E. (1992). The significance of age at onset for schizophrenia. *Schizophrenia Bulletin, 18*(2), 209-215.

Department of Health and Human Services (2014). Fact sheet: Home and community based services. Medicaid.gov. Retrieved from https://www.medicaid.gov/medicaid/hcbs/downloads/hcbs-setting-factsheet.pdf.

Das, J. K., Salam, R. A., Lassi, Z. S., Khan, M. N., Mahmood, W., Patel, V., & Bhutta, Z. A. (2016). Interventions for adolescent mental health: an overview of systematic

reviews. Journal of Adolescent Health, 59(4), S49-S60. https://doi.org/10.1016/j.jadohealth.2016.06.020

de Tribolet-Hardy, F., & Habermeyer, E. (2016). Schizophrenic patients between General and Forensic psychiatry. Frontiers in public health, 4, 135. https://doi.org/10.3389/fpubh.2016.00135

Easden, M. H., & Sakdalan, J. A. (2015). Clinical diagnostic features and dynamic risk factors in a New Zealand inpatient forensic mental health setting. Psychiatry, Psychology and Law, 22(4), 483-499. https://doi.org/10.1080/13218719.2015.1035424

Ennals, P., Fossey, E. M., Harvey, C. A., & Killackey, E. (2014). Postsecondary education: Kindling opportunities for people with mental illness. Asia-Pacific Psychiatry, 6(2), 115-119. https://doi.org/10.1111/appy.12091

Esch, P., Bocquet, V., Pull, C., Couffignal, S., Lehnert, T., Graas, M., …Ansseau, M. (2014). The downward spiral of mental disorders and educational attainment: a systematic review on early school leaving. BMC Psychiatry, 14(1), 237. https://doi.org/10.1186/s12888-014-0237-4

Expósito, M. S., & Felipe-Casta-o, E. (2018). Cognitive insight, neurocognition and life skills in patients with schizophrenia. Psicothema, 30(3), 251-256.

Fovet, T., Geoffroy, P. A., Vaiva, G., Adins, C., Thomas, P., & Amad, A. (2015). Individuals with bipolar disorder and their relationship with the criminal justice system: a critical review. Psychiatric services, 66(4), 348-353. https://doi.org/10.1176/appi.ps.201400104

Fowler, D., Hodgekins, J., & French, P. (2017). Social Recovery Therapy in improving activity and social outcomes in early psychosis: Current evidence and longer term outcomes. Schizophrenia research.

Gagnon, J. C. (2008). State level curricular, assessment, and accountability policies, practices, and philosophies for exclusionary school settings (pp. 1-14). Journal of Special Education.

Gagnon, J. C., Barber, B. R., Van Loan, C., & Leone, P. E. (2009). Juvenile correctional schools: Characteristics and approaches to curriculum. Education and Treatment of Children, 673-696. https://doi.org/10.1353/etc.0.0068

GED Testing Service. (2015). A Fighting Chance at 4 Million Jobs. Retrieved from: http://www.gedtestingservice.com/educators/2014test

Glahn, D., Bearden, C., Bowden, C., & Soares, J. (2006). Reduced educational attainment in bipolar disorder. Journal of Affective Disorders, 92(2), 309-312.

Goldberg, R. W., Rollins, A. L., & Lehman, A. F. (2003). Social network correlates among people with psychiatric disabilities. Psychiatric Rehabilitation Journal, 26(4), 393-402. https://doi.org/10.2975/26.2003.393.402

Goulding, S. M., Chien, V. H., & Compton, M. T. (2010). Prevalence and correlates of school drop-out prior to initial treatment of nonaffective psychosis: further evidence suggesting a need for supported education. Schizophrenia research, 116(2), 228-233. https://doi.org/10.1016/j.schres.2009.09.006

Green, M. F., Kern, R. S., Braff, D. L., & Mintz, J. (2000). Neurocognitive deficits and functional outcome in schizophrenia: Are we measuring the "right stuff"?

Schizophrenia Bulletin 26(1):119. https://doi.org/10.1093/oxfordjournals.schbul.a033430

Hartley, M. T. (2010). Increasing resilience: Strategies for reducing dropout rate for college students with disabilities. American Journal of Psychiatric Rehabilitation, 13(4), 295-315. https://doi.org/10.1080/15487768.2010.523372

Harvey, P. D., Parrella, M., White, L., Mohs, R. C., Davidson, M., & Davis, K. L. (1999). Convergence of cognitive and adaptive decline in late-life schizophrenia. Schizophrenia Research, 35(1): 77-84. https://doi.org/10.1016/S0920-9964(98)00109-1

Harvey, P. D., Wingo, A. P., Burdick, K. E., & Baldessarini, R. J. (2010). Cognition and disability in bipolar disorder: Lessons from schizophrenia research. Bipolar Disorders, 12(4): 364-375. https://doi.org/10.1111/j.1399-5618.2010.00831.x

Harrell, F. (2015). Regression modeling strategies: with applications to linear models, logistic and ordinal regression, and survival analysis. Springer.

Hawkins, D. M. (1980). Identification of outliers (Vol. 11). London: Chapman and Hall. https://doi.org/10.1007/978-94-015-3994-4

Heckman, J. J., Humphries, J. E., & Veramendi, G. (2015). The causal effects of education on earnings and health. Unpublished manuscript, Department of Economics, University of Chicago.

Hogan, M. F. (2003). New Freedom Commission Report: The President's New Freedom Commission: Recommendations to transform mental health care in America. Psychiatric Services.

Horn, J. L. (1965). Fluid and crystallized intelligence: A factor analytic study of the structure of among primary mental abilities. Ph.D. Thesis. University of Illinois.

Horn, J. L., & Cattell, R. B. (1967). Age differences in fluid and crystallized intelligence. Acta psychologica, 26, 107-129. https://doi.org/10.1016/0001-6918(67)90011-X

Horn, J. L. (2008). Spearman, g, expertise, and the nature of human cognitive capability. Extending intelligence: Enhancement and new constructs, 185-230.

Hornsveld, R. J., Bulten, E. H., de Vries, E. T., & Kraaimaat, F. W. (2008). Violent forensic psychiatric inpatients and violent detainees in the Netherlands. Journal of Forensic Psychiatry & Psychology, 19(3), 407-419. https://doi.org/10.1080/14789940802190145

Hosmer, D. W., & Lemeshow, S. (2000). Applied logistic regression (2nd Edition). New York: Wiley. https://doi.org/10.1002/0471722146

Hosmer, D. W., Jr., Lemeshow, S., & Sturdivant, R. X. (2013). Interpretation of the fitted logistic regression model. Applied Logistic Regression, Third Ed., 49-88. https://doi.org/10.1002/9781118548387.ch3

Hu, B., Shao, J., & Palta, M. (2006). Pseudo-R2 in logistic regression model. Statistica Sinica, 16, 847-860.

Hunt, E. (2007). Improving Intelligence: What's the Difference From Education?. In Extending Intelligence (pp. 27-44). Routledge.

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004)

Iosifescu, C. Ş. (2014). The Foundation of Success in Adult Learning: Dilemmas and Concerns. Procedia - Social and Behavioral Sciences, 142, 403-409.

https://doi.org/10.1016/j.sbspro.2014.07.700

Isohanni, I., Jones, P. B., Järvelin, M. R., Nieminen, P., Rantakallio, P., Jokelainen, J., ... & Isohanni, M. (2001). Educational consequences of mental disorders treated in hospital. A 31-year follow-up of the Northern Finland 1966 Birth Cohort. Psychological medicine, 31(02), 339-349. https://doi.org/10.1017/S003329170100304X

Isohanni, M., Lauronen, E., Moilanen, K., Isohanni, I., Kemppainen, L., Koponen, H., . . . Tienari, P. (2005). Predictors of schizophrenia: Evidence from the Northern Finland 1966 Birth Cohort and other sources. The British journal of psychiatry 187(48), s4-s7. https://doi.org/10.1192/bjp.187.48.s4

Jääskeläinen, E., Juola, P., Hirvonen, N., McGrath, J. J., Saha, S., Isohanni, M., ... & Miettunen, J. (2012). A systematic review and meta-analysis of recovery in schizophrenia. Schizophrenia bulletin, 39(6), 1296-1306. https://doi.org/10.1093/schbul/sbs130

Jayakodya, R., Danziger, S., & Kessler, R. C. (1998). Early-onset psychiatric disorders and male socioeconomic status. Social Science Research, 27(4), 371-387. https://doi.org/10.1006/ssre.1997.0616

Jones, P., Murray, R., Rodgers, B., & Marmot, M. (1994). Child development risk factors for adult schizophrenia in the British 1946 birth cohort. The Lancet, 344, 1398-1402. https://doi.org/10.1016/S0140-6736(94)90569-X

Jordaan, J., Beukes, R., & Esterhuyse, K. (2018). The development and evaluation of a life skills programme for young adult offenders. International journal of offender

therapy and comparative criminology, 62(10), 3077-3096. https://doi.org/10.1177/0306624X17737682

Joyce, E. (2013). Cognitive function in schizophrenia: Insights from intelligence research. British Journal of Psychiatry, 203(3), 161-162. https://doi.org/10.1192/bjp.bp.112.109553

Kahn, L., Hurth, J., Kasprzak, C. M., Diefendorf, M. J., Goode, S. E., & Ringwalt, S. S.(2009). The national early childhood technical assistance center model for longterm systems change. Topics in Early Childhood Special Education, 29(1), 24-39. https://doi.org/10.1177/0271121409334039

Kawachi, I., Adler, N. E., & Dow, W. H. (2010). Money, schooling, and health: Mechanisms and causal evidence. Annals of the New York Academy of Sciences, 1186(1), 56-68. https://doi.org/10.1111/j.1749-6632.2009.05340.x

Keefe, R. S., Eesley, C. E., & Poe, M. P. (2005). Defining a cognitive function decrement in schizophrenia. Biological Psychiatry, 57(6), 688-691. https://doi.org/10.1016/j.biopsych.2005.01.003

Keenan, S., King, G., Curran, C. J., & McPherson, A. (2014). Effectiveness of experiential life skills coaching for youth with a disability. Physical & occupational therapy in pediatrics, 34(2), 119-131. https://doi.org/10.3109/01942638.2013.842200

Kessler, R. C., Foster, C. L., Saunders, W. B., & Stang, P. E. (1995). Social consequences of psychiatric disorders, I: Educational attainment. American Journal of Psychiatry, 152(7), 1026-32. https://doi.org/10.1176/ajp.152.7.1026

Keyes, K. M., Platt, J., Kaufman, A. S., & McLaughlin, K. A. (2017). Association of fluid intelligence and psychiatric disorders in a population-representative sample of US adolescents. JAMA psychiatry, 74(2), 179-188. https://doi.org/10.1001/jamapsychiatry.2016.3723

Kidd, S. A., Kaur, J., Virdee, G., George, T. P., McKenzie, K., & Herman, Y. (2014). Cognitive remediation for individuals with psychosis in a supported education setting: A randomized controlled trial. Schizophrenia Research, 157(1-3), 90-98. https://doi.org/10.1016/j.schres.2014.05.007

King, G., McPherson, A., Mosleh, D., Hartman, L., Rapley, J., & Pinto, M. (2018). Program opportunities of residential immersive life skills programs for youth with disabilities. Research in developmental disabilities, 83, 233-246. https://doi.org/10.1016/j.ridd.2018.09.003

Kirmayer, L. J., Boothroyd, L. J., Laliberté, A., & Simpson, B. L. (1999). Suicide Prevention and Mental Health Promotion in First Nations and Inuit Communities. Culture and Mental Health Research Unit Report.

Kjellsson, G., Clarke, P., & Gerdtham, U. G. (2014). Forgetting to remember or remembering to forget: a study of the recall period length in health care survey questions. Journal of health economics, 35, 34-46. https://doi.org/10.1016/j.jhealeco.2014.01.007

Kupper, L. (2000). A Guide to the Individualized Education Program.

Laerd Statistics. (2018). Multinomial Logistic Regression using SPSS Statistics. (2018). Retrieved November 25, 2018, from https://statistics.laerd.com/spss-

tutorials/multinomial-logistic-regression-using-spss-statistics.php

Lattuca, L. R., & Stark, J. S. (2011). Shaping the college curriculum: Academic plans in context. John Wiley & Sons.

Law, D., & Jacob, J. (2015). Goals and goal based outcomes (GBOs): Some useful information (third edition) CAMHS Press: London.

Lawrence, A. (2017). Influence seekers: The production of grey literature for policy and practice. Information Services & Use, 37(4), 389-403. https://doi.org/10.3233/ISU-170857

LeBlanc, M., & Fitzgerald, S. (2000). Research design and methodology section: Logistic regression for school psychologists. School Psychology Quarterly, 15(3), 344-358. https://doi.org/10.1037/h0088791

Lisic, J. (2012, July 31). How to verify linearity assumption in linear regression with categorical predictors? Retrieved from https://stats.stackexchange.com/questions/33430/how-to-verify-linearity-assumption-in-linear-regression-with-categorical-predict

Livingston, J. (2006). A statistical survey of Canadian forensic mental health inpatient programs. Healthcare Quarterly, 9(2), 56-61. https://doi.org/10.12927/hcq..18104

Livingston, J., Nijdam-Jones, A., & Brink, J. (2012). A tale of two cultures: examining patient-centered care in a forensic mental health hospital. Journal of Forensic Psychiatry & Psychology, 23(3), 345-360. https://doi.org/10.1080/14789949.2012.668214

Lloyd, C. (2010). Vocational rehabilitation and mental health. Chichester, U.K.: Wiley-

Blackwell. https://doi.org/10.1002/9781444319736

Long, J. S. (1997). Regression models for categorical and limited dependent variables. Thousand Oaks, CA: Sage.

Malone, E. A., & Wright, D. (2018). "To promote that demand": Toward a history of the marketing white paper as a genre. Journal of Business and Technical Communication, 32(1), 113-147. https://doi.org/10.1177/1050651917729861

Mardirossian, R. K., & Esmail, A. M. (2017). Access of Hispanic Inmates to Correctional Education (Ged) in California and Its Impact on Three Year Recidivism Rates. Race, Gender & Class, 24(1/2), 203.

Marshall, D. J., Vitacco, M. J., Read, J. B., & Harway, M. (2014). Predicting voluntary and involuntary readmissions to forensic hospitals by insanity acquittees in Maryland. Behavioral Sciences & The Law, 32(5), 627-640. https://doi.org/10.1002/bsl.2136

Maryland Statewide Individualized Education Program Process Guide. (2019). Retrieved from http://marylandpublicschools.org/programs/Documents/Special-Ed/IEP/MarylandIEPProcessGuide.pdf

Mathew, I., Gardin, T. M., Tandon, N., Eack, S., Francis, A. N., Seidman, L. J., . . . Keshavan, M. S. (2014). Medial temporal lobe structures and hippocampal subfields in psychotic disorders: findings from the Bipolar-Schizophrenia Network on Intermediate Phenotypes (B-SNIP) study. JAMA psychiatry, 71(7), 769-777. https://doi.org/10.1001/jamapsychiatry.2014.453

McCusker, K., & Gunaydin, S. (2015). Research using qualitative, quantitative or mixed

methods and choice based on the research. Perfusion, 30(7), 537-542. https://doi.org/10.1177/0267659114559116

Medalia, A. (2013). Cognitive remediation for psychotic and affective disorders. Canadian Journal of Psychiatry, 58(6), 309. https://doi.org/10.1177/070674371305800601

Meesters, P. D., Schouws, S., Stek, M., de Haan, L., Smit, J., Eikelenboom, P., … Comijs, H. (2013). Cognitive impairment in late life schizophrenia and bipolar I disorder. International Journal of Geriatric Psychiatry, 28(1), 82-90. https://doi.org/10.1002/gps.3793

Mental Health Commission of Canada. (2009). Toward Recovery & Well-Being. A Framework for a Mental Health Strategy for Canada. Retrieved from http://www.mentalhealthcommission.ca/SiteCollectionDocuments/Key_Documents/en/2009/Mental_Health_ENG.pdf, Archived at http://www.webcitation.org/5xwWzcUy5

Mering, M. (2018). Defining and Understanding Grey Literature. Serials Review, 1-3. https://doi.org/10.1080/00987913.2018.1525239

Meservey, F., & Skowyra, L. K. R. (2015). Caring for youth with mental health needs in the juvenile justice system: Improving knowledge and skills. Research and Program Brief. National Center for Mental Health and Juvenile Justice.

Miller, C., & Nguyen, N. (2008) Who's Supporting Us? TAFE Staff Perspectives on Supporting Students with Mental Illness. NCVER.

Miller, M. T., Grover, K. S., Deggs, D. M., D'Amico, M., Katsinas, S. G., & Adair, L.

(2016). Adult Education in Community Colleges: New Challenges to Old Problems. MPAEA Journal of Adult Education, 45(2), 17-23.

Minichino, A., Francesconi, M., Carrión, R. E., Bevilacqua, A., Parisi, M., Rullo, S., ... & Cadenhead, K. (2017). Prediction of functional outcome in young patients with a recent-onset psychiatric disorder: Beyond the traditional diagnostic classification system. Schizophrenia research, 185, 114-121. https://doi.org/10.1016/j.schres.2016.12.019

Moeller, M., Day, S. L., & Rivera, B. D. (2004). How is Education Perceived on the Inside?: A Preliminary Study of Adult Males in a Correctional Setting. Journal of Correctional Education, 55(1), 40-59.

Mojtabai, R., Stuart, E. A., Hwang, I., Eaton, W. W., Sampson, N., & Kessler, R. C. (2015). Long-term effects of mental disorders on educational attainment in the National Comorbidity Survey ten-year follow-up. Social psychiatry and psychiatric epidemiology, 50(10), 1577-1591. https://doi.org/10.1007/s00127-015-1083-5

Molla, M., Madans, J., & Wagener, D. (2004). Differentials in adult mortality and activity limitation by years of education in the United States at the end of the 1990s. Popular Development Review. 30, 625-646. https://doi.org/10.1111/j.1728-4457.2004.00035.x

Mutica, M., Marinescu, I., & Pirlog, M. (2013). Cognitive Impairment in Schizophrenia. Romanian Journal of Psychopharmocology, 13(4), 252-262.

National Alliance on Mental Illness. (2013). "State Legislation Report 2013: Trends,

Themes & Best Practices in State Mental Health Legislation." Arlington, VA: National Alliance on Mental Illness.

National Center for Education Statistics (NCES) (2017, April). Status Dropout Rates. Retrieved July 26, 2017, from http://nces.ed.gov/

Newcomer, R., Kang, T., Kaye, H. S., & LaPlante, M. (2002). Housing changes and moves into supportive housing among adults with disabilities. Journal of Disability Policy Studies, 12(4), 268-279. https://doi.org/10.1177/104420730201200406

Newsom. (2010). Multiple Logistic Regression and Model Fit. Retrieved from http://web.pdx.edu/~newsomj/da2/ho_logistic3.pdf

NRI. (2014). NRI: Analytics Improving Behavioral Health. Retrieved from http://www.nri-ncdata.org/Profiles.cfm?State=MD&Year=15&Keyword=forensic

Nutley, S. M., Walter, I., & Davies, H. T. (2007). Using evidence: How research can inform public services. Policy press. https://doi.org/10.2307/j.ctt9qgwt1

Organisation for Economic Co-operation and Development. (2018). Characteristics of education systems, in education at a glance 2018: OECD indicators. Paris, France: Author.

Office of the Auditor General of Ontario. (2016). Specialty Psychiatric Hospital Services (Chapter 3.12). 2016 Annual Report Volume 1. Retrieved from http://www.auditor.on.ca/en/content/annualreports/arreports/en16/v1_312en16.pdf

Ontario Review Board. (2012). Retrieved from

http://www.camh.ca/en/hospital/health_information/the_forensic_mental_health_system_in_ontario/Pages/forensic_mhontario_orb.aspx#whathospital

Oreopoulos, P. (2005). Canadian Compulsory School Laws and their Impact on Educational. Analytical Studies Branch Research Paper Series, Statistics Canada, catalogue, (11F0019MIE).

Oudekerk, B. A., Chauhan, P., & Reppucci, N. D. (2012). Risk and Protective Factors for Educational Achievement among Serious Offending Girls. Journal of Research on Adolescence, 22(2), 333-349. https://doi.org/10.1111/j.1532-7795.2011.00771.x

Parks, J., Radke, A. Q., & Haupt, M. B. (2014). "The vital role of state psychiatric hospitals." Alexandria, VA: National Association of State Mental Health Program Directors (NASMHPD).

Pavuluri, M. N. (2016). A review of pediatric bipolar disorder. Journal of Alternative Medicine Research, 8(4), 405.

Peng, C. Y. J., & Nichols, R. N. (2003). Using multinomial logistic models to predict adolescent behavioral risk. Journal of Modern Applied Statistical Methods, 2(1), 16. https://doi.org/10.22237/jmasm/1051748160

Powell, V. (2012). Revival of the position paper: Aligning curricula and professional competencies. Communication Teacher, 26(2), 96-103. https://doi.org/10.1080/17404622.2011.643805

Rajji, T., Ismail, Z., & Mulsant, B. (2009). Age at onset and cognition in schizophrenia: Meta-analysis. The British Journal of Psychiatry, 195(4), 286-293. https://doi.org/10.1192/bjp.bp.108.060723

Rajji, T. K., Miranda, D., & Mulsant, B. H. (2014). Cognition, Function, and Disability in Patients with Schizophrenia: A Review of Longitudinal Studies/Cognition, fonction et incapacité chez des patients souffrant de schizophrénie: une revue des études longitudinales. The Canadian Journal of Psychiatry, 59(1), 13. https://doi.org/10.1177/070674371405900104

Rea, L. M., & Parker, R. A. (2005). Designing and conducting survey research (3rd ed.) San Francisco, CA: Jossey-Bass.

Reddon, J. R., Hoglin, B., & Woodman, M. A. (2008). Immediate effects of a 16-week life skills education program on the mental health of adult psychiatric patients. Social Work in Mental Health, 6(3), 21-40. https://doi.org/10.1300/J200v06n03_02

Reininger-Rogers, T. A. (2014). A review of the bureau of prisons' education policy. Politics Bureaucracy & Justice, 4(2), 6-12.

Rice, M. E., Harris, G. T., Cormier, C. A., Lang, C., Coleman, G., & Krans, T. S. (2005). An evidence-based approach to planning services for forensic psychiatric patients. Issues in Forensic Psychology, 5,13-49.

Richard-Devantoy, S., Deguigne, F., Annweiler, C., Letourneau, G., & Beauchet, O. (2013). Influence of gender and age on cognitive inhibition in late-onset depression: a case-control study. International Journal of Geriatric Psychiatry, 28(11), 1125-1130. https://doi.org/10.1002/gps.3929

Ringeisen, H., Langer Ellison, M., Ryder-Burge, A., Biebel, K., Alikhan, S., & Jones, E. (2017). Supported education for individuals with psychiatric disabilities: State of

the practice and policy implications. Psychiatric rehabilitation journal, 40(2), 197. https://doi.org/10.1037/prj0000233

Ritchie, J., & Lewis, J. (2003). Qualitative research practice: a guide for social science students and researchers. London: Sage Publications.

Robertson, A. G., Swanson, J. W., Lin, H., Easter, M. M., Frisman, L. K., & Swartz, M. S. (2015). Influence of criminal justice involvement and psychiatric diagnoses on treatment costs among adults with serious mental illness. Psychiatric Services, 66(9), 907-909. https://doi.org/10.1176/appi.ps.201500134

Rud, I. (2015). The relationship between youth crime and education. Maastricht University. Schalock, R. L. (2001). *Outcome-based evaluation*. Springer Science & Business Media.

Schaufenbil, R., Kornbluh, R., Stahl, S., & Warburton, K. D. (2015). A new standard of care for forensic mental health treatment: Prioritizing forensic intervention. CNS spectrums, 20(03), 172-176. https://doi.org/10.1017/S1092852915000140

Schizophrenia Facts and Statistics. (2010). Retrieved January 30, 2019, from http://www.schizophrenia.com/szfacts.htm

Schroeders, U., Schipolowski, S., & Wilhelm, O. (2015). Age-related changes in the mean and covariance structure of fluid and crystallized intelligence in childhood and adolescence. Intelligence, 48, 15-29. https://doi.org/10.1016/j.intell.2014.10.006

Schubert, C. A., Mulvey, E. P., Hawes, S. W., & Davis, M. (2018). Educational and Employment Patterns in Serious Adolescent Offenders with Mental Health

Disorders: The Importance of Educational Attainment. Criminal Justice and Behavior, 45(11), 1660-1687. https://doi.org/10.1177/0093854818784330

Schwartz, R., Estein, O., Komaroff, J., Lamb, J., Myers, M., Stewart, J., & … Park, M. (2013). Mental health consumers and providers dialogue in an institutional setting: A participatory approach to promoting recovery-oriented care. Psychiatric Rehabilitation Journal, 36(2), 113-115. https://doi.org/10.1037/h0094980

Seidl, H., Meisinger, C., Kirchberger, I., Burkhardt, K., Kuch, B., & Holle, R. (2016). Validity of self-reported hospital admissions in clinical trials depends on recall period length and individual characteristics. Journal of Evaluation in Clinical Practice,22, 446-454. https://doi.org/10.1111/jep.12506

Sharlein, J. (2018). Beyond Recidivism: Investigating Comparative Educational and Employment Outcomes for Adolescents in the Juvenile and Criminal Justice Systems. Crime & Delinquency, 64(1), 26-52. https://doi.org/10.1177/0011128716678193

Sheldon-Sherman, J. (2013). The IDEA of an Adequate Education for All: Ensuring Success for Incarcerated Youth with Disabilities. Journal of Law & Education, 42(2), 227-274.

Shi, J., Zhang, Y., Liu, F., Li, Y., Wang, J., Flint, J., . . . Wang, X. (2014). Associations of education attainment, occupation, social class and major depressive disorder among Han Chinese women. Plos ONE, 9(1), 1-7. https://doi.org/10.1371/journal.pone.0086674

Simpson, A. I., & Jones, R. M. (2018). Two Challenges Affecting Access to Care for

Inmates with Serious Mental Illness: Detecting Illness and Acceptable Services. https://doi.org/10.1177/0706743718792844

Simpson, A. I., McMaster, J. J., & Cohen, S. N. (2013). Challenges for Canada in meeting the needs of persons with serious mental illness in prison. Journal of the American Academy of Psychiatry and the Law Online, 41(4), 501-509.

Smeets-Janssen, M. M. J., Meesters, P. D., Comijs, H. C., Eikelenboom, P., Smit, J. H., de Haan, L., … & Stek, M. L. (2013). Theory of Mind differences in older patients with early-onset and late-onset paranoid schizophrenia. International journal of geriatric psychiatry, 28(11), 1141-1146. https://doi.org/10.1002/gps.3933

Song, W. (2011). Labor Market Impacts of the GED [R] Test Credential on High School Dropouts: Longitudinal Evidence from NLSY97. GED Testing Service [R] Research Studies, 2011-2. GED Testing Service.

Starkweather, J., & Moske, A. K. (2011). Multinomial logistic regression. 29, 2825-2830.

Stoep, A. V., Weiss, N. S., Kuo, E. S., Cheney, D., & Cohen, P. (2003). What proportion of failure to complete secondary school in the US population is attributable to adolescent psychiatric disorder? The Journal of Behavioral Health Services & Research, 30(1), 119-124. https://doi.org/10.1097/00075484-200301000-00009

Tabachnick, B. G., & Fidell, L. S. (2007). Using Multivariate Statistics. 5th ed. Boston, MA: Allyn & Bacon/Pearson Education.

Teich, J. (2016). Better data for better mental health services: evidence-based policies for improving care and treatment of those with serious mental illness are urgently

needed-but good evidence is hard to find. Issues in Science and Technology, (2), 61.

Teigset, C. M., Mohn, C., Brunborg, C., Juuhl-Langseth, M., Holmén, A., & Rund, B. R. (2018). Do clinical characteristics predict the cognitive course in early-onset schizophrenia-spectrum disorders?. Journal of Child Psychology and Psychiatry. https://doi.org/10.1111/jcpp.12896

Thompson, E. D. (2008). A survey of white paper types.

Tseng, V. (2012). The Uses of Research in Policy and Practice. Social Policy Report. Volume 26, Number 2. Society for Research in Child Development. https://doi.org/10.1002/j.2379-3988.2012.tb00071.x

U.S. Census Bureau. (2016). Educational Attainment. Retrieved from https://www.census.gov/topics/education/educational-attainment.html

U.S. Department of Education, National Center for Education Statistics. (2018). Digest of Education Statistics, 2016 (NCES 2017-094), Table 204.30.

U.S. Department of Health and Human Services. (2009). National consensus statement on mental health recovery. Retrieved from http://store.samhsa.gov/shin/content/SMA05-4129/SMA05-4129.pdf

Visher, C. A., Lattimore, P. K., Barrick, K., & Tueller, S. (2017). Evaluating the long-term effects of prisoner reentry services on recidivism: What types of services matter?. Justice Quarterly, 34(1), 136-165. https://doi.org/10.1080/07418825.2015.1115539

Waghorn, G., Saha, S., Harvey, C., Morgan, V. A., Waterreus, A., Bush, R., … McGrath,

J. J. (2012). 'Earning and learning'in those with psychotic disorders: The second Australian national survey of psychosis. Australian and New Zealand Journal of Psychiatry, 46(8), 774-785. https://doi.org/10.1177/0004867412452015

Waghorn, G., Still, M., Chant, D., & Whiteford, H. (2004). Specialised supported education for Australians with psychotic disorders. Australian Journal of Social Issues, 39(4), 443-458. https://doi.org/10.1002/j.1839-4655.2004.tb01193.x

Walker, D., & Smith, T. (2016). Nine pseudo r square indices for binary logistic regression models. Journal of Modern Applied Statistical Methods, 15(1), 848-854. https://doi.org/10.22237/jmasm/1462077720

Watzke, S., & Brieger, P. (2004). [Neuropsychological testing in vocational rehabilitation for subjects with schizophrenia]. Fortschritte der Neurologie und Psychiatrie, 72(11), 643-651. https://doi.org/10.1055/s-2003-812449

White, G., Thomas, J., Weldon, P., Lawrence, A., Galatis, H., & Tyndall, J. (2013). Grey literature in Australian education. Grey Journal, 9(2), 103-108.

Wik, A., Hollen, V., & Fisher, W. H. (2017). Forensic patients in state psychiatric hospitals: 1999-2016. Falls Church, Va, National Association of State Mental Health Directors Research Institute.

Yell, M. L., Shriner, J. G., & Katsiyannis, A. (2006). Individuals with disabilities education improvement act of 2004 and IDEA regulations of 2006: Implications for educators, administrators, and teacher trainers. Focus on exceptional children, 39(1), 1-24. https://doi.org/10.17161/fec.v39i1.6824

Zhu, B., Chen, C., Dang, X., Dong, Q., & Lin, C. (2017). Hippocampal subfields'

volumes are more relevant to fluid intelligence than verbal working memory. Intelligence, 61, 169-175. https://doi.org/10.1016/j.intell.2017.02.003

Appendix A: The Project

The project deliverable developed as a white paper is presented beginning on the next page.

Relationship between Age at First Hospitalization and Educational Attainment among Forensic Psychiatric Patients

Project Results and Recommendations

Malinda M. Lawson

Table of Contents

Executive Summary

The purpose of this white paper is to communicate the results of a research study on the relationship between age at first hospitalization and educational attainment among forensic psychiatric patients from 2011 to 2016 to the director of education services at [redacted]. The results of these analyses lead to the recommendation to update the policies and procedures for educational placement to include the study findings. These changes will aide in the improvement of education services for forensic psychiatric patients thru the appropriate placement of patients which will enable the Education Services department to provide patients with more appropriate educational opportunities. The research was conducted using data collected by the Canadian Institutes of Health Information (CIHI). Descriptive statistics and multinomial logistic regression were included in the quantitative analysis. Age at first hospitalization was found to be a predictor for educational attainment among patients diagnosed with Schizophrenia and other psychotic disorders and patients diagnosed with mood disorders. The age at first hospitalization which best predicts each category of educational attainment was also calculated.

Overview of the Problem

The standard of treatment in U.S. and Canadian forensic psychiatric facilities is now evidence-based patient centered care while focusing on reducing the violence and meeting forensic discharge criteria as well as being recovery-oriented from a mental illness in an attempt to return these patients to continuing mental health recovery environments within the community (Cannon Design, 2012; Livingston, Nijdam-Jones, & Brink, 2012; Parks et al., 2014; Schaufenbil et al., 2015). The most promising treatments are evidence-based and are designed to reduce the risk of violent recidivism, as well as target aggression, anger, institutional management problems, social withdrawal, and life skill deficits (Burgess, Curtis-Downes, & Gibson, 2013; Parks et al., 2014; Rice et al., 2005). One possible contributor to the social withdrawal and life skills deficits, or 'social exclusion', of those diagnosed with a mental illness due to the reduced occupational opportunities and inability to accumulate social capital has been found to be the underdeveloped area of vocation or the failure to complete education (Easden & Sakdalan, 2015; Isohanni et al., 2001).

During their course of treatment at [redacted], the maximum security forensic psychiatric facility, patients are often referred to education services with the expectation of completing their GED ([redacted] Education Services Provider, personal communication, December 14, 2015). Mental illness often disrupts and hinders educational attainment (Burgess et al., 2013; Ennals, Fossey, Harvey, & Killackey, 2014). The effects of mental illness appear to have a greater impact on educational attainment of those younger in age, but those with the most severe mental illnesses may not be able to reach the lower levels of educational transitions thereby hindering them from attaining future education levels (Mojtabai et al., 2015). The age at first hospitalization of various mental illnesses appears to be correlated with one's ability to fulfill educational goals. Adolescents who were hospitalized for their first episode of non-affective psychosis had a 44% high school dropout rate and those hospitalized for first episode schizophrenia, paranoid type, had a high school dropout rate of 45.8% compared to the national dropout rate which decreased during the years of that study from 12.1% to 7.4% (Esch et al., 2014; National Center for Education Statistics, 2017). Individuals diagnosed with schizophrenia who dropped out of high school had an earlier age at first hospitalization than those individuals diagnosed with schizophrenia who received their high school diploma (Goulding, Chien, & Compton, 2010). Allen et al. (2013) compared the academic and social functioning of individuals diagnosed with schizophrenia and discovered the deterioration in academic functioning found in both sexes accelerates from childhood to late adolescence, and the study also determined that "the deterioration in premorbid academic functioning may be a unique neurodevelopmental marker for schizophrenia" (p.134). The lack of predictive measures creates a problem when determining appropriate class placement and setting appropriate education goals for this population. A gap in practice exists as there is no current predictor of educational attainment that considers the effects of mental illness, and there is a lack of research on the return to education following a disruption due to a mental disorder (Mojtabai et al., 2015). An overall lack of mental health data exists in the United States which inhibits research on those with severe mental illnesses (Teich, 2016).

Study Overview

Sample Size

All participants had the common characteristics of a diagnosis of psychotic disorder or mood disorder and being admitted as forensic psychiatric inpatients in Canada during the years 2011-2016.

Although the sample required for this study was 60 participants (30 for each diagnosis), the data requested produced a sample containing 18,866 participants, including 16,639 participants diagnosed with Schizophrenia and 2,227 participants diagnosed with mood disorders.

Research Questions

The research questions were written separately for each of the two mental illness diagnoses.

Research Question 1:

Can the age at first hospitalization predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders) from 2011 to 2016?

$H_0$1: Age at first hospitalization does not predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders).

H_a1: Age at first hospitalization does predict the educational attainment level of forensic psychiatric patients diagnosed with psychotic disorders (schizophrenia and other psychotic disorders).

Research Question 2:

If the age at first hospitalization is predictive of the educational attainment level of forensic psychiatric patients diagnosed with

psychotic disorders (schizophrenia and other psychotic disorders) from 2011 to 2016,

which ages of first hospitalization best predict each of eight levels of educational attainment?

Research Question 3:

Can the age at first hospitalization predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders) from 2011 to 2016?

$H_0$3: Age at first hospitalization does not predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders).

H_a3: Age at first hospitalization does predict the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders).

Research Question 4:

If the age at first hospitalization is predictive of the educational attainment level of forensic psychiatric patients diagnosed with mood disorders (bipolar and related disorders and depressive disorders) from 2011 to 2016, which ages of first hospitalization best predict each of eight levels of educational attainment?

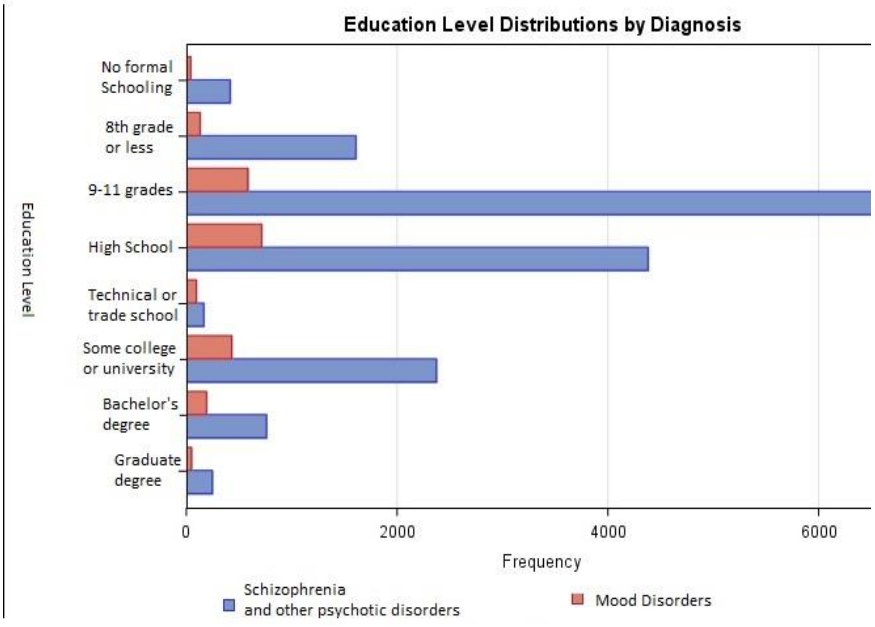
Data Analysis

The nature of this study was a quantitative study using secondary analysis of data that was previously collected upon admission into a general hospital or mental health facility in Ontario, Canada. All data collected was previously obtained upon admission and gathered through OMHRS. Multinomial logistic regression techniques were employed to determine the predictive relationships between educational attainment level and age at first hospitalization of mental illness among forensic psychiatric patients who were admitted to a maximum security forensic psychiatric facility from 2011 to 2016.

Descriptive Statistics

The distribution of education achievement level by diagnoses for the years 2011-2016 is shown in the graph. Education attainment level varied by diagnosis. The most common education level achieved by patients diagnosed with Schizophrenia or other psychotic disorders was "ninth-11th grade". However, the most common education achievement level of patients diagnosed with mood disorder was "high school" graduate. For this study, high school graduate was chosen as the reference for each of the two categories of mental illness due to the importance of attaining a high school diploma.

Education Level Distribution by Diagnosis



Multinomial Logistic Regression

Schizophrenia and other psychotic disorders

- The odds ratios for patients first hospitalized with Schizophrenia and other psychotic disorders prior to age 15 when compared to those first hospitalized between 15-24 years of age were 84.67 % more likely to receive no schooling than achieve high school graduation and 72.9% more likely to attain less than eighth grade than a high school diploma.
- Compared to patients first hospitalized with Schizophrenia and other psychotic disorders between the ages 15-24, those first hospitalized between 25-44 years of age were 26.5% more likely to attain a high school diploma than attain an education level of eighth grade or less and 29.7% more likely to attain a high school diploma than only a ninth 11 grade education.
- Those patients first hospitalized between 25-44 years of age indicated an increased likelihood to obtain the education level beyond high school in every education category when compared to those who were first hospitalized between the ages of 15 and 24: 68.5 % more likely to complete trade or technical school, 17.9% more likely to have some college education, 76.3% more likely to complete a bachelor degree, and 74.6% more likely to complete a graduate degree than attain a high school diploma.
- Patients first hospitalized with Schizophrenia and other psychotic disorders between the ages of 45 and 64 were 55.9% more likely to attain an eighth grade education or less when compared to those first hospitalized between 15-24 years old but were 26.6% more likely to complete a high school diploma than attain only a ninth-11th grade education.
- Patients first hospitalized between the ages of 45-64 are also more likely to attain levels beyond the high school diploma in every category than those first hospitalized between 15 and 24 years of age: 81.8% more likely to complete trade or technical school, 68.6% more likely to have some college, 80.4% more likely to complete a bachelor's degree, and 87.0% more likely to complete a graduate degree.
- Odds ratios indicate it is 79.8% more likely for those with a first hospitalization for Schizophrenia or other psychotic disorder at age 65 or older to have less than an eighth grade education and 93.7% more likely to complete a bachelor's degree when compared to those first hospitalized between the age at 15 and 24.

Multinomial Logistic Regression

Schizophrenia and other psychotic disorders

The age at first hospitalization which bests predicts each level of educational attainment were determined by the highest odds ratio and are listed in the table.

Best predictor by education level for patients diagnosed with Schizophrenia or other psychotic disorders

Education Level	Age at First Hospitalization	Exp(β)	95 % Wald Confidence Limits	
No Schooling	14 and Under	4.351	3.2	5.916
Less than 8th grade	65 and older	3.839	1.916	7.693
9-11 grades	No predictor for attaining this education level			
High School	Chosen as the referent grade level			
Technical or trade school	45-64	4.503	2.753	7.367
Some college	45-64	2.183	1.774	2.686
Bachelor's degree	65 and older	14.821	7.264	30.241
Graduate degree	45-64	6.705	4.388	10.244

- The odds ratio for no schooling was statistically significant only for patients first hospitalized at age 14 and under indicating 84.7% more likely to have no schooling than complete a high school diploma.
- Patients who were first hospitalized at age 65 or older were 79.3% more likely to attain an eighth grade education or less than achieving a high school diploma indicating a first hospitalization age at 65 or older is the best predictor for attaining an eighth grade education or less.
- This study did not produce any statistically significant age groups as a predictor for attaining a ninth-11th-grade education.
- An age at first hospitalization of 45-64 was found to be the best predictor for completing trade or technical school. An odds ratio of 4.503 indicates it is 81.8% more likely to complete trade or technical school than complete a high school diploma if a patient was first hospitalized between the ages of 45-64.
- It was 68.5% more likely for patients first hospitalized between the ages of 45-64 to attend some college than to attain only a high school diploma demonstrating this age group is the best predictor for attending some college.
- An age at first hospitalization at age 65 and older was the best predictor for attaining a bachelor's degree as it is 93.6% more likely than attaining only a high school diploma.

Patients who were first hospitalized between 45-64 were 87.0% more likely to attain a graduate degree rather than a high school diploma indicating an age at first hospitalization of 45-64 is the best indicator for a graduate degree education level.

Multinomial Logistic Regression

Mood Disorders

Odds ratios for patients diagnosed with a mood disorder were dramatically different than those for patients diagnosed with Schizophrenia or other psychotic disorder. There were 7 found to be statistically significant ($p<.05$).

- Patients first hospitalized at age 14 or younger are 74.3% more likely to attain an education level of eighth grade or less than a high school diploma compared to those first hospitalized between the ages of 15-24. This model again supports the limitation of higher education levels due to the age at the participants.
- Patients who were first hospitalized with a mood disorder between the ages of 25 and 44 were 71.2% more likely to receive a high school diploma than attain an education level of ninth-11th when compared to patients who were first hospitalized between the ages of 15 and 24.
- Patients first hospitalized with a mood disorder between the age at 25 and 44 were 75.6% more likely to attain a university degree than a high school diploma.
- Patients first hospitalized with a mood disorder between the age at 45 and 64 were 82.4% more likely to attain either a university degree and 68.4% more likely to complete a technical or trade school than achieve only a high school diploma compared to patients first hospitalized between 15 and 24.
- Patients who were first hospitalized at age 65 or older were 87.6% more likely to complete a university degree than a high school diploma when compared to those first hospitalized with a mood disorder between the age at 15 and 24.
- There were no statistically significant predictors for education levels “no schooling” and “some college”.
- The Less than eighth grade education level had a best predictor of age 14 and under.
- Grades 9-11 had two statistically significant age groups. Age at first hospitalization of 25-44 had an odds ratio of .584, and age at first hospitalization of 45-64 had an odds ratio of .629. These odds ratios are between 0 and 1 indicating a high school diploma was more likely than only attaining a ninth-11th grade education. Therefore, there is no predictor which supports individuals attaining a ninth-11th-grade education level.
- The best predictor for college degree levels increased in age as the degree level increased. The best predictor for bachelor’s degree is age group 25-44, and the best predictor for graduate degree is age group 65 and older.

Multinomial Logistic Regression

Mood Disorders

Best Predictor by Education Level for Patients Diagnosed with Mood Disorders				
Education Level	Age at First Hospitalization	Exp(β)	95 % Wald Confidence Limits	
No Schooling	No statistically significant age group			
Less than 8th grade	14 and under	2.9	1.297	6.483
9-11 grades	No predictor for attaining this education level			
High School	Chosen as the referent grade level			
Technical or trade school	45-64	2.174	1.087	4.348
Some college	No statistically significant age group			
Bachelor's degree	25-45	3.101	2.021	4.759
Graduate degree	65 and older	7.049	2.459	20.204

- There were no statistically significant predictors for education levels "no schooling" and "some college".
- The Less than eighth grade education level had a best predictor of age 14 and under.
- Grades 9-11 had two statistically significant age groups. Age at first hospitalization of 25-44 had an odds ratio of .584, and age at first hospitalization of 45-64 had an odds ratio of .629. These odds ratios were between 0 and 1 indicating a high school diploma was more likely than only attaining a ninth-11th grade education. Therefore, there is no predictor which supports individuals attaining a ninth-11th grade education level.
- The best predictor for attaining college degree levels increased in age as the degree level increased. The best predictor for attaining a bachelor's degree is age group 25-44, and the best predictor for graduate degree is age group 65 and older.

Summary of Findings

Using the quantitative design method, the findings provided additional insight to this unique population and will build on the limited research currently available. the age at first hospitalization of a mental illness was found to be an additional predictor of educational attainment which may be used when determining placement upon a patient's referral to educational services. It is important to consider the timelines and age factors of both fluid intelligence and crystallized intelligence when reviewing the results.

Many of the best predictors per education level for patients diagnosed with Schizophrenia and other psychotic disorders can be coordinated with the ages of which individuals attend the various levels of schooling. For example, some participants could be current patients at an age younger than 14 years old thereby limiting their ability to attain further education levels such as a high school diploma or education beyond high school. However, this would not account for those older patients who were first hospitalized at an early age but were unable to achieve beyond an eighth grade level or received no schooling as they aged. Their ability to attain education appears to be truncated which could be an effect of their development of fluid and crystallized intelligence. The same intelligence performances including speeded tasks, abstract problem-solving, and unfamiliar performances, which commonly decline at a more rapid rate in individuals with schizophrenia are the same performances associated with fluid intelligence which declines with age. Patients who were first hospitalized between 45-64 years of age or 65 and older would be older than the typical age at individuals who complete technical or trade school, some college and even those who complete a graduate degree. This is further evidence that when the education and experiences which increase crystallized intelligence are not interrupted, educational attainment is not truncated. The statistically significant age groups for education level ninth -11 grade were more likely to complete high school than drop out in the ninth -11 grades.

However, the referent age category of 15-25 years old covers a wide span including the typical years in which a person may graduate and go on to other education levels. There could be a vast difference in the education levels for those hospitalized between 15-18 and those first hospitalized between 19 and 25. The one best predictor that appeared to be out of the ordinary was for the less than eighth grade education level. The age at first hospitalization between the ages of 45-64 seemed to be a stark contrast since the same age group was the best predictor for most education levels beyond a high school diploma. However, upon further examination and additional research, the predictor makes more sense. The youngest person in that age range would have entered school in the year 1980. Prior to 1980, the minimum dropout age for schools was 15 years old or less in many provinces including New Brunswick, Quebec, Prince Edward Isle, and British Columbia (Oreopoulos, 2005). Many areas also had exemptions for children who could pass a seventh or eighth grade equivalency test (Oreopoulos, 2005).

The participants diagnosed with mood disorders were represented by a smaller sample. The participants were found to have an increased rate of higher education levels when their age at first hospitalization increased which matches the development of fluid and crystallized intelligence. When the education and experiences were not interrupted at an early age, an increased crystallized intelligence was more likely leading to an increased educational attainment level. The exception was trade or technical schooling with a best predictor of age at first hospitalization of 45-64. However, this education attainment occurs beyond initial development allowing an increase in crystallized intelligence.

The most relevant education levels for the problem addressed by this study are less than eighth grade through high school graduate. Although the effect is small, age at first hospitalization can be used as a predictor to assist in the appropriate placement of patients requesting education services especially GED classes.

The analysis of the data found the age at first hospitalization to be a predictor of educational attainment among forensic psychiatric patients diagnosed with the two most common diagnoses: Schizophrenia and other psychotic disorders or mood disorders (de Tribolet-Hardy & Habermeyer, 2016; Robertson et al., 2015). In order to include this predictor as part of the educational placement procedure for forensic psychiatric patients, it is important to gain an understanding of the best predictor identified for those education levels which are the focus of Education Services at [redacted].

Patients who had an age at first hospitalization with a diagnosis of Schizophrenia or other psychotic disorder at age 14 or under were the best predictor for having no schooling and were a statistically significant predictor of achieving less than an eighth-grade education. Cognitive dysfunction is more prevalent in adolescents with an early onset diagnosis of Schizophrenia than in individuals with a later onset (Teigset et al., 2018). Patients whose age at first hospitalization was 14 years old and under was also the best predictor for attaining an eighth-grade education or less for patients diagnosed with mood disorder. Although the construction of the data collection did not allow for the differentiation of the types of mood disorders within the category, bipolar is a prevalent diagnosis in the forensic setting (Fovet et al., 2015).

Early onset bipolar patients who are involved with multiple systems of care such as special education, child welfare, mental health services, and emergency psychiatric care, have poorer outcomes than children who are not involved with multiple systems of care (Connor, Ford, Pearson, Scranton, & Dusad, 2017). Also, Cavendish (2014) determined that youth with disabilities involved with the juvenile justice system had poorer education outcomes than those youth not involved with the juvenile justice system. The disruption during development of young people caused by psychosis can hinder an individual's ability to achieve key milestones including education-based milestones (BİLAÇ, ERCAN, Uysal, & Aydin, 2014; Bond et al., 2014; Fowler, Hodgekins, & French, 2017). Adolescents and young adults with first episode hospitalization often become education dropouts (Bond, Drake, & Luciano, 2015).

The stability of crystallized intelligence increases with maintenance and improvements throughout adulthood, but fluid intelligence peaks in late adolescence or early adulthood followed by a steady decline (Horn, 2008; Schroeders, Schipolowski, & Wilhelm, 2015). Crystallized intelligence is more sensitive to learning and formal education than fluid intelligence, but fluid intelligence is still sensitive to differentiation of learning environments (Becker, Lüdtke, Trautwein, Köller, & Baumert, 2012; Hunt, 2007). Ackerman (2000) found evidence that the course of crystallized intelligence throughout age depends strongly on the knowledge acquired. If a mental illness is severe enough to require a first hospitalization prior to age 14 and under, crystallized intelligence may be truncated due to lack of ability to attend formal education and ability to acquire knowledge through learning, and fluid intelligence may be impacted due to the difference in learning environments. Therefore, if the age at first hospitalization was at 14 years old or under, and the patient is diagnosed with either Schizophrenia or a mood disorder, GED classes may not be the most appropriate placement, especially if the patient was involved in special education and/or was involved with the juvenile justice system.

The age categories used by CIHI complicates the findings for the 9th to 11th grade education level for patients diagnosed with Schizophrenia and other psychotic disorders. Individuals typically graduate high school at age 17 years old in the United States and 17-18 years old in Canada (OECD, 2018). The age category used by CIHI includes 15-24 year olds which includes a majority of ages in which individuals would have obtained a high school diploma. The typical age at onset for males is 15-25 (Schizophrenia Facts and Statistics, 2010). Individuals who have a first hospitalization age at 15-17 may have their ability to complete a high school diploma hindered by their mental illness or the treatment of the mental illness whereas others who are hospitalized between the ages of 18-24 may have already obtained their diplomas.

Males with psychosis were found to have lower fluid and crystallized intelligence than a control group without psychosis, and females with psychosis were found to have lower fluid intelligence than a control group without psychosis (Ćosović, Todorović, Andrić-Petrović, & Marić, 2016). In Schizophrenia, cognitive ability is affected by the dysfunction of a frontoparietal neural network which is believed to support fluid intelligence (Joyce, 2013). Lower fluid intelligence is also associated with greater severity across disorders (Keyes, Platt, Kaufman, & McLaughlin, 2017).

Consideration needs to be given to older patients who ask for education services also. At the adult level, individuals are now required to have involvement in planning their own lives (Department of Health and Human Services, 2014). The research demonstrated that patients diagnosed with Schizophrenia and other psychotic disorders who have their first hospitalization between 45-64 years old are more likely to obtain post-secondary education, and patients diagnosed with mood disorders who have their first hospitalization between 25-44 years old are more likely to obtain a bachelor's degree. Studies have found that cognitive impairment is more generalized and severe in patients who have chronic Schizophrenia compared to first-episode patients (Expósito & Felipe-Castaño, 2018; Sponheim et al., 2010). Premorbid cognitive functioning, duration of illness, age, lack of educational milestone achievements, severity of symptoms, and being institutionalized are all contributing factors of cognitive decline or deficits (Expósito & Felipe-Castaño, 2018). Therefore, these factors should be considered when determining educational placement of older patients who have been diagnosed with Schizophrenia or other psychotic disorders but are not currently hospitalized for their first episode. Also, patients with Schizophrenia and psychotic bipolar disorder have a reduction in brain volume in the hippocampus, and "hippocampal volumes were associated with the severity of psychosis, declarative memory and overall cognitive performance" (Mathew et al., 2014). The hippocampal volume has been determined to play a critical role in learning and memory negatively impacting fluid intelligence (Zhu, Chen, Dang, Dong, & Lin, 2017). Therefore, older patients who have been diagnosed with Schizophrenia and other psychotic disorders or psychotic bipolar disorder who were involved with special education for cognitive issues and dropped out of high school, will be impacted by a declining fluid intelligence thereby hindering their ability to attain a GED. Although there have been advances in treatment, less than 14% of patients diagnosed with Schizophrenia are able to achieve sustainable symptomatic and functional recovery outcomes (Fowler et al., 2017; Jääskeläinen et al., 2012). Without sustainable symptomatic and functional recovery, patients are less likely to be successful in areas such as education (Fowler et al., 2017).

Patients who are not able to complete their GED need alternative educational opportunities. Adults who participated in a Life Skills program were found to have improved depression symptomology (Reddon, Hoglin, & Woodman, 2008). Life skills education refers to instruction focused on developing skills necessary to cope with challenges and demands that occur in daily life including communication, decision-making, and problem solving skills (Baldo & Uzamugunda, 2000; Jordaan, Beukes, & Esterhuyse, 2018; Kirmayer, Boothroyd, Laliberté, & Simpson, 1999). Skills which are commonly referred to as Instrumental Activities of Daily Living (IADL) include budgeting or money management, shopping for groceries, and preparing meals (American Occupational Therapy Association (AOTA), 2014; Newcomer, Kang, Kaye, & LaPlante, 2002). Goal-focused programs are effective in supporting skill development in these areas which increases successful transitioning to the community (Keenan, King, Curran, & McPherson, 2014). Life skills is a widely accepted intervention for increasing skills necessary for everyday life and have been found to show significant enhancement of mental health among adolescents who have been diagnosed with a mental illness (Das et al., 2016).

Recommendations

Update policies and procedures to include findings in the educational p

process.

1. **Update the educational placement policy (Attachment A).** The educational placement standard procedure should be updated to include age at first hospitalization as one of the predictors for educational placement. Predictors are not named specifically in the document, but an updated standard procedure instructs the use of the updated educational assessment.
2. **Update the educational assessment documentation (Attachment B).** The educational assessment document is a tool designed to define the required data to be collected while providing a structure for all collected data to be reported on a single page. The completed document is placed in the medical chart to allow any staff member to find the information in a designated location.
3. **Employ a flowchart which clarifies the decision-making process for educational placement (Attachment C).** The flow chart is a tool designed for use by the education coordinator completing the assessment. The chart allows for a more specific, less subjective determination based on the predictor findings. When used in conjunction with other factors, such as current capability, stability of mental illness, etc., a more appropriate educational placement can be determined. The flow chart is meant to be a preliminary placement allowing for the continued review of each individual in order to provide continuously appropriate education opportunities. Patients should be mentally stable and on a status level which allows participation in off-ward groups prior to being referred.

Implementation and Evaluation

Implementation

Implementation of the proposed changes to the educational placement procedure would be a multi-step process. The first step would be to work with the Director of Education and the teachers responsible for making placement decisions in order to create a finalized standard procedure. The standard procedure, found in Appendix A, includes a general statement, scope, and purpose along with the determined steps of the procedure. The proposed standard procedure would then need to be approved by the Director of Rehabilitation before implementing changes. Upon approval, the process will be presented to the rest of the education department, the rehabilitation department, and the social work department. This presentation should include everyone who makes patient referrals to education. If any additional staff members are identified, they will be invited to any of the previously determined departmental meetings to attend the presentation. Upon completion of the presentations, the procedure will be utilized for all new referrals.

Teachers who currently have patients struggling in a class would need to submit a request for re-evaluation. Those patients found to be inappropriate for their current placement will be placed in a more appropriate class.

I propose a launch of the project to take place in late July – early August 2019 in order to make appropriate placements for the fall semester.

Project Evaluation

An outcome-based project evaluation will promote a dual-emphasis on accountability and program policy improvement (Schalock, 2001). The evaluation will consist of monitoring patient progress through IEP goals, individual education goals, and GED pass rates. Outcome-based IEP goals are required by federal law to be updated annually for patients who are under the age at 21 and involved in special education (Kupper, 2000). Goals for patients who are above the age at 21 can be structured similarly to IEP goals. "Goals should be SMART (specific, measurable, achievable, relevant, and time-bound)" and dependent upon the needs of the patient (Maryland Statewide IEP Process Guide, 2019). These goals are required to be assessed quarterly (COMAR 13A.05.01.09.B).

Outcome based goals are frequently used in mental health settings and are used to create the goal, track progress, and at the end of the semester (or other pre-determined time) determine how close to the end goal the patient has achieved (Law & Jacob, 2015). Tracking these goals will allow for accountability of both the teachers and patients. GED pass rates should be viewed as both length of time in class prior to passing the test and number of patients who pass the GED each year. Progress data should be used to determine possible changes to be made for program policy improvement.

The evaluation process may identify additional classes, such as life skills which may be necessary to meet the educational needs of some patients. Integrating new classes will take approximately 6 months to create a class protocol and syllabus, research and adopt new curricula, obtain referrals, and place appropriate patients.

Conclusion

Overall treatment plans for forensic psychiatric patients in maximum security forensic psychiatric hospitals have changed to place the emphasis on evidence-based treatment practices. These practices require measurable goals with real-world significance (Parks et al., 2014). Education is one area which can be improved upon in order to positively impact patient reintegration back into society.

This white paper was designed to communicate research findings and present recommendations for changes in the educational placement process of forensic psychiatric patients. Mental illness has an impact on educational attainment and this study found age at first hospitalization is a predictor for educational attainment. Appropriate educational opportunities will be beneficial to both the patient and the facility. The recommended educational placement procedure is a step toward research-based educational opportunities for forensic psychiatric patients. Following a more formal standard procedure which utilizes an updated educational assessment and a more concrete system of placement ensures a more appropriate education for all patients who request education services. Appropriate opportunities may increase an individual's educational success which could also lead to an increase in employability after being reintegrated into the community. Increased opportunities may also reduce recidivism among forensic psychiatric patients.

References

Ackerman, P. L. (2000). Domain-specific knowledge as the "dark matter" of adult intelligence: Gf/Gc, personality and interest correlates. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 55(2), 69-84. doi:10.1093/geronb/55.2.p69

Allen, D. N., Strauss, G. P., Barchard, K. A., Vertinski, M., Carpenter, W. T., & Buchanan, R. W. (2013). Differences in developmental changes in academic and social premorbid adjustment between males and females with schizophrenia. Schizophrenia research,146(1), 132-137. doi:10.1016/j.schres.2013.01.032

American Occupational Therapy Association . (2014). Occupational therapy practice framework: Domain and process (3rd ed.). American Journal of Occupational Therapy, 68 (Suppl. 1), S1-S48. Retrieved from https://www.aota.org

Baldo, M., & Uzamugunda, J. (2000). Evaluating adolescents' AIDS education: The experience of Uganda. Journal of Health Management, 2(1), 81-97. doi:10.1177/097206340000200104

Becker, M., Lüdtke, O., Trautwein, U., Köller, O., & Baumert, J. (2012). The differential effects of school tracking on psychometric intelligence: Do academic-track schools make students smarter? Journal of educational psychology, 104(3), 682-699. doi:10.1037/a0027608

Bilaç, Ö., Ercan, E. S., Uysal, T., & Aydin, C. (2014). The prevalence of anxiety and mood disorders, and demographic characteristics in elementary school students. Turkish Journal of Psychiatry, 25(3). doi:10.5080/u7670Bond, G. R., Drake, R. E., & Luciano, A. (2015). Employment and educational outcomes in early intervention programmes for early psychosis: a systematic review. *Epidemiology and psychiatric sciences*, *24*(5), 446-457.

Bond, G. R., Drake, R. E., & Luciano, A. (2015). Employment and educational outcomes in early intervention programmes for early psychosis: A systematic review. Epidemiology and Psychiatric Sciences, 24(5), 446-457. doi:10.1017/s2045796014000419

Burgess, B., Curtis-Downes, D., & Gibson, R. C. (2013). Education and employment levels among Jamaican patients newly diagnosed with schizophrenia and bipolar disorder. International Journal of Social Psychiatry, 59(3), 247-253. doi:10.1177/0020764011433638

Canadian Institute for Health Information. (2013). Ontario mental health reporting system resource manual, 2013–2014: Module 1—Clinical coding. Retrieved from https://www.qhc.on.ca/photos/custom/OMHRS_Manual_Module_1_Clinical_Coding_2013_EN_web.pdf

Canadian Institute for Health Information. (2016). Ontario mental health reporting system: Assessment types and data elements, 2016-2017. Retrieved from https://www.cihi.ca/sites/default/files/omhrs_data_dictionary_2016-17_en.pdf

Canadian Institute for Health Information. (2017). Ontario mental health reporting system: Data quality documentation 2016–2017. Retrieved from https://www.cihi.ca/sites/default/files/document/omhrs-dq-external-report-2016-2017-en.pdf

Cannon Design. (2012). Independent study on future demand for state-operated psychiatric hospital capacity. Retrieved from http://dlslibrary.state.md.us/publications/JCR/2011/2011_72.pdf

Cavendish, W. (2014). Academic attainment during commitment and postrelease education–related outcomes of juvenile justice-involved youth with and without disabilities. Journal of Emotional and Behavioral Disorders, 22(1), 41-52. doi:10.1177/1063426612470516

Connor, D. F., Ford, J. D., Pearson, G. S., Scranton, V. L., & Dusad, A. (2017). Early-onset bipolar disorder: Characteristics and outcomes in the clinic. Journal of Child and Adolescent Psychopharmacology, 27(10), 875-883. doi:10.1089/cap.2017.0058

Ćosović, V., Todorović, N., Andrić-Petrović, S., & Marić, N. P. (2016). Sex differences in fluid and crystalized intelligence focus on people with psychosis. Psihijatrija

danas, 48(2), 201-214.
Das, J. K., Salam, R. A., Lassi, Z. S., Khan, M. N., Mahmood, W., Patel, V., & Bhutta, Z. A. (2016). Interventions for adolescent mental health: an overview of systematic reviews. Journal of Adolescent Health, 59(4), S49-S60. https://doi.org/10.1016/j.jadohealth.2016.06.020
Department of Health and Human Services (2014). Fact sheet: Home and community based services. Medicaid.gov. Retrieved from https://www.medicaid.gov/medicaid/hcbs/downloads/hcbs-setting-factsheet.pdf.
de Tribolet-Hardy, F., & Habermeyer, E. (2016). Schizophrenic patients between General and Forensic psychiatry. Frontiers in public health, 4, 135. https://doi.org/10.3389/fpubh.2016.00135
Easden, M. H., & Sakdalan, J. A. (2015). Clinical diagnostic features and dynamic risk factors in a New Zealand inpatient forensic mental health setting. Psychiatry, Psychology and Law, 22(4), 483-499. https://doi.org/10.1080/13218719.2015.1035424
Ennals, P., Fossey, E. M., Harvey, C. A., & Killackey, E. (2014). Postsecondary education: Kindling opportunities for people with mental illness. Asia-Pacific Psychiatry, 6(2), 115-119. https://doi.org/10.1111/appy.12091
Esch, P., Bocquet, V., Pull, C., Couffignal, S., Lehnert, T., Graas, M., …Ansseau, M. (2014). The downward spiral of mental disorders and educational attainment: a systematic review on early school leaving. BMC Psychiatry, 14(1), 237. https://doi.org/10.1186/s12888-014-0237-4
Expósito, M. S., & Felipe-Casta-o, E. (2018). Cognitive insight, neurocognition and life skills in patients with schizophrenia. Psicothema, 30(3), 251-256.
Fovet, T., Geoffroy, P. A., Vaiva, G., Adins, C., Thomas, P., & Amad, A. (2015). Individuals with bipolar disorder and their relationship with the criminal justice system: a critical review. Psychiatric services, 66(4), 348-353. https://doi.org/10.1176/appi.ps.201400104
Fowler, D., Hodgekins, J., & French, P. (2017). Social Recovery Therapy in improving activity and social outcomes in early psychosis: Current evidence and longer term outcomes. Schizophrenia research.
Goulding, S. M., Chien, V. H., & Compton, M. T. (2010). Prevalence and correlates of school drop-out prior to initial treatment of nonaffective psychosis: further evidence suggesting a need for supported education. Schizophrenia research, 116(2), 228-233. https://doi.org/10.1016/j.schres.2009.09.006
Horn, J. L. (2008). Spearman, g, expertise, and the nature of human cognitive capability. *Extending intelligence: Enhancement and new constructs*, 185-230.
Hunt, E. (2007). Improving Intelligence: What's the Difference From Education?. In *Extending Intelligence* (pp. 27-44). Routledge.
Isohanni, I., Jones, P. B., Järvelin, M. R., Nieminen, P., Rantakallio, P., Jokelainen, J., ... & Isohanni, M. (2001). Educational consequences of mental disorders treated in hospital. A 31-year follow-up of the Northern Finland 1966 Birth Cohort. Psychological medicine, 31(02), 339-349. https://doi.org/10.1017/S003329170100304X
Jääskeläinen, E., Juola, P., Hirvonen, N., McGrath, J. J., Saha, S., Isohanni, M., ... & Miettunen, J. (2012). A systematic review and meta-analysis of recovery in schizophrenia. Schizophrenia bulletin, 39(6), 1296-1306. https://doi.org/10.1093/schbul/sbs130
Jordaan, J., Beukes, R., & Esterhuyse, K. (2018). The development and evaluation of a life skills programme for young adult offenders. International journal of offender therapy and comparative criminology, 62(10), 3077-3096. https://doi.org/10.1177/0306624X17737682
Joyce, E. (2013). Cognitive function in schizophrenia: Insights from intelligence research. British Journal of Psychiatry, 203(3), 161-162. https://doi.org/10.1192/bjp.bp.112.109553
Keenan, S., King, G., Curran, C. J., & McPherson, A. (2014). Effectiveness of experiential life skills coaching for youth with a disability. Physical & occupational therapy in pediatrics, 34(2), 119-131. https://doi.org/10.3109/01942638.2013.842200
Keyes, K. M., Platt, J., Kaufman, A. S., & McLaughlin, K. A. (2017). Association of fluid intelligence and psychiatric disorders in a population-representative sample of US adolescents. JAMA psychiatry, 74(2), 179-188. https://doi.org/10.1001/jamapsychiatry.2016.3723

Kirmayer, L. J., Boothroyd, L. J., Laliberté, A., & Simpson, B. L. (1999). Suicide Prevention and Mental Health Promotion in First Nations and Inuit Communities. Culture and Mental Health Research Unit Report.

Livingston, J., Nijdam-Jones, A., & Brink, J. (2012). A tale of two cultures: examining patient-centered care in a forensic mental health hospital. Journal of Forensic Psychiatry & Psychology, 23(3), 345-360. https://doi.org/10.1080/14789949.2012.668214

Mathew, I., Gardin, T. M., Tandon, N., Eack, S., Francis, A. N., Seidman, L. J., . . . Keshavan, M. S. (2014). Medial temporal lobe structures and hippocampal subfields in psychotic disorders: findings from the Bipolar-Schizophrenia Network on Intermediate Phenotypes (B-SNIP) study. JAMA psychiatry, 71(7), 769-777. https://doi.org/10.1001/jamapsychiatry.2014.453

Mojtabai, R., Stuart, E. A., Hwang, I., Eaton, W. W., Sampson, N., & Kessler, R. C. (2015). Long-term effects of mental disorders on educational attainment in the National Comorbidity Survey ten-year follow-up. Social psychiatry and psychiatric epidemiology, 50(10), 1577-1591. https://doi.org/10.1007/s00127-015-1083-5

National Center for Education Statistics (NCES) (2017, April). Status Dropout Rates. Retrieved July 26, 2017, from http://nces.ed.gov/

Newcomer, R., Kang, T., Kaye, H. S., & LaPlante, M. (2002). Housing changes and moves into supportive housing among adults with disabilities. Journal of Disability Policy Studies, 12(4), 268-279. https://doi.org/10.1177/104420730201200406

Organisation for Economic Co-operation and Development. (2018). Characteristics of education systems, in education at a glance 2018: OECD indicators. Paris, France: Author.

Oreopoulos, P. (2005). Canadian Compulsory School Laws and their Impact on Educational. Analytical Studies Branch Research Paper Series, Statistics Canada, catalogue, (11F0019MIE).

Parks, J., Radke, A. Q., & Haupt, M. B. (2014). "The vital role of state psychiatric hospitals." Alexandria, VA: National Association of State Mental Health Program Directors (NASMHPD).

Reddon, J. R., Hoglin, B., & Woodman, M. A. (2008). Immediate effects of a 16-week life skills education program on the mental health of adult psychiatric patients. Social Work in Mental Health, 6(3), 21-40. https://doi.org/10.1300/J200v06n03_02

Rice, M. E., Harris, G. T., Cormier, C. A., Lang, C., Coleman, G., & Krans, T. S. (2005). An evidence-based approach to planning services for forensic psychiatric patients. Issues in Forensic Psychology, 5,13-49.

Robertson, A. G., Swanson, J. W., Lin, H., Easter, M. M., Frisman, L. K., & Swartz, M. S. (2015). Influence of criminal justice involvement and psychiatric diagnoses on treatment costs among adults with serious mental illness. Psychiatric Services, 66(9), 907-909. https://doi.org/10.1176/appi.ps.201500134

Schaufenbil, R., Kornbluh, R., Stahl, S., & Warburton, K. D. (2015). A new standard of care for forensic mental health treatment: Prioritizing forensic intervention. CNS spectrums, 20(03), 172-176. https://doi.org/10.1017/S1092852915000140

Schizophrenia Facts and Statistics. (2010). Retrieved January 30, 2019, from http://www.schizophrenia.com/szfacts.htm

Schroeders, U., Schipolowski, S., & Wilhelm, O. (2015). Age-related changes in the mean and covariance structure of fluid and crystallized intelligence in childhood and adolescence. Intelligence, 48, 15-29. https://doi.org/10.1016/j.intell.2014.10.006

Teich, J. (2016). Better data for better mental health services: evidence-based policies for improving care and treatment of those with serious mental illness are urgently needed-but good evidence is hard to find. Issues in Science and Technology, (2), 61.

Teigset, C. M., Mohn, C., Brunborg, C., Juuhl-Langseth, M., Holmén, A., & Rund, B. R. (2018). Do clinical characteristics predict the cognitive course in early-onset schizophrenia-spectrum disorders?. Journal of Child Psychology and Psychiatry. https://doi.org/10.1111/jcpp.12896

Zhu, B., Chen, C., Dang, X., Dong, Q., & Lin, C. (2017). Hippocampal subfields' volumes are more relevant to fluid intelligence than verbal working memory. Intelligence, 61, 169-175. https://doi.org/10.1016/j.intell.2017.02.00

Attachment A

[redacted] **HOSPITAL CENTER**

STANDARD PROCEDURE: ***Educational Placement***

GENERAL STATEMENT: When Education Services receives a referral, an educational assessment shall ensure that the individual is placed in appropriately. Patients over 21 will be assessed and placed in an appropriate class. Per the Special Education Standard Procedure, appropriate special education and related services are available to an individual with a disability from birth to the end of the school year in which they child turns 21.

CROSS REFERENCES: SPECIAL EDUCATION STANDARD PROCEDURE
IDEA 2004 (34CFR300)

DEFINITIONS:

IEP - The Individualized Education Plan is a written statement for a child with a disability that is developed, reviewed, and revised in a meeting in keeping with certain requirements of law and regulations.

ITP Team – The ITP Team includes [redacted] staff members assigned to the patient's treatment team including: one or more licensed physicians and/or psychiatrists; one or more of the following mental health professionals licensed in the State of Maryland: a clinical psychologist and/or a clinical social worker. Other members of the treatment team may include a teacher, a representative from Rehabilitation Services, Special Programs Coordinator, and others as appropriate.

ATTACHMENTS: Education Assessment

SCOPE: All patients requesting education services, treatment team members and staff

PURPOSE: The purpose of this procedure is to provide all [redacted] staff with information on special education policies, procedures, practices, and information required to maintain compliance with the federal and State laws. When required, [redacted] staff shall be responsible for implementing the individualized Education Plan (IEP), writing educational progress reports, participating in

educational meetings, reviewing and revising the IEP as needed.

PROCEDURE:

I. For all patients under the age of 21 who are entitled to Special Education services, refer to the Special Education Standard Procedure.

II. For all other patients:

A. Upon receipt of the Education Services referral, an interview will be completed within 7 days.

a. For each individual, the evaluating teacher will be assigned as the educational coordinator.

i. An educational assessment will be completed and placed in chart #2.

ii. Placement will be determined using the information collected on the educational assessment.

iii. An ITP team meeting will be held to review and revise the ITP as appropriate.

B. Once it is determined that the individual is appropriate for an educational placement, discretion of the timeline for placement shall be given to the education coordinator and treatment team with consideration for the patient's clinical condition, readiness for instruction, and willingness for education involvement prior to initiating instructional services.

LEVEL OF RESPONSIBILITY: All staff who are engaged in the treatment of patients.

CQI: Rehabilitation Policy

DEVELOPED BY: 2/19

Attachment B

Date:

Time:

History per Chart:

Language: _____

Court Status: _____

Weschler Abrieviated Scale of Intelligence (2nd)

(WASI-II) administered on _____

by _____

Estimated IQ: _____ Percentile Rank: _____

Confidence Interval: _____ Range: _____

Additional Testing (if applicable)

Administered on _____ by _____

Test _____

IQ: _____ Grade equivalent: _____

Test _____

Grade equivalent: _____

Word Recognition _____

Sentence Comprehension _____

Spelling _____

Math _____

Patient Reported Educational History:

Education Level Completed: _____

Age during last year of education: _____

Last school attended: _____

Patient Reported Special Education:

- ☐ IEP (active or inactive)
- ☐ 504 Plan
- ☐ Behavior Plan
- ☐ Other _____

Mental Health Diagnosis: _____

Age of First Hospitalization: _____

Other Related Diagnoses: _____

Other System Involvement:

- ☐ Foster Care
- ☐ Child Protective Services
- ☐ Juvenile Justice
- ☐ DDA
- ☐ Lead exposure

Non-public Schools attended:

_____

_____

_____

_____

Educational Services Participation

Classes Enrolled (completion date)

- ☐ GED Services (_____)
- ☐ English Literature (_____)
- ☐ American Govt (_____)
- ☐ Computer Literacy (_____)
- ☐ Life Skills (_____)
- ☐ Other _____ (_____)
- ☐ Other _____ (_____)
- ☐ Other _____ (_____)

Evaluator: _____

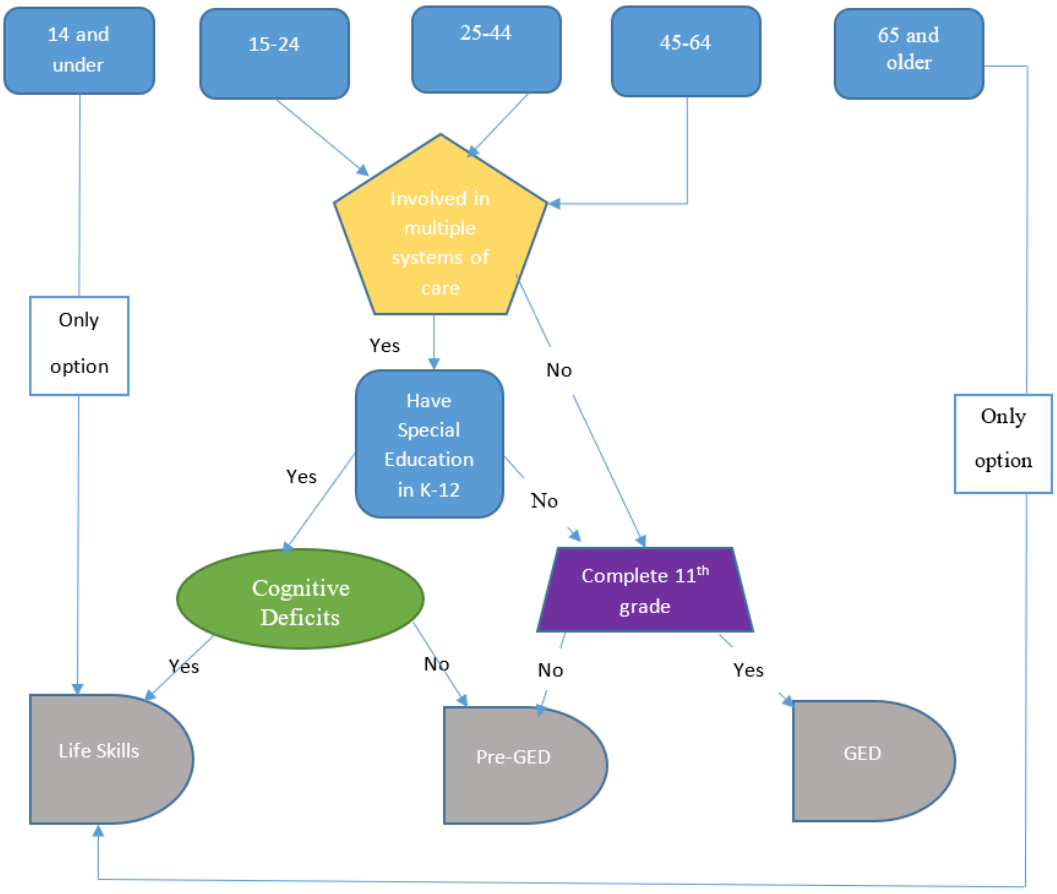
Patient

EDUCATIONAL ASSESSMENT

Attachment C

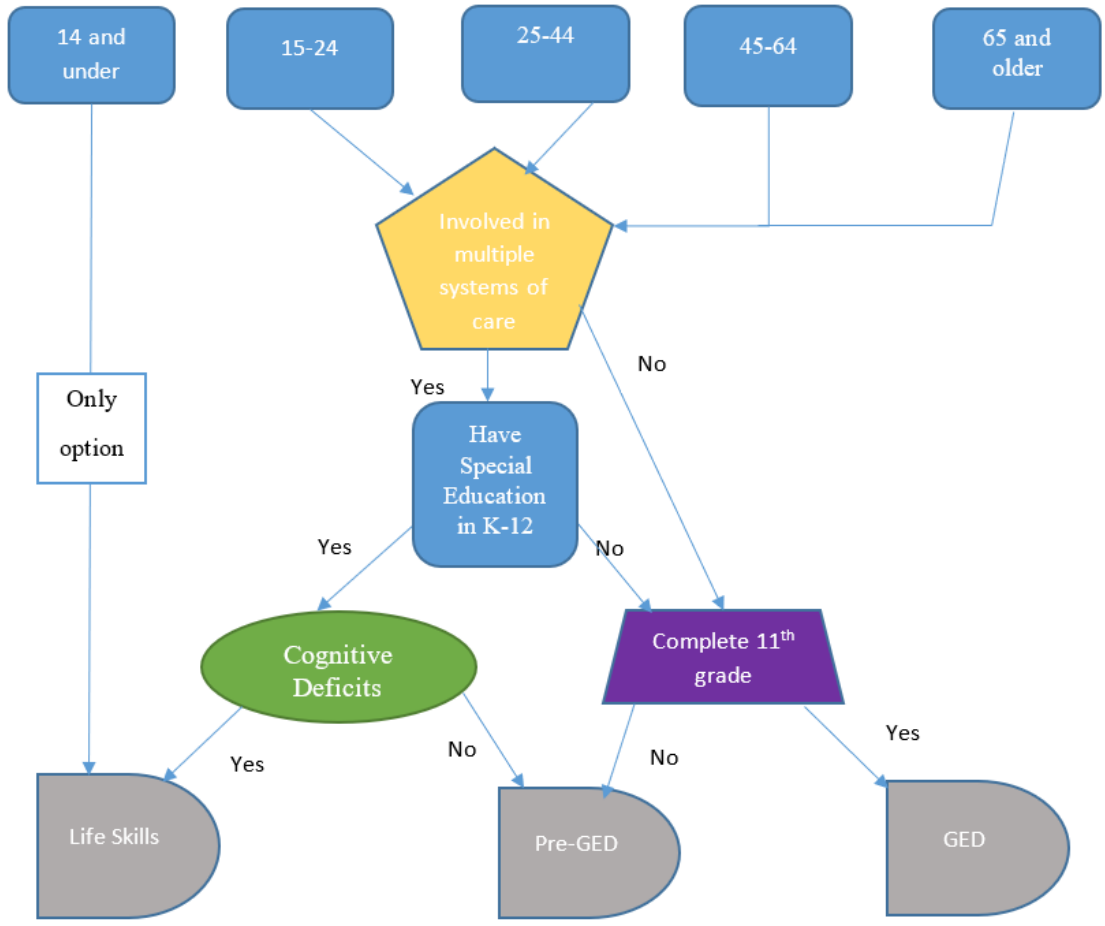
Age at First Hospitalization as a Predictor for Educational Placement for Patients Diagnosed with Schizophrenia or Other Psychotic Disorders

(Preliminary consideration for placement allowing for continued review of the individual to ensure proper placement)



Age at First Hospitalization as a Predictor for Educational Placement for Patients Diagnosed with Mood Disorders

(Preliminary consideration for placement allowing for continued review of the individual to ensure proper placement)



Appendix B: Additional Tables and Graphs

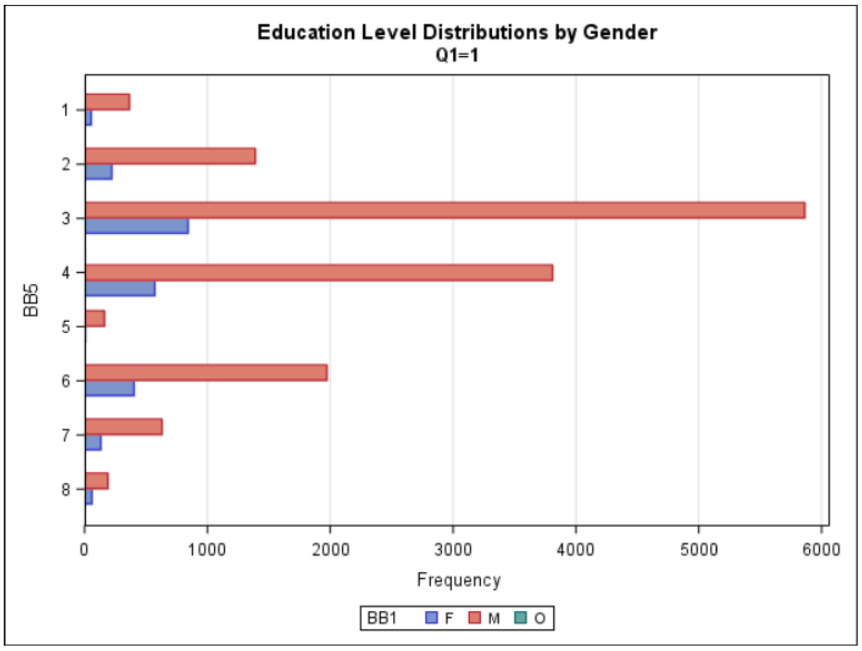


Figure B1. Schizophrenia and other psychotic disorders: Education level by gender.

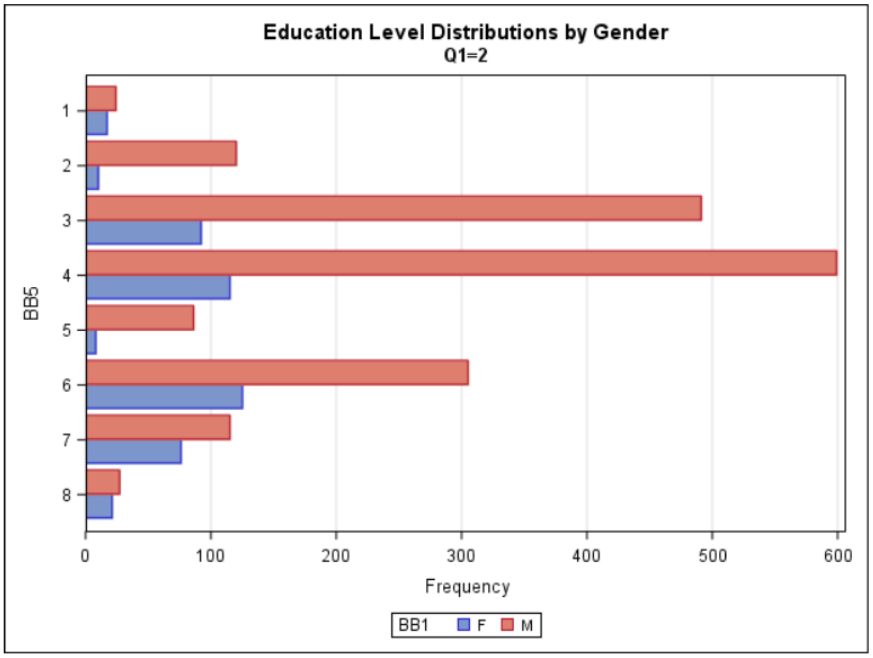


Figure B2. Mood disorders: Education level by gender.

Table B1

Analysis of Maximum Likelihood Estimates for Psychotic Disorders

Parameter		BB5	DF	Estimate	Standard Error	WaldChi-Square	Pr > ChiSq	Exp(Est)
Intercept		1	1	-2.5551	0.0774	1090.4008	<.0001	0.078
Intercept		2	1	-1.0399	0.0407	654.4164	<.0001	0.353
Intercept		3	1	0.6416	0.0257	624.7554	<.0001	1.899
Intercept		5	1	-3.6049	0.1277	797.0298	<.0001	0.027
Intercept		6	1	-0.7163	0.0363	390.1699	<.0001	0.489
Intercept		7	1	-2.4447	0.0735	1105.4164	<.0001	0.087
Intercept		8	1	-3.5433	0.1239	817.5592	<.0001	0.029
DD6	1	1	1	1.4704	0.1568	87.9989	<.0001	4.351
DD6	1	2	1	0.9919	0.1062	87.2648	<.0001	2.696
DD6	1	3	1	0.0516	0.0878	0.3456	0.5566	1.053
DD6	1	5	1	-0.6578	0.5953	1.2211	0.2691	0.518
DD6	1	6	1	-0.3012	0.1378	4.7756	0.0289	0.74
DD6	1	7	1	-0.2085	0.2771	0.5664	0.4517	0.812
DD6	1	8	1	-1.1248	0.7211	2.4328	0.1188	0.325
DD6	3	1	1	0.0889	0.1174	0.5733	0.4489	1.093
DD6	3	2	1	-0.236	0.0667	12.5105	0.0004	0.79
DD6	3	3	1	-0.6569	0.0435	228.3455	<.0001	0.518
DD6	3	5	1	0.5218	0.1739	8.9999	0.0027	1.685
DD6	3	6	1	0.1647	0.0546	9.0871	0.0026	1.179
DD6	3	7	1	1.1666	0.0906	165.7553	<.0001	3.211
DD6	3	8	1	1.0772	0.1522	50.0964	<.0001	2.936
DD6	4	1	1	0.3215	0.2423	1.7604	0.1846	1.379
DD6	4	2	1	0.444	0.1265	12.3081	0.0005	1.559
DD6	4	3	1	-0.4516	0.0999	20.4358	<.0001	0.637
DD6	4	5	1	1.5048	0.2511	35.903	<.0001	4.503
DD6	4	6	1	0.7805	0.1058	54.3837	<.0001	2.183
DD6	4	7	1	1.4151	0.1575	80.7648	<.0001	4.117
DD6	4	8	1	1.9028	0.2163	77.4066	<.0001	6.705
DD6	5	1	1	0.6092	0.7599	0.6427	0.4228	1.839
DD6	5	2	1	1.3453	0.3546	14.3971	0.0001	3.839
DD6	5	3	1	-0.1451	0.3399	0.1822	0.6695	0.865
DD6	5	5	1	-8.5401	115.9	0.0054	0.9413	0
DD6	5	6	1	0.4751	0.4045	1.3794	0.2402	1.608
DD6	5	7	1	2.696	0.3639	54.9026	<.0001	14.821
DD6	5	8	1	-8.2023	94.9427	0.0075	0.9312	0

Table B2

Odds Ratio Estimates and Wald Confidence Intervals for Psychotic Disorders

Effect	BB5	Unit	Estimate	95% Confidence Limits	
DD6 1 vs 2	1	1	4.351	3.2	5.916
DD6 1 vs 2	2	1	2.696	2.19	3.32
DD6 1 vs 2	3	1	1.053	0.887	1.251
DD6 1 vs 2	5	1	0.518	0.161	1.663
DD6 1 vs 2	6	1	0.74	0.565	0.969
DD6 1 vs 2	7	1	0.812	0.472	1.397
DD6 1 vs 2	8	1	0.325	0.079	1.335
DD6 3 vs 2	1	1	1.093	0.868	1.376
DD6 3 vs 2	2	1	0.79	0.693	0.9
DD6 3 vs 2	3	1	0.518	0.476	0.565
DD6 3 vs 2	5	1	1.685	1.198	2.369
DD6 3 vs 2	6	1	1.179	1.059	1.312
DD6 3 vs 2	7	1	3.211	2.689	3.835
DD6 3 vs 2	8	1	2.936	2.179	3.957
DD6 4 vs 2	1	1	1.379	0.858	2.217
DD6 4 vs 2	2	1	1.559	1.216	1.998
DD6 4 vs 2	3	1	0.637	0.523	0.774
DD6 4 vs 2	5	1	4.503	2.753	7.367
DD6 4 vs 2	6	1	2.183	1.774	2.686
DD6 4 vs 2	7	1	4.117	3.024	5.605
DD6 4 vs 2	8	1	6.705	4.388	10.244
DD6 5 vs 2	1	1	1.839	0.415	8.154
DD6 5 vs 2	2	1	3.839	1.916	7.693
DD6 5 vs 2	3	1	0.865	0.444	1.684
DD6 5 vs 2	5	1	<0.001	<0.001	>999.999
DD6 5 vs 2	6	1	1.608	0.728	3.554
DD6 5 vs 2	7	1	14.821	7.264	30.241
DD6 5 vs 2	8	1	<0.001	<0.001	>999.999

Table B3

Analysis of Maximum Likelihood Estimates for Mood Disorder

Parameter		BB5	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq	Exp(Est)
Intercept		1	1	-2.9618	0.2648	125.1151	<.0001	0.052
Intercept		2	1	-1.981	0.1687	137.9474	<.0001	0.138
Intercept		3	1	0.0239	0.0826	0.0835	0.7726	1.024
Intercept		5	1	-2.5344	0.2166	136.876	<.0001	0.079
Intercept		6	1	-0.6136	0.0991	38.354	<.0001	0.541
Intercept		7	1	-2.2041	0.1863	140.0143	<.0001	0.11
Intercept		8	1	-2.9618	0.2648	125.1151	<.0001	0.052
DD6	1	1	1	-0.257	1.0536	0.0595	0.8073	0.773
DD6	1	2	1	1.0647	0.4104	6.7297	0.0095	2.9
DD6	1	3	1	0.2538	0.2777	0.8351	0.3608	1.289
DD6	1	5	1	0.00866	0.7661	0.0001	0.991	1.009
DD6	1	6	1	-0.0403	0.356	0.0128	0.9099	0.961
DD6	1	7	1	0.3716	0.5698	0.4252	0.5144	1.45
DD6	1	8	1	0.4361	0.7811	0.3117	0.5766	1.547
DD6	3	1	1	-0.0372	0.3743	0.0099	0.9208	0.963
DD6	3	2	1	0.2812	0.2235	1.5833	0.2083	1.325
DD6	3	3	1	-0.538	0.1253	18.4444	<.0001	0.584
DD6	3	5	1	0.7785	0.2636	8.7233	0.0031	2.178
DD6	3	6	1	0.1998	0.1348	2.1983	0.1382	1.221
DD6	3	7	1	1.1318	0.2185	26.8366	<.0001	3.101
DD6	3	8	1	0.4328	0.3393	1.6272	0.2021	1.542
DD6	4	1	1	0.6931	0.439	2.493	0.1144	2
DD6	4	2	1	0.5596	0.2959	3.5766	0.0586	1.75
DD6	4	3	1	-0.4644	0.1902	5.9633	0.0146	0.629
DD6	4	5	1	0.7765	0.3537	4.8206	0.0281	2.174
DD6	4	6	1	0.2253	0.1956	1.3263	0.2495	1.253
DD6	4	7	1	1.5449	0.2616	34.886	<.0001	4.688
DD6	4	8	1	0.4418	0.4738	0.8697	0.351	1.556
DD6	5	1	1	0.7646	1.0868	0.4949	0.4817	2.148
DD6	5	2	1	1.1701	0.6241	3.5144	0.0608	3.222
DD6	5	3	1	0.5515	0.4248	1.6858	0.1942	1.736
DD6	5	5	1	0.3372	1.0761	0.0982	0.754	1.401
DD6	5	6	1	-0.8904	0.788	1.2769	0.2585	0.41
DD6	5	7	1	1.9528	0.5373	13.2109	0.0003	7.049
DD6	5	8	1	-9.5777	176.1	0.003	0.9566	0

Table B4

Odds Ratios Estimates and Wald Confidence Intervals for Mood Disorders

Effect	BB5	Unit	Estimate	95% Confidence Limits	
DD6 1 vs 2	1	1	0.773	0.098	6.098
DD6 1 vs 2	2	1	2.9	1.297	6.483
DD6 1 vs 2	3	1	1.289	0.748	2.221
DD6 1 vs 2	5	1	1.009	0.225	4.528
DD6 1 vs 2	6	1	0.961	0.478	1.93
DD6 1 vs 2	7	1	1.45	0.475	4.43
DD6 1 vs 2	8	1	1.547	0.335	7.149
DD6 3 vs 2	1	1	0.963	0.463	2.007
DD6 3 vs 2	2	1	1.325	0.855	2.053
DD6 3 vs 2	3	1	0.584	0.457	0.746
DD6 3 vs 2	5	1	2.178	1.299	3.652
DD6 3 vs 2	6	1	1.221	0.938	1.59
DD6 3 vs 2	7	1	3.101	2.021	4.759
DD6 3 vs 2	8	1	1.542	0.793	2.997
DD6 4 vs 2	1	1	2	0.846	4.728
DD6 4 vs 2	2	1	1.75	0.98	3.125
DD6 4 vs 2	3	1	0.629	0.433	0.912
DD6 4 vs 2	5	1	2.174	1.087	4.348
DD6 4 vs 2	6	1	1.253	0.854	1.838
DD6 4 vs 2	7	1	4.688	2.807	7.827
DD6 4 vs 2	8	1	1.556	0.615	3.937
DD6 5 vs 2	1	1	2.148	0.255	18.079
DD6 5 vs 2	2	1	3.222	0.948	10.95
DD6 5 vs 2	3	1	1.736	0.755	3.991
DD6 5 vs 2	5	1	1.401	0.17	11.546
DD6 5 vs 2	6	1	0.41	0.088	1.923
DD6 5 vs 2	7	1	7.049	2.459	20.204
DD6 5 vs 2	8	1	<0.001	<0.001	>999.999