SUBSTANCE USE BEHAVIORS AMONG A NATIONALLY REPRESENTATIVE

SAMPLE OF COLLEGE STUDENTS WITH DISABILITIES

By

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ABSTRACT OF THE DISSERTATION

Substance use behaviors among a nationally representative

sample of college students with disabilities

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Background: A significant number of students enrolled in postsecondary institutions have a disability. Like many young adults, college students with disabilities have an elevated risk of substance use. However, research on substance use in this population is limited.

Objectives: This dissertation aims to: 1) Examine the prevalence of disability in U.S. college students by student characteristics, including disability status; 2) Present associations between disability status, sociodemographic characteristics, and substance use among college students; and 3) Explore the individual, interpersonal, institutional, and public policy factors affecting service utilization by college students with disabilities.

Methods: A mixed methods design was employed in this study. Data from the 2015 National Survey on Drug Use and Health (NSDUH) public use data file was analyzed. Purposeful sampling was employed for in-depth interviews with key informants at Rutgers University who provide services to students with disabilities.

Results: An estimated 2.6 million (12.6%) college students had a disability. The most common type of disability was cognitive impairment (7.3%). College students with any

disability had higher odds of current tobacco use (AOR = 1.31; 95% CI 1.01-1.69) and reported more ever use, past year use, and current use of illicit drugs (p<.001) than their nondisabled peers. Personal barriers emerged as dominant themes for service utilization by students with disabilities.

Conclusions: This dissertation documents the high prevalence of substance use among college students with disabilities. It also highlights the many barriers to service utilization for this population. Understanding the risk factors for substance use and strategies for prevention and treatment are important to people with disabilities, disability service providers, and public health policymakers. Hence, there is a need for the development of health improvement plans for college students that integrate inclusive policy, systems, and environmental strategies.

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CHAPTER 1: INTRODUCTION

There are approximately 21 million students enrolled in colleges and universities in the United States (National Center for Education Statistics, 2017). An estimated seven million students attend two-year institutions and over 13 million attend four-year institutions. Some 17.5 million students were expected to enroll in undergraduate programs and about three million in graduate programs in the 2016 Fall semester (National Center for Education Statistics, 2017). A significant number of those students have some form of disability. According to recent statistics by the U.S. Department of Education, 11% of undergraduate students report having a disability (Snyder, de Brey, & Dillow, 2016). This is compared to 20% of adults in the general U.S. population (Brault, 2012; Courtney-Long et al., 2015; Stevens, Courtney-Long, Okoro, & Carroll, 2016). The proportion of post-baccalaureate students reporting a disability is much lower at 5% (Snyder et al., 2016).

While estimates of the number of college students with disabilities vary, fifty-four percent of students surveyed in the 2016 American College Health Association - National College Health Assessment II (ACHA-NCHA II) reported being diagnosed or treated by a professional for one or more disabilities within the past year (American College Health Association, 2016). Several types of health conditions were reported, including psychiatric disorders, attention deficit hyperactivity disorder (ADHD), attention deficit disorder (ADD), chronic illness (e.g., cancer, diabetes, autoimmune disorders), and learning disabilities.

The transition period into adulthood is marked by exploration and the search for autonomy. Exploration often takes the form of initiation of substance use. Consequently,

young adults have the highest prevalence rates of substance use. The rate of substance

dependence or abuse in the past year among adults aged 18 to 25 (16.3%) was higher

than that among youths aged 12 to 17 (5%) and among adults aged 26 or older (7.1%)

(Center for Behavioral Health Statistics and Quality, 2015).

Among college students, alcohol is the most widely used substance, with annual

prevalence rates as high as 79%, and two out of three students reporting past-month use

(Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016; Lipari & Jean-Francois,

2013). Underage drinking continues to be a serious public health concern within this

group, and alcohol use disorders are fairly common (Center for Behavioral Health

Statistics and Quality, 2015). Marijuana and tobacco use are also very popular, with one

fifth of students reporting past-month use of each (American College Health Association,

2016; Substance Abuse and Mental Health Services Administration, 2014). Annual

prevalence of illicit drug use is 41%, while annual prevalence of any illicit drug use other

than marijuana is 19% (Johnston et al., 2016). Additionally, an increase in nonmedical

use of prescription medications has been found, with approximately 20% of college

students reporting nonmedical use of at least one prescription medication in their lifetime

(McCabe, West, Teter, & Boyd, 2014).

Like many young adults, college students with disabilities have an elevated risk of

substance use. However, research on substance use in this population is rare. There is a

small but growing body of research on the associations between ADHD and substance

use disorders. Findings suggest adolescents and young adults (including college

students) with ADHD are more likely to become dependent or abuse nicotine, alcohol,

marijuana, cocaine, or other substances. Similar results are found in small studies of

college students with learning disabilities (DuPaul, Pinho, Pollack, Gormley, & Laracy, 2015; Groenman et al., 2013; Janusis & Weyandt, 2010; Lee, Humphreys, Flory, Liu, & Glass, 2011; Rooney, Chronis-Tuscano, & Yoon, 2012). When it comes to psychiatric disabilities, approximately one third of all adolescents with mental illness had become regular alcohol drinkers or had used illicit drugs by the age of 18 (Conway, Swendsen, Husky, He, & Merikangas, 2016). Yet, very little is known about how this population fares after enrolling in college including how these comorbidities impact retention. Even more striking is the lack of information on the prevalence of substance use among students with other forms of disabilities.

People with disabilities have been described as an unrecognized health disparity population, a group that has been largely absent from public health research and promotion initiatives (Krahn, Walker, & Correa-De-Araujo, 2015; Rios, Magasi, Novak, & Harniss, 2016). From a public health policy standpoint, identifying disparities in substance use prevalence in this population is important to determining how best to direct resources in order to reduce these disparities. Monitoring and reducing health disparities in populations with disabilities is especially relevant, given current recommendations in *Healthy People 2020* and requirements by the Patient Protection and Affordable Care Act of 2010 (ACA) (Office of Disease Prevention and Health Promotion, 2017; U.S. Department of Health and Human Services, 2011).

To that end, this dissertation assessed the prevalence of disability, disability types, and characteristics of college students with disabilities in the U.S. A second objective was to examine the prevalence of substance use (e.g., tobacco, alcohol, marijuana, and other illicit drugs), and sociodemographic correlates among college students with

physical, cognitive, and other disabilities and their counterparts without disabilities. The final aim was to explore the individual, interpersonal, institutional, and public policy factors affecting service utilization by college students with disabilities. The specific aims and research questions (RQ) of the dissertation are as follows:

Aim 1: To examine the prevalence of disability in U.S. college students by student characteristics, including disability status.

- RQ 1: What is the prevalence of disability among U.S. college students?

- RQ 2: What is the prevalence of disability types among college students?

- RQ 3: What is the prevalence of college students with one, two, three, or four or more disability types?

- RQ 4: What is the prevalence of disability among college students by gender and academic level (first year; second or third year; fourth, fifth, or higher year)?

- RQ 5: How do college students with disabilities rate their overall health status compared to college students without disabilities?

- RQ 6: Is there a difference in full-time vs part-time enrollment patterns between students with disabilities and students without disabilities?

Aim 2: To present associations between disability status, sociodemographic characteristics, and substance use among college students.

- RQ 7: What is the prevalence of substance use in college students with disabilities?

- RQ 8: Is there a significant difference in the prevalence of substance use between college students with disabilities and their counterparts without disabilities?

- RQ 9: Is there a difference in substance use by disability type?

- RQ 10: What are the correlates of substance use in students with disabilities?

Aim 3: To explore the individual, interpersonal, institutional, and public policy factors affecting service utilization by college students with disabilities.

- RQ 11: What types of services are available to college students with disabilities?

- RQ 12: What are the perceived barriers to service utilization by students with disabilities?

- RQ 13: What are the ramifications of regulations such as the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973 on students' access to services?

CHAPTER 2: LITERATURE REVIEW

College Students and Disabilities

The number of students with disabilities attending post-secondary institutions has been increasing for decades (Cortiella & Horowitz, 2014; Newman, Wagner, Cameto, Knokey, & Shaver, 2010; Newman et al., 2011; Snyder et al., 2016). Postsecondary education is a primary goal for over 80% of youth with disabilities transitioning from high school. Improvements in supports and services provided throughout primary and secondary schools have had a significant impact, and now 60% of high school students with disabilities go on to college or university. Although this is a historically high number, it is still lower than the proportion of those without disabilities (60.1% vs 67.4%, respectively) (Newman et al., 2011). There is also evidence of differential rates of enrollment based on the type of disability. For example, young adults with sensory impairments, emotional disturbances, intellectual disabilities, or multiple disabilities vary in their patterns of enrollment from 10% for those with intellectual disability to more than 70% for students with visual impairments. Individuals with multiple disabilities and those with emotional disturbances typically have low enrollment rates (Cameto, Levine, & Wagner, 2004; Newman et al., 2011; Raue & Lewis, 2011).

Almost 90% of institutions of higher learning that enroll students with disabilities report enrolling students with specific learning disabilities. More than three quarters enrolled students with ADD, or ADHD, mobility limitations or orthopedic impairments, mental illness/psychological or psychiatric conditions. Seventy-three percent enrolled students who were deaf or had a hearing impairment, or had other health impairments or conditions, including chronic conditions. Over half had students who were blind or had a

visual impairment, autism spectrum disorder (ASD), or traumatic brain injury. Substantial numbers of colleges and universities also serve individuals with cognitive or intellectual disability (41%), difficulty speaking or language impairment (35%), and other disability (17%) (Raue & Lewis, 2011).

The transition to college is very stressful, particularly for young adults with disabilities. Many are living away from home for the first time. They are meeting new people and navigating social situations in a novel environment. Students who had an Individualized Education Program (IEP) in primary and secondary school are now expected to be responsible for scheduling their courses, managing their health conditions, and making decisions about available supports and services to which they are entitled. This presents special challenges and opportunities for students, the postsecondary institutions, educational professionals, and disability support providers.

Moreover, in the 2007–2008 school year, approximately 657,000 undergraduates and 107,000 graduate students were veterans. There are now over a million veterans enrolled in colleges and universities across the U.S., and their numbers continue to grow (Department of Veterans Affairs, 2017; Molina & Morse, 2015; Radford, 2011). This population also introduces new challenges for college campuses, as 21% of undergraduates who are veterans report having a disability, compared with 11 percent of non-veteran undergraduates (Snyder et al., 2016).

Definitions of Disability

The *International Classification of Functioning, Disability and Health* (ICF) is the international standard and provides language and a conceptual basis for the definition

and measurement of health and disability. It defines disability as an umbrella term for impairments, activity limitations, and participation restrictions. It is a multidimensional model with several interrelated components: a health condition, body functions and structures, activities, participation, environmental and personal factors. It goes on to describe disability as the interaction between individuals with a health condition (e.g., cerebral palsy, Down syndrome, and depression) and personal and environmental factors (e.g., negative attitudes, inaccessible transportation and public buildings, and limited social supports). This represents an expanded view of functioning and disability in terms of environmental factors that influence functioning, and classifies all of the domains of functioning and disability as well as the physical, social, and attitudinal environmental factors affecting them (World Health Organization, 2001).

Another widely used definition of disability comes from the Americans with Disabilities Act (ADA) of 1990 (amended in 2008), which prohibits discrimination on the basis of disability. It defines an individual with a disability as: 1) a person who has a physical or mental impairment that substantially limits one or more major life activities; 2) a person who has a history or record of such an impairment; or 3) a person who is perceived by others as having such an impairment. The ADA does not specifically name all of the impairments that are covered. Physical or mental impairments are defined as "any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological; musculoskeletal; special sense organs; respiratory, including speech organs; cardiovascular; reproductive; digestive; genitourinary; hemic and lymphatic; skin; and endocrine." Examples of mental

or psychological disorders include intellectual disability, emotional or mental illness, and specific learning disabilities (Americans with Disabilities Act, 1990).

Disability prevalence for children younger than age 15 is 8%. By age 45, it rises to 30%, and to 71% by age 80. Therefore, rates of disability increase with age. The severity of disability and the need for assistance to perform activities of daily living also increase with age (Altman & Bernstein, 2008; Brault, 2012). However, death rates from conditions such as heart disease are decreasing, which accounts for both the increase in life expectancies and in the number of people who experience chronic disabilities, including arthritis, which is a leading cause of disability among adults (Barbour, Helmick, Boring, & Brady, 2017; Centers for Disease Control and Prevention, 2009; Institute of Medicine, 2007).

Prevalence of Developmental Disability in College Students

A disability can be acquired at any stage in a person's life. However, a developmental disability is manifested in youth, and is defined by the Developmental Disabilities Assistance and Bill of Rights Act of 2000 (DD Act) as a severe, chronic disability which is: 1) attributable to a mental or physical impairment or a combination of mental and physical impairments; 2) manifested before the person attains age 22; 3) likely to continue indefinitely; and 4) which results in substantial functional limitations in three or more areas of major life activities. The major life activities delineated are: self-care, receptive and expressive language, learning, mobility, self-direction, capacity for independent living, and economic self-sufficiency (Administration on Intellectual and Developmental Disabilities, 2017).

Additionally, an individual from birth to age 9 who has a substantial developmental delay or specific congenital or acquired condition may be considered to have a developmental disability without meeting all of the criteria for substantial functional limitations, if the individual has a high probability of meeting those criteria later in life without services and supports (Administration on Intellectual and Developmental Disabilities, 2017). Examples of developmental disabilities are neurological disorders (ADD, ADHD), intellectual disabilities, learning disability, ASD, behavior disorders, traumatic brain injury, cerebral palsy, down syndrome, vision/hearing impairment, seizure disorder, and spina bifida.

Fifteen percent of children aged 3-17 years in the U.S. have one or more developmental disabilities. Learning disabilities and ADD/ADHD are the most commonly reported at 8% and 7%, respectively (Boyle et al., 2011). Even as childhood disability due to physical conditions continues to decline, there has been a significant increase in disabilities due to neurodevelopmental or mental health problems. Consequently, the number of children with certain types of developmental disabilities (ASD, ADHD, and other developmental delays) has risen in the past decade (Boyle et al., 2011; Houtrow, Larson, Olson, Newacheck, & Halfon, 2014).

As children with neurodevelopmental and psychiatric disorders transition into young adults, many pursue a postsecondary education. Subsequently, there are myriad implications for these students and the schools enrolling them. For example, there has been a documented increase in burden and severity of mental illness in recent cohorts of college students (Hunt & Eisenberg, 2010). Psychiatric conditions and ADHD were the most prevalent disabilities reported in the 2016 ACHA-NCHA II (American College

Health Association, 2016). According to one study, almost half of college students met Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria for at least one psychiatric condition in the previous year, specifically personality, mood, or anxiety disorders (Blanco et al., 2008).

About one third of the disabilities reported by postsecondary institutions were learning disabilities. Eighteen percent of disabilities were students with ADD/ADHD, 15% were mental illness/psychological or psychiatric conditions, and 11% were a health impairment/condition. Mobility limitation or orthopedic impairment were less prevalent at 7%. Four percent of students had deafness or hearing impairment. Blindness or visual impairment and cognitive difficulties or intellectual disability were reported by 3% of students, respectively. A small percentage had ASD and traumatic brain injury (2% each). Difficulty speaking or language impairment was reported by 1%, and 3% reported other unspecified disabilities (Newman et al., 2011; Raue & Lewis, 2011).

College Students and Substance Use

One in five college students use illicit drugs (Substance Abuse and Mental Health Services Administration, 2014). The availability of new substances and popularity of marijuana has contributed to the rise in prevalence of illicit drug use in this population (Center for Behavioral Health Statistics and Quality, 2015; Johnston et al., 2016; Lipari & Jean-Francois, 2013). In fact, annual prevalence of marijuana is 38%, and 5% use marijuana daily (American College Health Association, 2016; Johnston et al., 2016). A smaller proportion (3%), report past–year use of non-heroin narcotics (primarily Vicodin and OxyContin). However, annual prevalence of amphetamine use (e.g., Adderall and

Ritalin) was 10% for college students. Although prescribed to treat ADHD, these drugs

are often misused by college students to stay alert to complete course assignments and

study for exams (American College Health Association, 2016; Johnston et al., 2016;

McCabe et al., 2014).

Every day over 1.4 million college students drink alcohol, with about 2,600

drinking alcohol for the first time (Lipari & Jean-Francois, 2013). A third report heavy

drinking days in the past two weeks, and nearly 40% report being intoxicated in the past

month. One third report binge drinking – defined as five or more alcoholic drinks for

males or four or more alcoholic drinks for females on the same occasion – in the prior

two-week period. Thirteen percent report consuming ten or more drinks in a row in the

past two weeks (American College Health Association, 2016; Blanco et al., 2008; Center

for Behavioral Health Statistics and Quality, 2015; Johnston et al., 2016; Lipari & Jean-

Francois, 2013; Substance Abuse and Mental Health Services Administration, 2014).

The negative health, academic and social consequences of alcohol use in this group are

well documented and include poor grades, injuries, sexual assaults, overdoses, memory

blackouts, changes in brain function, lingering cognitive deficits, and legal problems

(White & Hingson, 2014).

While college students consume alcohol at much higher rates than their non-

college counterparts, they have significantly lower prevalence of daily smoking (4%

versus 16%) (Johnston et al., 2016). Although tobacco use prevalence continues to

decline among young adults aged 18-25, rates of use by tobacco products vary greatly.

Specifically, cigarettes, cigars, cigarillo, hookah, and electronic cigarettes are the most

common products (American College Health Association, 2016; Center for Behavioral

Health Statistics and Quality, 2015; Latimer, Batanova, & Loukas, 2014; Loukas,

Batanova, Fernandez, & Agarwal, 2015).

Disabilities and Substance Use

It is well documented that people with disabilities have consistently higher

prevalence of current smoking than people without disabilities. In 2015, rates were

23.4% vs. 14.9%, respectively (Altman & Bernstein, 2008; Borrelli, Busch, & Dunsiger,

2014; Brawarsky, Brooks, Wilber, Gertz, & Klein, 2002; Courtney-Long, Stevens,

Caraballo, Ramon, & Armour, 2014; Kraus, 2017). As with many other substance use

behaviors, this disparity in tobacco use between individuals with disabilities and those

without disabilities is attributed to the strong association between psychiatric disorders

and substance use. For instance, individuals with mental illness have significantly higher

rates of current smoking, smoke a greater number of cigarettes, and are less successful at

quitting (Brawarsky et al., 2002; Centers for Disease Control and Prevention Office on

Smoking and Health, 2017; Jamal et al., 2015; P. H. Smith, Mazure, & McKee, 2014;

Sung, Prochaska, Ong, Shi, & Max, 2011). Nicotine use disorder has been positively

associated with several psychiatric conditions such as panic disorders, clinical depression,

borderline personality disorder, bipolar disorders, generalized anxiety, and posttraumatic

stress disorder (Alegria et al., 2010; Chou et al., 2016; Cranford, Eisenberg, & Serras,

2009; S. M. Smith, Goldstein, & Grant, 2016).

Mental illness is also a risk factor for alcohol use in adolescents and adults

(Center for Behavioral Health Statistics and Quality, 2015; Conway et al., 2016; Grant et

al., 2008; S. M. Smith et al., 2016). Likewise, marijuana use has been associated with

affective disorders, anxiety, and personality disorders (Hasin et al., 2016). Among adults who report a substance use disorder in the past 12 months, about forty percent also had a mental illness in the past year. Moreover, eleven percent of adults with substance use disorder had a serious co-occurring mental illness. The problem is even more pervasive in college-aged adults (18-25) as they have the highest rates of co-occurring mental illness and substance use disorder. When it comes to major depression, young adults with the disease were more likely to be heavy alcohol drinkers, and use marijuana, among other substances (Center for Behavioral Health Statistics and Quality, 2015).

Although the association between psychological disorders and substance use has been extensively studied, there has been little research on the relationship between substance use and other types of disabilities. Disability can affect any organ in the body. Indeed, the ADA's broad definition of physical or mental impairment includes such conditions as orthopedic, visual, speech, and hearing impairments, cerebral palsy, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, intellectual disability, emotional illness, specific learning disabilities, HIV, and substance use disorders. Further, major life activities that may be affected by disability include caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working (Americans with Disabilities Act, 1990).

Yet, the preponderance of research focuses on psychiatric disorders and substance use. In one of the handful of studies to explore non-psychiatric disabilities, approximately 40% of adults 18–44 years old who have either complex activity limitation or basic actions difficulty reported currently smoking, compared with 22% of

nondisabled adults in this age group. Complex activity limitation was defined as limitations or restrictions in a person's ability to participate fully in social role activities, such as working or maintaining a household. People with emotional difficulties were the most likely to smoke (43%) compared with those who had other types of difficulties. Second most likely to smoke were individuals with cognitive difficulty, work limitation, or social limitation (26%-27%). On the other hand, adults with disabilities were less likely to be current alcohol drinkers than adults with no disability (Altman & Bernstein, 2008).

Similarly, individuals with disabilities were found to be more likely to have ever smoked and to be current smokers, and less likely to have quit smoking compared to those without disabilities. Smoking rates also varied by type of disability. Individuals with orthopedic, affective, and sensory conditions were more likely to be current smokers than those without disabilities. Conversely, adults with chronic conditions were more likely to have ever smoked, but were less likely to be current smokers than adults without disabilities (Brawarsky et al., 2002).

More recently, Courtney-Long and colleagues (2014) analyzed smoking prevalence by disability type (vision, hearing, cognitive, or ambulatory, or limitations with self-care or independent living) and found adults with a disability were more likely than adults without a disability to be current smokers. Smoking prevalence for each type of disability (except for self-care limitation) was significantly higher than for adults without a disability. The prevalence of current smoking by disability type ranged from 32% (self-care limitation) to 44% (cognitive limitation). Another study also using a nationally representative sample found that almost 40% of respondents age 21 to 44 with

mobility impairments smoked cigarettes, compared with 22% of adults without mobility

impairments (Borrelli et al., 2014).

College Students with Disabilities and Substance Use

Another significant gap in the literature is the scant amount of research on

substance use among college students with disabilities. By age 18, the majority of

adolescents with pre-existing mental disorders had consumed alcohol at least once and

had reported having the opportunity to use drugs. Furthermore, adolescents with mental

disorders also had high lifetime rates of both alcohol and illicit drug abuse (Conway et

al., 2016). As stated earlier, although the majority of young adults with disabilities

continue on to postsecondary education, much remains unknown about this population.

Equally important is the paucity of information on estimates of substance use

among students with other, non-psychiatric, forms of disabilities. According to ACHA,

5% of students have chronic illnesses (e.g., cancer, diabetes, autoimmune disorders), 4%

have a learning disability, and 9% have other disabilities such as hearing and vision

impairments, mobility/dexterity, and speech or language disorders (American College

Health Association, 2016). As a notable exception, Bernert, Ding, and Hoban (2012)

found college students with disabilities engaged in significantly more substance use

behaviors than their nondisabled peers.

Examples of research on this topic are exceedingly rare and include a study that

found college students with ADHD and learning disabilities reported significantly more

substance use than their counterparts without disabilities (DuPaul et al., 2015). Another

study of college students with ADHD concluded that such students were less likely to use

marijuana and alcohol, but were more likely to misuse prescription stimulants (Janusis & Weyandt, 2010). Meanwhile, prospective cohort studies that followed children with and without ADHD into adolescence or adulthood found that children with ADHD were significantly more likely to have ever used nicotine and other substances (Groenman et al., 2013; Lee et al., 2011). In contrast, a longitudinal study on students who were receiving special education services found lower substance use among young adults (Yu, Huang, Newman, & Malouf, 2008). Hence, results are mixed.

According to current trends, the proportion of U.S. residents with various disabilities will continue to rise in coming years (Iezzoni, Kurtz, & Rao, 2014). Yet people with disabilities are largely excluded from mainstream epidemiological, public health, and outcomes research (Rios et al., 2016). *Healthy People 2020* is a U.S. Department of Health and Human Services (HHS) initiative which provides science-based, national objectives for improving the health of all Americans during the years 2010-2020. It calls for the inclusion of measures of disability in all health data collection systems. It also identifies the need for better disability health data as a critical emerging issue in informing policy and program development regarding critical issues of health disparities and health equity. One recommendation by the Office of Disease Prevention and Health Promotion (2017) is that standard disability items be included in all public health surveillance instruments and that data be analyzed for individuals with disabilities where disability is in the data source. Additionally, questions on disability status are required by the ACA and are intended to help monitor health disparities in populations with disabilities. Specifically, Section 4302 of the ACA requires a standard set of

disability identifiers be included on all population health surveys conducted or sponsored by HHS (U.S. Department of Health and Human Services, 2011).

To my knowledge, no published study has examined substance use in college students with a range of disabilities using mixed methods design. Understanding the prevalence of students with disabilities and the extent to which they engage in substance use behaviors will help education professionals and disability support services providers in delivering appropriate supports so that students can fully participate in the campus environment. Considering that mental illness is one of the most significant public health problems among young adults, it will also help guide mental health professionals in understanding the complex associations between disability and substance use in higher education.

Theoretical framework

The Social Ecology Model (SEM) of health was used as the conceptual framework for the dissertation (Figure 1). This theory-based model emphasizes the myriad and interacting individual-level and population-level determinants of health and interventions. A key concept of SEM is that health behaviors have multiple levels of influences, including individual, interpersonal, institutions and organizations, community, and public policy. Another is that influences on behaviors interact across these different levels. Understanding these multifaceted and interactive effects of personal and environmental factors can better inform the development of comprehensive intervention approaches that can systematically target mechanisms of change at several levels of influence (Centers for Disease Control and Prevention, 2017; Sallis, Owen, & Fisher, 2008). Indeed, the many barriers that stand in the way of people with disabilities having access to quality health care (include stigma and discrimination) are related to actual or perceived differences attributed to demographic characteristics such as an impairment. Hence, disability health disparities often arise from social assumptions and prejudices, inaccessible physical environments, and inflexible policies and procedures.

Individual or personal factors in the SEM include gender, religious identity, racial/ethnic identity, sexual orientation, economic status, financial resources, values, goals, expectations, and age. Genetics, resiliency, coping skills, time management skills, health literacy, personal agency in accessing health care, and stigma associated with accessing counseling and other support services are also considered in this "micro-level" factor (American College Health Association, 2017; Centers for Disease Control and Prevention, 2017; Sallis et al., 2008; UNICEF, 2017).

Interpersonal factors are formal and informal social networks and social support systems that can influence individual behaviors, including family, friends, peers, co-workers, religious networks, customs, or traditions. In a postsecondary setting this includes roommates, faculty, supervisors, resident advisors, rituals, diversity, athletics, recreation, intramural sports, clubs, and Greek life (American College Health Association, 2017).

Institutional factors encompass social institutions with organizational characteristics and formal and informal rules and regulations for operations that affect how, or how well, services are provided to an individual or group (Sallis et al., 2008; UNICEF, 2017). This includes campus climate (e.g., tolerance/intolerance, safety), class schedules, financial policies, distance to classes and buildings, noise, and availability of common spaces. Examples of institutional factors that affect health are: 1) the ways in which college students with disabilities utilize assistance provided by disability support services; and 2) mechanisms in place for college students with substance use and mental health issues to access available services and supports.

Community factors involve relationships among organizations, institutions, and informational networks. The built environment, neighborhood associations, community leaders, on/off-campus housing, businesses (e.g., bars, fast food restaurants), commuting, parking, transportation, walkability, and parks are examples of community factors (American College Health Association, 2017; Sallis et al., 2008; UNICEF, 2017).

Policy or enabling factors are global, national, state, and local laws and policies, including policies regarding the allocation of resources for health and access to healthcare services, and restrictive policies (Centers for Disease Control and Prevention, 2017;

Sallis et al., 2008; UNICEF, 2017). In the context of this paper, they include policies that allocate resources to establish and maintain infrastructure that connect individuals and the larger social environment to create a healthy campus (American College Health Association, 2017). Such policies comprise national and state drug laws, those that restrict tobacco use in public spaces, as well as alcohol sales and consumption. Regulations that increase taxes on cigarettes and alcohol serve the same purpose.

Principally, this dissertation assessed two of the main legislative acts that affect students' access to accommodations in postsecondary institutions, Title II of the ADA and Section 504 of the Rehabilitation Act of 1973. They require that an institution make reasonable accommodations for those individuals with a qualified disability.

This study explored personal, institutional, social, environmental, and other barriers faced by students with disabilities. The ways in which college students with disabilities utilize assistance provided by disability support services was also examined. The researcher interviewed staff at Rutgers Office of Disability Services, Rutgers Student Health, and others who serve students with disabilities, substance use, and mental health issues, to discuss the services and supports available to students. Finally, knowledge and interpretation of Title II of the ADA and Section 504 of the Rehabilitation Act of 1973 were investigated.

Figure 1. Social Ecology Model (SEM) of Health.

Public
Policy
Federal, state,
and local
regulations and
laws

Institutions
and
Organizations
Schools
Societal institutions
Health care
administration
The built
environment

Interpersonal
Individual
relationships
Support groups
Social network
Cultural context

Individual
Attitudes
Knowledge
Beliefs
Behaviors
Self-concept
Skills
Developmental
history

CHAPTER 3: METHODS

A mixed methods design was employed in this study. Study Aims 1 and 2 were addressed using quantitative methods while Aim 3 was achieved qualitatively. Mixed methods research design involves the systematic integration of quantitative and qualitative data within a study (Creswell, Fetters, & Ivankova, 2004; Devers, 1999; Kornhaber, de Jong, & McLean, 2015; Palinkas et al., 2011; Weiner, Amick, Lund, Lee, & Hoff, 2011). The focus is on collecting, analyzing, and merging both quantitative and qualitative data into one investigation. Mixed methods research draws on the strengths of both qualitative and quantitative methodologies by combining approaches in a single research study to provide a more comprehensive understanding (Palinkas, 2014; Wisdom, Cavaleri, Onwuegbuzie, & Green, 2012). Integration permits a more complete and synergistic utilization of data than would separate quantitative and qualitative data collection and analysis (Creswell et al., 2004; Moffatt, White, Mackintosh, & Howel, 2006; Wisdom et al., 2012). Qualitative methods are used to provide a "thick description" or depth of understanding to complement breadth of understanding provided by quantitative methods. Additionally, they elicit the perspective of individuals, explore issues, develop conceptual theories, or evaluate processes (Bradley, Curry, & Devers, 2007; Palinkas, 2014; Palinkas et al., 2011).

Mixed methods designs are prominent in health services research where qualitative inquiry can improve the description and explanation of complex, real-world phenomena (Bradley et al., 2007; Creswell et al., 2004; Kornhaber et al., 2015; Moffatt et al., 2006; Weiner et al., 2011; Wisdom et al., 2012; Wisdom & Creswell, 2013). Health services research explores how social factors, financing systems, organizational

structures and processes, and personal behaviors affect access to health care, quality of health care, health, and well-being. Health services researchers utilize mixed methods to understand barriers to health care (particularly mental health services) (Devers, 1999; Palinkas, 2014; Palinkas et al., 2011). Most mixed methods research combine surveys with interviews (Weiner et al., 2011).

The purpose of using both quantitative and qualitative methods in the current research was to achieve principles of complementarity and expansion. Each method was used to answer different, but closely related research questions. Complementarity occurs when quantitative and qualitative methods are used in complementary fashion to answer related questions for the purpose of elaboration (e.g., using qualitative data to provide depth of understanding and quantitative data to provide breadth of understanding). Expansion occurs when researchers seek to expand the breadth and depth of the study by using different methods for different research components (Onwuegbuzie & Collins, 2007; Palinkas et al., 2011; Wisdom et al., 2012).

Integration occurred at the conceptualization of the study and was accomplished through an explanatory sequential design (Fetters, Curry, & Creswell, 2013). Quantitative analysis used data from the 2015 NSDUH, while qualitative research consisted of individual semi-structured interviews. The quantitative research was conducted first. Questions for the interview protocol were informed by findings from the 2015 NSDUH. This sequential design ensured that qualitative implementation was dependent on the quantitative results (Creswell, Plano Clark, Gutmann, & Hanson, 2003). As each method was employed to answer a set of different research questions, the combination of the two methodologies served to strengthen the study by providing a

deeper understanding of substance use among college students with disabilities and service utilization by this population.

Subsequent results from the interviews indicated the presence of a large number of students with mental health issues at the university. This important finding and the impact of mental health in service utilization on campus led to further investigation of mental illness variables in the NSDUH data. Hence, the qualitative interviews also informed the quantitative methodology.

Gilburt et al. (2013) relied on the principle of complementarity when they used a mixed methods quasi-experimental design to assess the implementation of recovery-orientated practice through training across a system of mental health services. They employed a quantitative care plan audit to evaluate behavioral intent. Qualitative assessment comprised of semi-structured interviews to explore staff understanding of recovery, implementation in services and the wider system, and the perceived impact of the intervention.

Similarly, Moffat et al. (2006) documented the interpretation of a mixed methods study, and outlined an approach to dealing with apparent discrepancies between qualitative and quantitative research data in a randomized controlled trial evaluating whether welfare rights advice had an impact on health and social outcomes among older individuals. Quantitative data included standardized outcome measures of health and well-being, health-related behaviors, psychosocial interaction, and socioeconomic status. Qualitative data consisted of semi-structured interviews to explore participants' views about the intervention, its outcome, and the acceptability of the research process.

Mixed methods studies are complex to plan and conduct, and thereby require increased resources. However, using a mixed methods design has several advantages, including that they: 1) give voice to study participants and ensure that findings are grounded in participants' experiences; 2) provide flexibility and are adaptable to many study designs to expand on information obtained by quantitative research; and 3) collect rich, comprehensive data (Kornhaber et al., 2015; Wisdom & Creswell, 2013).

Quantitative study of substance use behaviors among a nationally representative sample of college students with disabilities

Data Source

This study used data from the 2015 National Survey on Drug Use and Health (NSDUH) public use data file. NSDUH is an annual survey that provides information about the use of illicit drugs, alcohol, and tobacco among members of the United States civilian, noninstitutionalized population aged 12 and older, including residents of noninstitutionalized group quarters such as college dormitories, group homes, shelters, rooming houses, and civilians dwelling on military installations. It also includes questions that focus on health issues. Further information regarding NSDUH methodology and definitions are available from the Substance Abuse and Mental Health Services Administration (SAMHSA) (Center for Behavioral Health Statistics and Quality, 2016b).

The sample for the 2015 NSDUH was selected using a multistage, deeply stratified sample design. Interviews were conducted using computer-assisted interviewing (CAI) methods. In 2015, the survey was administered using a combination of interviewers using computer-assisted personal interviewing (CAPI) and audio

computer-assisted self-interviewing (ACASI). Respondents received a $30 cash incentive for completion of the interview. The NSDUH 2015 public use data file contains 57,146 CAI interviews. The weighted screening response rate was 79.69% and weighted interview response rate was 69.66% (Center for Behavioral Health Statistics and Quality, 2016a).

Measures

Demographics

Analysis was limited to college students. The 2015 NSDUH defined a respondent as a full or part-time college student if they were aged 18 to 22, enrolled in school, enrolled at the college level, and either a full-time student or part-time student. Although the vast majority of college students are 18-22 years old, this analysis included a much wider age range for the following reasons. First, according to the National Center for Education Statistics (NCES), the number of students older than 22 years attending post-secondary institutions has been rising. In fact, the percentage of students age 25 and over is projected to increase by almost 20% in the coming years (Snyder et al., 2016). Second, a small yet nontrivial number of young adults less than 18 years old attend postsecondary institutions.

Respondents were categorized as college students if they: 1) answered yes to the question, *"Are you now attending or are you currently enrolled in school? By "school," we mean an elementary school, a junior high or middle school, a high school, or a college or university. Please include home schooling as well;"* and 2) indicated that they are enrolled at the college or university level *(College or university/1st year; College or*

university/2nd Year, 3rd year; or College or university/4th Year, 5th or higher year) to the question, "*What grade or year of school are you now attending? What grade or year of school will you be attending when your vacation is over?*"

Demographic questions include age, gender, race/ethnicity, family income, academic level, marital status, college enrollment status, and self-rated health status.

Disability

Disability status was assessed using the following questions from the 2015 NSDUH: *1) Are you deaf or do you have serious difficulty hearing? 2) Are you blind or do you have serious difficulty seeing, even when wearing glasses? 3) Because of a physical, mental or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions? 4) Do you have serious difficulty walking or climbing stairs? 5) Do you have difficulty dressing or bathing? 6) Because of a physical, mental or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?* The questions identified disabilities in six disability type categories: hearing, vision, cognition, mobility, self-care, and independent living. Any respondent who answered "yes" to any of these questions was categorized as having a disability. Respondents with "no" responses to all six questions were classified as having no disability.

The disability types were not mutually exclusive, and respondents could have more than one type of disability. Responses of "don't know" or "refused" were excluded from analyses. Respondents were identified as having a specific disability type if they responded "yes" to the question corresponding to that disability type. For each person

who has any disability, the number of disability types were calculated by summing the number of "yes" responses to the six questions.

This six-item set of questions is used on the American Community Survey (ACS) and other major surveys to measure disability, and is the data standard for survey questions on disability. This set of questions was developed by a federal interagency committee to be consistent with the ICF. The question set defines disability from a functional perspective and was developed to monitor disparities between persons with disabilities and those without disabilities (U.S. Department of Health and Human Services, 2011).

Due to the low prevalence of some disabilities and the resulting small sample size, hearing (n=78) and vision disabilities (n=201) were combined into one category for all analyses of the association between substance use and those disabilities. Likewise, mobility (n=97) and self-care (n=36) disabilities were also combined.

Mental illness

The 2015 NSDUH included a mental health module that was designed to provide data on various mental health measures including mental illness. The variable "Any Mental Illness" was defined as having serious, moderate, or mild mental illness. Specific information about this variable is available from SAMHSA (Center for Behavioral Health Statistics and Quality, 2016a).

Self-rated Health Status

Self-rated health was measured with the following question: *"Would you say your health in general is excellent, very good, good, fair, or poor?"*

Health Care Utilization

Health care utilization was measured with the following questions: *1) How many times have you visited a doctor, nurse, physician assistant or nurse practitioner about your own health at a doctor's office, a clinic, or some other place in the past 12 months?2) Have you received any mental health treatment in the past year? 3) Have you received any mental health treatment at a school setting in the past year?*

Tobacco Use Measures

Ever use, past month, and past year use rates of tobacco products were analyzed. According to the NSDUH 2015, respondents who report having used tobacco products during the past month are categorized as current tobacco users.

Nicotine Dependence Measure

Nicotine dependence was measured using the Nicotine Dependence Severity Scale (NDSS) and the Fagerstrom Test of Nicotine Dependence (FTND) for respondents who reported smoking cigarettes in the past month. The NDSS is a multidimensional measurement of nicotine dependence. It measures five aspects of dependence: smoking drive (compulsion to smoke driven by nicotine craving and withdrawal), nicotine

tolerance, preference for smoking over other activities, regularity of smoking, and invariance of smoking (Shiffman, Waters, & Hickcox, 2004).

The FTND measure was based on the FTND scale (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991) and assessed how soon after waking a respondent had their first cigarette. A respondent was defined as having nicotine dependence, if the first cigarette was smoked within 30 minutes of waking up on the days they smoked and the respondent reported smoking cigarettes in the past month. Based on the NDSS and the FTND, a respondent who reported smoking cigarettes was defined as having nicotine dependence in the past month, if they met either the NDSS or the FTND criteria for dependence (Center for Behavioral Health Statistics and Quality, 2016a).

Alcohol and Illicit Drug Use

Ever use, past-year use, and past-month use of alcohol, illicit drugs and misuse of psychotherapeutics were analyzed. Due to small cell sizes, only ever use of heroin, and ever misuse of tranquilizers and sedatives were assessed. The 2015 NSDUH only contained data for past year use of OxyContin.

Alcohol and Illicit Drug Dependence and Abuse

The 2015 NSDUH assessed dependence and abuse of alcohol and illicit drugs based on the criteria for dependence and abuse in the DSM-IV (American Psychiatric Association, 1994). For marijuana, inhalants, hallucinogens, and prescription tranquilizers, a respondent was defined as having dependence if he or she met three or more of six standard dependence criteria. Dependence criteria for alcohol, prescription

pain relievers, cocaine, heroin, methamphetamine, prescription sedatives, and prescription stimulants include the six standard criteria and an additional withdrawal criterion. A respondent was defined as having dependence if he or she met three or more of six or seven dependence criteria that pertain to that substance. For each illicit drug and alcohol, a respondent was defined as having abused that substance if he or she met one or more of four abuse criteria and was determined not to be dependent upon the substance of interest (Center for Behavioral Health Statistics and Quality, 2016a).

Data Analysis

Sample

Aim 1: To examine the prevalence of disability in U.S. college students by student characteristics, including disability status.

Data analysis was conducted using SAS 9.4 survey procedures. Sample weights were applied to the data to adjust for non-response and the probabilities of selection, including those resulting from over-sampling. The 2015 NSDUH used 2010 census-based population estimates in the post-stratification adjustment.

A subpopulation analysis should use the entire sample in the analysis and also take into account the sample size of the created domain (Heeringa, West, & Berglund, 2010). To that end, analysis used the "domain" statement in the SAS survey procedures to ensure that the correct use of the entire data set occurred and separate analyses per

domain were performed while accounting for the random variability introduced by domain sample sizes unrelated to sample design.

The Taylor Series Linearization procedures was used. This method derives a linear approximation of variance estimates that are used to develop corrected standard errors and confidence intervals for statistics of interest. It is used in analyses of survey data including descriptive estimation of population statistics as well as linear and logistic regression.

A priori covariates included in the analyses were age, sex, race/ethnicity, college enrollment level, marital status, family income, perceived health status, and enrollment status. Based on the literature review, these sociodemographic correlates were examined to predict prevalence. The sociodemographic variables age, sex, race/ethnicity, and family income are well documented predictors of disability (Altman & Bernstein, 2008; Brault, 2012; Courtney-Long et al., 2015; Iezzoni et al., 2014). As mentioned previously, risk of disability increases with age. Females generally have higher rates of disability, so do non-Hispanic Blacks. Research also suggests that individuals with higher household income levels and higher levels of education have lower prevalence of disability. Although not equivalent, college academic level was used in this study in place of the commonly used "educational attainment" variable.

Univariate procedures included frequency analyses of the variables of interest. Bivariate associations between disability status and various sociodemographic variables, perceived health status and enrollment status were tested using the Rao-Scott Chi-Square test. Cross-tabulations were used to calculate the prevalence of disability by all the covariates, including sociodemographic characteristics.

Finally, prevalence and 95% confidence intervals (CIs) were calculated for any disability, disability type, and number of disability types (one, two, three, four or more). As with previous research, respondents with four, five, or six disability types were combined into a single category due to small sample sizes (Stevens, Carroll, et al., 2016).

Prevalence and 95% CIs were also calculated for sociodemographic (age, sex, race/ethnicity, college enrollment level, marital status, and total family income), perceived health status and other variables among students with no disability and any disability. Prevalence of any disability and disability type (with 95% CIs) were calculated by sociodemographic variables.

Aim 2: To present associations between disability status, sociodemographic characteristics, and substance use among college students.

Ever use, past month, and past year prevalence of substance use, misuse, and substance use disorders (dependence and abuse) were estimated with cross-tabulations. Sociodemographic correlates were examined with logistic regression to predict prevalence in students with and without disabilities. Adjusted odds ratios (AORs) with 95% CIs for each explanatory variable are presented. Standard errors were estimated using the Taylor series linearization method to account for sample weights and clustering. Statistical significance was evaluated at the α level of 0.05.

The following procedure was used to develop a logistic regression model for explaining the variation in the response variables (substance use variables) in terms of possible explanatory variables. Variables for inclusion in the model were primarily based on relevant extant research. First, frequency distributions of the variables were

examined. Second, the relationship between substance use variables and each

explanatory variable was analyzed using contingency tables. The likelihood ratio test

statistic was used to test whether the additional variable was a confounder. Exploratory

analysis also included bivariate analyses of disability status and substance use on

explanatory variables, including sociodemographic variables. Finally, after completing

the univariate and bivariate analyses, independent covariates included in the final

adjusted models were sociodemographic characteristics gender, age, race/ethnicity,

perceived health status, academic level, and disability. The dependent variables for the

logistic regression models were substance use, misuse, and abuse/dependence. Adjusted

odds ratios (AORs) were obtained. The study was approved by the Institutional Review

Board at Rutgers University.

Aim 3: To explore the individual, interpersonal, institutional, and public policy factors affecting service utilization by college students with disabilities.

Qualitative study of factors affecting health care utilization by college students with disabilities

Sample

Purposeful sampling was employed for interviews with "key informants" to

identify and select information-rich cases (Devers & Frankel, 2000; DiCicco-Bloom &

Crabtree, 2006). This involves identifying and selecting individuals or groups of

individuals that are especially knowledgeable about or experienced with a phenomenon

of interest (Onwuegbuzie & Collins, 2007; Palinkas, 2014; Turner, 2010). The

individuals recruited to participate in the study were knowledgeable about health care and

disability support services provided to Rutgers University students. The sampling frame

included Rutgers University faculty and staff from Office of Disability Services (ODS),

Health, Outreach, Promotion, and Education (H.O.P.E.), Employee Assistance & Student

Wellness Programs (EAP/SWP), Counseling, Alcohol and other Drug Assistance

Program and Psychiatric Services (CAPS), and Rutgers Student Health. These

professionals work with students with disabilities, substance use, and mental health

issues, and were able to discuss the services and supports available to students.

"Snowball" sampling was utilized whereby interviewees were asked if they knew other

knowledgeable university staff who may be amenable to participating in the study

(Onwuegbuzie & Collins, 2007; Sadler, Lee, Seung-Hwan Lim, & Fullerton, 2010). The

researcher contacted these individuals through e-mail and telephone calls.

Data collection

Semi-structured interviews were conducted either face-to-face or by telephone

(based on interviewee's preference) between May 2018 and July 2018. The researcher

received informed consent from participants before interviews. Interviews were audio

recorded with participant's consent and transcribed verbatim. The interview protocol

(see Appendix A) was informed by a review of the literature, the Social Ecology Model

(SEM) of health, and results from the quantitative research which produced *a priori*

themes. The protocol used open-ended questions to answer the research questions

(Devers & Frankel, 2000; Frankel & Devers, 2000; Hill et al., 2005). Although the

protocol was developed to obtain specific information about college students and enable

comparison across cases, the researcher nevertheless remained open and flexible so that follow-up questions and probes were used to elicit more detail from participants (DiCicco-Bloom & Crabtree, 2006; Gill, Stewart, Treasure, & Chadwick, 2008). The interview guide was piloted for problems with the research design and/or interview questions.

The interviewer asked every question on the protocol and probed particular areas that emerged for each interviewee. The sequence in which questions were asked sometimes varied based on the flow of conversation. Hence, the protocol served as a guide, but one that allowed for flexibility (DiCicco-Bloom & Crabtree, 2006; Gill et al., 2008; Hill et al., 2005; Knox & Burkard, 2009; Turner, 2010).

Semi-structured in-depth interviews are the most widely used interviewing format for qualitative research (DiCicco-Bloom & Crabtree, 2006). Using this method, the research sought to obtain depth of understanding of the personal, institutional, social, environmental, and other barriers faced by students with disabilities. The ways in which college students with disabilities utilize assistance provided by disability support services were explored in interviews. Sampling continued until no new themes emerged from the interviews; until data saturation was reached. The concept of "saturation" is used to establish validity in qualitative methods, and is the point at which no additional data collection is needed, as no new themes are emerging and further data collection would not likely yield new information. Saturation refers to the comprehensiveness necessary to ensure that all information related to the phenomenon of inquiry has been collected and analyzed (DiCicco-Bloom & Crabtree, 2006; Goodell, Stage, & Cooke, 2016; Palinkas, 2014). The study was approved by the Institutional Review Board at Rutgers University.

Data Analysis

Transcribed interviews were imported into NVivo 12 software for qualitative analysis. An integrated approach to developing code structure was utilized for both inductive development of codes as well as a deductive organizing framework for code types (Bradley et al., 2007). Codes with similar contents were grouped into categories and into larger themes. The interview guide questions served as a provisional list of *a priori* codes by which to analyze the data. The researcher first reviewed data to identify emergent themes and concepts. The coding frame was further developed and modified as new themes and subthemes emerged in the course of the analysis. Reliability of qualitative data analysis is usually achieved by establishing a specified level of agreement in identification of topics or themes (Goodell et al., 2016; Palinkas, 2014). Hence, the developing coding frame was discussed amongst the researcher and two qualitative methodology professionals on the Doctoral Committee until a consensus was reached and a codebook finalized. This consensus approach is frequently used in qualitative research (Bradley et al., 2007; Gilburt et al., 2013; Lyon et al., 2014; Moffatt et al., 2006; Palinkas, 2014).

CHAPTER 4: RESULTS

Quantitative study of substance use behaviors among a nationally representative sample of college students with disabilities

Prevalence of disability by student characteristics

Analyses were conducted on a subsample of 6681college-attending individuals. The number of individuals reporting any disability was 867, while 5814 reported no disability. Overall demographic characteristics of U.S. college students are presented in Table 1. An estimated 2.6 million (12.6%) college students had a disability while 18 million (87.4%) reported no disability. The most common type of disability was cognitive impairment (7.3%) followed by independent living limitation (2.9%) and vision impairment (2.8%). Mobility limitations were reported by 1.6%, and 1.3% had a hearing impairment. The prevalence of self-care limitations was the lowest at 0.6%. In terms of the number of functional disability types, 9.6% had one disability, 2.4% had two disabilities, 0.4% reported three disabilities, and 0.2% had four or more disability types. Twenty-four percent of students were diagnosed with a mental illness in the previous year. Although fifteen percent (15%) of college students reported receiving mental health treatment in the past year, less than one percent (0.22%) received mental health treatment at a school setting.

A larger proportion of students with any disability were female (61.9% vs. 54.2%; p=0.004) and 50 years or older (7.9% vs. 4.0%) compared with students without a disability. Those who had a disability had a significantly higher prevalence of being first year students (29.8% vs. 22.1%). However, individuals who reported a disability had a

lower prevalence of being fourth year or higher students (29.2% vs. 36.8%) compared to first year students. The percentage of students with any disability who reported their self-rated health status as fair or poor was three times higher when compared to their non-disabled counterparts (12.9% vs. 4.3%; AOR= 5.32). After adjusting for demographic characteristics, there was no statistically significant difference between the two groups with respect to age, race/ethnicity, family income, marital status, and full-time versus part-time enrollment (Table 2).

Table 1. Prevalence of sociodemographic characteristics of college students (n= 6681). 2015 National Survey on Drug Use and Health.

Demographic characteristic	n	% (95% CI)
Gender		
Male	2793	44.9 (43.1-46.7)
Female	3888	55.1 (53.3-56.9)
Age group (yrs.)		
12-17 *	102	0.7 (0.5-0.9)
18-25	5118	62.5 (60.9-64.2)
26-34	915	19.6 (18.2-21.0)
35-49	466	12.6 (11.3-13.9)
50 or Older	80	4.5 (3.3-5.8)
Race/ethnicity		
White, non-Hispanic	3651	57.0 (55.2-58.8)
Black, non-Hispanic	944	13.7 (12.7-14.7)
Hispanic	1201	18.2 (16.7-19.7)
Asian	459	7.6 (6.6-8.6)
Other	426	3.5 (3.0-4.0)
Family income		
Less than $20,000	2173	27.1 (24.2-28.9)
$20,000 - $49,999	1984	29.2 (27.4-31.1)
$50,000 - $74,999	871	13.9 (12.7-15.1)
$75,000 or More	1653	29.7 (27.8-31.7)
Academic year		
1st year	1774	23.1 (21.3-24.9)
2nd Year, 3rd year	2773	41.0 (38.8-43.2)
4th Year, 5th or higher year	2134	35.9 (33.8-38.0)
Marital status		
Married	934	20.1 (19.3-22.7)
Widowed	13	0.4 (0.1-0.7)
Divorced or Separated	266	6.1(5.2-6.9)
Never Been Married	5468	72.6 (70.8-74.4)

Self-rated health status		
Excellent	2040	30.4 (28.8-31.9)
Very Good	2830	42.6 (40.9-44.2)
Good	1440	21.7 (20.2-23.2)
Fair/Poor	371	5.4 (4.7-6.0)
College enrollment status		
Full-time	4862	67.9 (65.6-70.2)
Part-time	1807	32.1 (29.8-34.4)
Disability		
No Disability	5814	87.4 (86.3-88.6)
Any disability	867	12.6 (11.4-13.7)
Hearing	78	1.3 (0.8-1.9)
Vision	201	2.8 (2.2-3.4)
Cognition	534	7.3 (6.3-8.2)
Mobility	97	1.6 (1.1-2.1)
Self-care	36	0.6 (0.4-0.8)
Independent living	192	2.9 (2.3-3.5)
Number of functional disability types		
1	666	9.6 (8.5-10.7)
2	154	2.4 (1.9-2.8)
3	31	0.4 (0.2-0.5)
4 or more	16	0.2 (0.04-0.4)
Mental illness in the past year		
Yes	1589	24.1 (22.7-25.4)
No	4993	75.9 (74.6-77.3)
Have received any mental health treatment in past year		15.1 (14.2-16.1)
Yes	1005	84.9 (83.9-85.8)
No	5557	
Received outpatient mental health treatment at a school setting in the past year		
Yes	18	0.2 (0.1-0.3)
No	6537	99.8 (99.7-99.9)

Percentages are weighted and may not total 100% in each category due to rounding.

CI = Confidence interval

*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Table 2. Prevalence of sociodemographic characteristics among college students by disability status and association between disability, sociodemographic and other risk factors estimated using logistic regression modeling[a]. 2015 National Survey on Drug Use and Health.

| Demographic characteristic | Disability status[b] | | Type 3 p-value | AOR[a] 95%CI |
	No disability % (95% CI) (n=5814)	Any disability % (95% CI) (n=867)		
Gender			**0.004**	
Male	45.8 (44.0-47.6)	38.1 (33.7-42.5)		REF
Female	54.2 (52.4-56.0)	61.9 (57.5-66.3)		**1.31 (1.09-1.56)**
Age group (yrs.)			0.303	
12-17*	0.7 (0.5-0.9)	1.0 (0.4-1.7)		0.75 (0.25-2.24)
18-25	62.6 (60.7-64.4)	62.2 (57.3-67.2)		0.59 (0.30-1.16)
26-34	20.1 (18.6-21.6)	16.5 (12.9-20.2)		0.51 (0.26-1.03)
35-49	12.6 (11.2-14.1)	12.3 (8.6-16.1)		0.53 (0.27-1.07)
50 or older	4.0 (2.7-5.3)	7.9 (4.1-11.7)		REF
Race/ethnicity			0.288	
White non-Hispanic	56.6 (54.7-58.5)	60.0 (55.4-64.7)		REF
Black non-Hispanic	13.7 (12.6-14.8)	13.4 (10.2-16.6)		0.84 (0.63-1.12)
Hispanic	18.3 (16.7-19.9)	17.0 (13.6-20.4)		0.81 (0.61-1.08)
Asian	7.9 (6.8-9.0)	5.6 (3.3-7.9)		0.64 (0.40-1.03)
Other	3.5 (2.8-4.1)	3.9 (2.0-5.8)		1.00 (0.55-1.82)
Family income			0.890	
Less than $20,000	26.8 (24.9-28.7)	29.2 (25.0-33.4)		1.00 (0.79-1.27)
$20,000 - $49,999	29.4 (27.5-31.3)	28.3 (23.5-33.2)		0.90 (0.68-1.20)
$50,000 - $74,999	14.0 (12.6-15.4)	13.4 (10.6-16.3)		0.96 (0.68-1.36)
$75,000 or More	29.9 (27.9-31.8)	29.0 (24.2-33.8)		REF
Academic year			**0.012**	
1st year	22.1 (20.3-23.9)	29.8 (24.9-34.8)		**1.58 (1.16-2.14)**
2nd Year, 3rd year	41.0 (38.7-43.3)	40.9 (35.4-46.5)		1.18 (0.91-1.53)
4th Year, 5th or higher year	36.8 (34.6-39.1)	29.2 (24.1-34.3)		REF
Marital Status			0.544	
Married	21.1 (19.4-22.7)	20.5 (15.1-25.8)		0.95 (0.68-1.33)
Widowed	0.2 (0.0-0.3)	1.6 (0.0-3.5)		4.19 (0.60-29.36)
Divorced or Separated	6.0 (5.2-6.8)	6.6 (3.5-9.7)		0.97 (0.61-1.55)
Never Been Married	72.8 (71.0-74.5)	71.3 (65.5-77.0)		REF
Self-rated health status			**<0.0001**	
Excellent	32.2 (30.6-33.8)	18.0 (14.3-21.6)		REF
Very Good	43.4 (41.7-45.1)	37.0 (31.5-42.4)		**1.55 (1.15-2.09)**
Good	20.1 (18.5-21.7)	32.1 (27.4-36.8)		**2.8 (2.13-3.68)**
Fair/Poor	4.3 (3.6-4.9)	12.9 (9.5-16.3)		**5.32 (3.68-7.70)**
College enrollment status			0.983	
Full-time	68.2 (65.9-70.5)	65.9 (60.1-70.9)		1.00 (0.79-1.28)
Part-time	31.8 (29.5-34.1)	34.1(29.1-39.0)		REF

Percentages are weighted and may not total 100% in each category due to rounding.

[a] Results are adjusted for gender, age, race/ethnicity, family income, academic year, marital status, self-rated health status, and college enrollment status.

[b] Referent group is college students with no disability.

AOR = Adjusted odds ratio

CI = Confidence interval

*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Prevalence of substance use by disability status

Tobacco and alcohol

Prevalence of ever use of tobacco products was significantly higher in students with any disability (65.6% vs. 58.4%), especially for cigarettes (58.5% vs. 50.0%) and pipe (12.9% vs. 8.6%). Past year tobacco use was also higher for this group (42.3% compared to 34.1%). This was particularly true of cigarettes where over a third (35%) of college students with any disability reported past year use compared to a quarter of students without a disability. Similarly, this group had a higher proportion of current tobacco users (past 30 days use) than non-disabled students (32.4% vs. 23.8%). Alcohol use was not significantly different between the groups (Table 3).

Several significant associations emerged between predictor variables and tobacco use after adjusting for covariates. Overall odds of ever tobacco use was significantly higher for students with any disability (AOR = 1.26; 95% CI 1.04-1.57) compared to those without a disability (Table 4). Being male (AOR= 1.72) and current use of any illicit drug (AOR = 7.30) also increased the odds of ever tobacco use. A number of other characteristics decreased the odds of ever tobacco use, including being: 12 to 25 years old (versus 26 years or older); Black non-Hispanic (AOR = 0.39), Hispanic (AOR = 0.65), or Asian (AOR = 0.29) versus White non-Hispanic; and being in the first academic year (AOR = 0.73) compared to fourth year or higher.

Determinants of past year and current tobacco use were similar. Indeed, having a disability was associated with past year tobacco use (AOR = 1.27; 95% CI 1.05-1.54). Gender, age, race/ethnicity, academic year, self-rated health status, and any current illicit drug use were significant variables. Likewise, odds ratios of being a current smoker were

elevated for students with any disability (AOR = 1.31; 95% CI 1.01-1.69). Gender,

race/ethnicity, academic year, self-rated health status, and current illicit drug use were

significant predictors in the model. However, age was not found to be significant. Those

who rated their health status as fair or poor also had significantly higher odds of past year

(AOR = 1.59) and current tobacco use (AOR = 1.69) compared to students who reported

having good or excellent health.

Table 3. Prevalence of tobacco and alcohol use by disability status among college students, bivariate association between disability status. 2015 National Survey on Drug Use and Health.

Substances	Disability status		Chi-Square p-value
	No disability % (95% CI) (n=5814)	Any disability % (95% CI) (n=867)	
Any tobacco product			
Ever use	58.4 (56.5-60.2)	65.6 (60.9-70.2)	**0.0061**
Past year use	34.1 (32.1-36.0)	42.3 (38.1-46.6)	**0.0003**
Past 30 days use	23.8 (22.0-25.7)	32.4 (27.6-37.3)	**0.0008**
Cigarettes			
Ever use	50.0 (48.3-51.8)	58.5 (54.2-62.7)	**0.0005**
Past year use	25.0 (23.2-26.8)	35.0 (31.4-38.6)	**<0.0001**
Past 30 days use	18.0 (16.4-19.7)	26.6 (22.3-30.9)	**0.0002**
Cigars			
Ever use	35.8 (34.1-37.5)	39.1 (33.2-45.1)	0.2766
Past year use	16.1 (14.5-17.7)	17.7 (14.0-21.4)	0.3922
Past 30 days use	6.4 (5.5-7.4)	8.6 (5.9-11.4)	0.1004
Pipe			
Ever use	8.6 (7.1-10.1)	12.9 (9.6-16.1)	**0.0077**
Past 30 days use	0.9 (0.6-1.2)	1.20 (0.5-1.9)	0.3863
Smokeless			
Ever use	16.8 (15.5-18.0)	18.6 (14.5-22.6)	0.3689
Past year use	6.1 (5.2-6.9)	6.5 (4.0-9.0)	0.6832
Past 30 days use	3.3 (2.7-3.9)	3.6 (1.7-5.4)	0.7677
Alcohol use			
Ever use	83.9 (82.6-85.1)	85.5 (82.5-88.5)	0.3088
Past year use	76.4 (74.7-78.0)	75.8 (71.7-79.9)	0.7721
Past 30 days use	60.3 (58.4-62.3)	57.4 (51.4-63.4)	0.3717
Binge drinking in the past 30 days	34.5 (32.3-36.7)	35.4 (30.8-40.0)	0.7087
Heavy drinking in the past 30 days	9.8 (8.4-11.1)	11.44 (8.7-14.2)	0.2611

Percentages are weighted.

 AOR = Adjusted odds ratio

CI = Confidence interval

Table 4. Results of adjusted logistic regression modeling[a] of the association between disability status, sociodemographic characteristics, and tobacco use among college students. 2015 National Survey on Drug Use and Health.

Demographic characteristic	Tobacco ever used			Tobacco use in the past year			Tobacco use in the past month		
	AOR	95%CI	p	AOR	95%CI	p	AOR	95%CI	p
Disability status									
No disability		REF			REF			REF	
Any disability	1.26	1.04-1.57	0.02	1.27	1.05-1.54	0.01	1.31	1.01-1.69	0.04
Gender									
Male	1.72	1.51-1.96	<0.0001	1.88	1.59-2.22	<0.0001	1.70	1.37-2.12	<0.0001
Female		REF			REF			REF	
Age group (yrs.)									
12-17*	0.28	0.15-0.51	<0.0001	2.36	0.91-6.09	0.8	0.61	0.21-1.78	0.37
18-25	0.41	0.25-0.69	0.0006	2.42	1.09-5.35	0.03	1.15	0.52-2.58	0.73
26-34	0.91	0.55-1.49	0.70	3.56	1.51-8.37	0.004	2.12	0.88-5.12	0.10
35-49	1.16	0.68-1.98	0.59	2.79	1.15-6.78	0.02	2.17	0.91-5.16	0.08
50 or Older		REF			REF			REF	
Race/ethnicity									
White non-Hispanic		REF			REF			REF	
Black non-Hispanic	0.39	0.32-0.48	<0.0001	0.55	0.44-0.69	<0.0001	0.68	0.53-0.87	0.002
Hispanic	0.65	0.53-0.79	<0.0001	0.59	0.47-0.75	<0.0001	0.59	0.43-0.82	0.001
Asian	0.29	0.20-0.40	<0.0001	0.36	0.25-0.51	<0.0001	0.44	0.30-0.64	<0.0001
Other	1.19	0.87-1.65	0.28	1.31	0.92-1.87	0.14	1.55	1.08-2.23	0.02
Academic year									
1st year	0.73	0.62-0.86	0.0002	1.25	1.03-1.52	0.03	1.48	1.13-1.93	0.004
2nd Year, 3rd year	0.98	0.83-1.16	0.84	1.31	1.08-1.59	0.006	1.42	1.09-1.84	0.008
4th Year, 5th or higher year		REF			REF			REF	
Self-rated health status									
Excellent/Very Good/ Good		REF			REF			REF	
Fair/Poor	1.26	0.91-1.73	0.16	1.59	1.15-2.21	0.005	1.69	1.19-2.42	0.004
Any illicit drug use in the past year									
No		REF			REF			REF	
Yes	7.30	5.71-9.33	<0.0001	6.24	5.25-7.43	<0.0001	6.16	5.30-7.16	<0.0001

[a] Results adjusted for disability status, gender, age, race/ethnicity, academic year, self-rated health status, and any illicit drug use in the past year.
AOR = Adjusted odds ratio
CI = Confidence interval
*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Illicit substances

Significant differences were observed in the prevalence of illicit substance use and misuse by disability status among college students (Table 5). College students with any disability reported more ever use, past year use, and current use of illicit drugs ($p<.001$). For example, 20.1% currently used marijuana compared with 15.1% of their counterparts with no disabilities. A similar pattern emerged for cocaine with 3% of students with any disability reporting current use compared to 1.3% of their non-disabled peers. In fact, ever use of both cocaine and heroin were significantly higher ($p<0.001$). They also reported higher levels of ever misuse, past year misuse and current misuse of prescription pain relievers, OxyContin, tranquilizers, sedatives, stimulants and any psychotherapeutics.

Students with any disability had significantly higher odds of having ever used the illicit drugs listed, and any illicit drug overall (AOR = 1.42; 95% CI 1.14-1.77), after adjusting for gender, age, race/ethnicity, academic year, self-rated health status, and tobacco use. Compared to their counterparts with no disabilities, they had nearly twice the odds of having tried cocaine (AOR = 1.92; 95% CI 1.42-2.58) and three times the odds of ever having used heroin (AOR = 2.96; 95% CI 1.76-4.99). Further, higher odds of current marijuana (AOR = 1.36; 95% CI 1.04-1.78) and cocaine (AOR = 1.73; 95% CI 0.84-3.57) use were estimated for students with any disability.

Misuse of psychotherapeutics are also presented in Table 5 with increased odds of ever misused (AOR = 1.86; 95% CI 1.43-2.41), past year misused (AOR = 1.74; 95% CI 1.38-2.19), and current misuse (AOR = 2.13; 95% CI 1.50-3.03) for students with any disability. The odds of misusing OxyContin in the past year was 2.54 times higher with

similar results for prescription pain relievers (AOR = 2.02; 95% CI 1.55-2.64). Current misuse of prescription pain relievers (AOR = 2.33; 95% CI 1.34-4.05), ever misuse of tranquilizers (AOR = 2.09; 95% CI 1.52-2.86) and sedatives (AOR = 2.67; 95% CI 1.86-3.82) were also significantly higher for students with any disability. Although students with any disability reported a 56% increased odds of ever misusing stimulants, results for past year and current use were not statistically significant.

Estimated associations between illicit drug use behaviors and demographic characteristics are presented in Table 6. Similar to results for tobacco use, males and students with any disability had significantly increased odds of reporting all illicit drug use behaviors. A positive relationship between academic year and illicit drug use emerged across every illicit drug use behavior. As academic year increased, so did the odds of using illicit drugs. This association was significant for ever use of an illicit drug (first year: AOR = 0.69, second and third year: AOR = 0.82) and for current use (first year: AOR = 0.75).

In contrast, there was an inverse association between age and illicit drug use. The younger the student, the more likely they were to have reported past year use (12-17 years of age, AOR = 8.94; 18-25, AOR = 7.70; 26-34, AOR = 3.45; 35-49, AOR = 1.90). This pattern was only significant for current and past year drug use. Those reporting fair/poor health had 64% greater odds of being current drug user compared to those reporting excellent/very good/good health. Asian students had significantly lower odds for all illicit drug use behaviors compared with White non-Hispanics. Conversely, current tobacco use was positively and significantly associated with every illicit drug use behavior (p < 0.0001).

Table 5. Prevalence of illicit substance use and misuse of psychotherapeutics by disability status among college students, bivariate association with disability status, and results of adjusted logistic regression modeling[a] for disability status and odds of substance use. 2015 National Survey on Drug Use and Health.

Substances	Disability status[b]		Chi-Square p-value	AOR 95%CI
	No disability % (95% CI) (n=5814)	**Any disability** % (95% CI) (n=867)		
Any illicit drug				
Ever use	54.8 (52.9-56.7)	64.9 (59.7-70.1)	**0.0004**	**1.42 (1.14-1.77)**
Past year use	30.1 (28.2-32.0)	42.4 (37.7-47.1)	**<0.0001**	**1.69 (1.37-2.09)**
Past month use	17.3 (15.7-18.8)	26.5 (22.9-30.1)	**<0.0001**	**1.61 (1.29-2.02)**
Marijuana				
Ever use	49.4 (47.5-51.3)	58.5 (53.1-63.8)	**0.0020**	**1.31(1.04-1.65)**
Past year use	25.7 (23.9-27.5)	33.2 (28.0-38.1)	**0.0039**	**1.38 (1.05-1.80)**
Past month use	15.1 (13.5-16.6)	20.1 (17.4-24.4)	**0.0029**	**1.36 (1.04-1.78)**
Cocaine				
Ever use	11.2 (9.5-12.8)	21.0 (16.8-25.1)	**<0.0001**	**1.92 (1.42-2.58)**
Past year use	3.7 (2.7-4.6)	7.9 (5.0-10.9)	**0.0009**	**1.91 (1.23-2.97)**
Past month use	1.3 (0.9-1.7)	3.0 (1.1-5.0)	**0.0229**	**1.73 (0.84-3.57)**
Heroin				
Ever use	0.7 (0.38-0.92)	2.9 (1.3-4.6)	**<0.0001**	**2.96 (1.76-4.99)**
Prescription pain relievers				
Ever misused	11.5 (10.4-12.7)	22.6 (18.5-26.7)	**<0.0001**	**2.07 (1.57-2.74)**
Past year misuse	5.7 (5.0-6.4)	12.1 (9.4-14.8)	**<0.0001**	**2.02 (1.55-2.64)**
Past month misuse	1.4 (0.9-1.9)	4.3 (2.3-6.3)	**<0.0001**	**2.33 (1.34-4.05)**
OxyContin				
Past year misuse	0.9 (0.6-1.1)	2.6 (1.2-4.0)	**0.0001**	**2.54 (1.38-4.68)**
Tranquilizers				
Ever misused	5.3 (4.5-6.1)	11.9 (9.1-14.8)	**<0.0001**	**2.09 (1.52-2.86)**
Stimulants				
Ever misused	8.9 (7.8-9.9)	13.6 (11.2-15.9)	**0.0003**	**1.56 (1.14-2.15)**
Past year misuse	6.7 (5.7-7.8)	8.4 (6.4-10.4)	0.1282	1.16 (0.86-1.57)
Past month misuse	2.1 (1.6-2.6)	3.0 (1.8-4.2)	0.1737	1.21 (0.70-2.08)
Sedatives				
Ever misused	1.9 (1.4-2.4)	5.7 (3.9-7.5)	**<0.0001**	**2.67 (1.86-3.82)**
Any psychotherapeutics misuse				
Ever misused	17.7 (16.2-19.1)	29.5 (25.3-33.6)	**<0.0001**	**1.86 (1.43-2.41)**
Past year misuse	12.0 (11.0-13.2)	20.5 (17.0-24.0)	**<0.0001**	**1.74 (1.38-2.19)**
Past month misuse	3.9 (3.1-4.6)	9.3 (6.9-11.6)	**<0.0001**	**2.13 (1.50-3.03)**

Percentages are weighted.

[a] Results are adjusted for gender, age, race/ethnicity, academic year, self-rated health status, and tobacco use.

[b] The referent group is college students without a disability.

AOR = Adjusted odds ratio

CI = Confidence interval

Table 6. Results of adjusted logistic regression modeling[a] of the association between disability status, sociodemographic characteristics, and illicit drug use among college students. 2015 National Survey on Drug Use and Health.

Demographic characteristic	Any illicit drugs – ever used			Any illicit drug use in the past year			Any illicit drug use in the past month		
	AOR	95%CI	p	AOR	95%CI	p	AOR	95%CI	p
Disability status									
No disability		REF			REF			REF	
Any disability	**1.42**	**1.14-1.77**	**0.002**	**1.69**	**1.37-2.09**	**<0.0001**	**1.61**	**1.29-2.01**	**<0.0001**
Gender									
Male	**1.21**	**1.05-1.40**	**0.009**	**1.22**	**1.05-1.42**	**<0.008**	**1.32**	**1.11-1.57**	**0.0014**
Female		REF			REF			REF	
Age group (yrs.)									
12-17*	0.84	0.44-1.60	0.60	**8.94**	**2.98-26.80**	**<0.0001**	**27.50**	**4.24-178.46**	**0.0005**
18-25	0.89	0.46-1.73	0.74	**7.70**	**2.80-21.21**	**<0.0001**	**17.86**	**3.10-102.77**	**0.0012**
26-34	0.99	0.52-1.89	0.98	**3.45**	**1.25-9.52**	**0.02**	**7.75**	**1.35-44.51**	**0.02**
35-49	0.85	0.44-1.65	0.64	1.90	0.70-5.19	0.21	4.13	0.64-26.50	0.14
50 or Older		REF			REF			REF	
Race/ethnicity									
White non-Hispanic		REF			REF			REF	
Black non-Hispanic	0.89	0.72-1.09	0.26	0.99	0.81-1.23	0.98	0.96	0.78-1.16	0.65
Hispanic	0.85	0.70-1.04	0.11	0.99	0.79-1.24	0.15	0.96	0.75-1.24	0.77
Asian	**0.35**	**0.25-0.50**	**<0.0001**	**0.43**	**0.29-0.64**	**<0.0001**	**0.44**	**0.24-0.82**	**0.009**
Other	1.23	0.85-1.77	0.28	1.12	0.86-1.47	0.39	1.28	0.95-1.74	0.10
Academic year									
1st year	**0.69**	**0.57-0.82**	**<0.0001**	0.86	0.73-1.03	0.10	**0.75**	**0.64-0.88**	**0.0004**
2nd Year, 3rd year	**0.82**	**0.70-0.95**	**0.009**	0.90	0.77-1.06	0.20	0.88	0.73-1.06	0.17
4th Year, 5th or higher year		REF			REF			REF	
Self-rated health status									
Excellent/Very Good/ Good		REF			REF			REF	
Fair/Poor	1.22	0.87-1.70	0.26	1.05	0.79-1.41	0.72	**1.64**	**1.24-2.18**	**0.0006**
Tobacco past 30 days use									
No		REF			REF			REF	
Yes	**4.68**	**3.81-5.75**	**<0.0001**	**4.16**	**3.51-4.92**	**<0.0001**	**6.08**	**5.22-7.08**	**<0.0001**

[a] Results adjusted for disability status, gender, age, race/ethnicity, academic year, self-rated health status, and past month tobacco use.
AOR = Adjusted odds ratio
CI = Confidence interval
*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Substance dependence or abuse

Students with any disability met criteria for substance dependence or abuse at higher rates than students without a disability (Table 7). Approximately 13% met criteria for nicotine dependence in the past month compared to six percent of students without a disability (*p*<0.0001). Prevalence of past year dependence or abuse of alcohol and marijuana were also significantly higher. Additionally, 5.4% of students with any disability had past year dependence or abuse of psychotherapeutics compared to less than one percent of their peers (*p*<0.0001). Past year dependence or abuse of any illicit drug was 12.4% for this population compared to 4.2% for their counterparts.

With respect to past month nicotine dependence, students with any disability had 79% higher odds of meeting criteria for diagnosis (AOR = 1.79; 95% CI 1.24=2.60). They had approximately twice the odds of alcohol use disorder (AOR = 1.93; 95% CI 1.46-2.56), and had significantly higher prevalence of marijuana dependence or abuse (AOR = 2.32; 95% CI 1.64-3.28). The odds of psychotherapeutics dependence or abuse by students with any disability was more than six times that of students without a disability (AOR = 6.22; 95% CI 3.71-10.41). Additionally, they had about three times the odds of meeting criteria for past year dependence or abuse of any illicit drug (AOR = 2.93; 95% CI 2.12-4.04), and twice the odds of meeting criteria for illicit drug or alcohol dependence or abuse.

Table 7. Prevalence of substance dependence or abuse by disability status, bivariate association with disability status, and results of adjusted logistic regression modeling[a] for substance dependence or abuse among college students. 2015 National Survey on Drug Use and Health.

Substances	Disability status		Chi-Square p-value	AOR 95% CI
	No disability % (95% CI) (n=5814)	Any disability % (95% CI) (n=867)		
Nicotine dependence in the past month[b]	5.9 (5.0-6.8)	12.5 (9.0-16.0)	<0.0001	1.79 (1.24-2.60)
Past year dependence or abuse[c]				
Alcohol	8.7 (7.6-9.8)	15.7 (12.2-19.3)	<0.0001	1.93 (1.46-2.56)
Marijuana	3.2 (2.7-3.8)	7.4 (5.2-9.6)	<0.0001	2.32 (1.64-3.28)
Any psychotherapeutics misuse	0.8 (0.5-1.0)	5.4 (3.7-7.2)	<0.0001	6.22 (3.71-10.41)
Any illicit drug other than marijuana	1.3 (0.9-1.7)	7.0 (4.8-9.2)	<0.0001	4.45 (2.86-6.93)
Any illicit drug	4.2 (3.5-4.8)	12.4 (9.6-15.2)	<0.0001	2.93 (2.12-4.04)
Illicit drug or alcohol	11.1(10.0-12.3)	21.6 (17.7-25.5)	<0.0001	2.10 (1.63-2.71)
Illicit drug and alcohol	1.7 (1.3-2.1)	6.5 (4.6-8.5)	<0.0001	3.71 (2.38-5.78)

Percentages are weighted.
[a] The referent group is college students without a disability.
[b] Results are adjusted for gender, age, race/ethnicity, academic year, self-rated health status, and illicit drug or alcohol dependence or abuse in the past year.
[c] Results are adjusted for gender, age, race/ethnicity, academic year, self-rated health status, and nicotine dependence in the past month.
AOR = Adjusted odds ratio
CI = Confidence interval

After adjusting for demographic characteristics, having a disability was positively correlated with nicotine dependence (AOR = 1.79; 95% CI 1.24-2.60). Hispanic students had significantly lower odds of nicotine dependence compared to White non-Hispanics (AOR = 0.26). Nicotine dependence was significantly associated with academic year. First year (AOR = 3.15) and second-and-third-year students exhibited higher odds of the disorder (AOR = 2.70) than students fourth year or higher. Students reporting fair/poor

health had greater odds of meeting criteria for nicotine dependence compared to those reporting excellent/very good/good health (AOR = 1.78), and to have met criteria for illicit drug or alcohol dependence in the past year (AOR = 2.70) (Table 8).

Several of the demographic characteristics in Table 9 were positively associated with past year illicit drug dependence or abuse. Odds ratios for past year illicit drug dependence or abuse were statistically significant for students with any disability compared with their nondisabled counterparts. Males had more than twice the odds (AOR = 2.12) of meeting criteria for the disorders while the odds for students 18-25 was nearly seven times (AOR = 6.74) higher than those 50 or older. Other significant associations included increased odds of past year illicit drug dependence or abuse for students reporting fair or poor health (AOR = 2.80; 95% CI 1.70-4.36), and nicotine dependence (AOR = 3.77; 95% CI 2.44-5.89).

The results of adjusted associations between demographic characteristics and illicit drug or alcohol dependence or abuse in the past year are reported in Table 10. Students with any disability had higher odds of having the diagnoses than students without a disability. Males and students with nicotine dependence also had increased odds of 1.50 and 2.79, respectively. An inverse association was found between age and the disorders. As age increased the odds of diagnosis decreased and was significant for students 12-17 (AOR = 5.90) and 18-25 years of age (AOR = 4.48). Black non-Hispanics and Asians had significantly lower odds of diagnosis compared to White non-Hispanics. First year students had 28% lower odds of meeting criteria (vs. 4th Year, 5th or higher year). However, students who reported fair or poor health were more likely to also report past year illicit drug or alcohol dependence or abuse.

Table 8. Results of adjusted logistic regression modeling[a] of the association between disability status, sociodemographic characteristics, and nicotine dependence among college students. 2015 National Survey on Drug Use and Health.

Demographic characteristics	Nicotine dependence in the past month		
	AOR	**95%CI**	**p**
Disability status			
No disability		REF	
Any disability	**1.79**	**1.24-2.60**	**0.002**
Gender			
Male	1.01	0.75-1.37	0.95
Female		REF	
Age group (yrs.)			
12-17*	0.30	0.08-1.19	0.09
18-25	0.51	0.19-1.33	0.17
26-34	1.48	0.58-3.77	0.41
35-49	1.72	0.60-4.91	0.31
50 or Older		REF	
Race/ethnicity			
White non-Hispanic		REF	
Black non-Hispanic	0.67	0.44-1.02	0.06
Hispanic	**0.26**	**0.15-0.44**	**<0.0001**
Asian	0.63	0.38-1.06	0.08
Other	0.98	0.50-1.92	0.94
Academic year			
1st year	**3.15**	**2.05-4.85**	**<0.0001**
2nd Year, 3rd year	**2.70**	**1.82-4.00**	**<0.0001**
4th Year, 5th or higher year		REF	
Self-rated health status			
Excellent/Very Good/ Good		REF	
Fair/Poor	**1.78**	**1.19-2.65**	**0.005**
Illicit drug in the past year			
No		REF	
Yes	**2.70**	**1.92-3.81**	**<0.0001**

[a] Results adjusted for disability status, gender, age, race/ethnicity, academic year, self-rated health status, and any illicit drug or alcohol dependence or abuse in the past year.
AOR = Adjusted odds ratio
CI = Confidence interval
*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Table 9. Results of adjusted logistic regression modeling[a] of the association between disability status, sociodemographic characteristics, and illicit drug dependence or abuse in the past year among college students. 2015 National Survey on Drug Use and Health.

Demographic characteristics	Illicit drug dependence or abuse in the past year		
	AOR	95%CI	p
Disability status			
No disability		REF	
Any disability	**2.93**	**2.12-4.04**	**<0.0001**
Gender			
Male	**2.12**	**1.53-2.93**	**<0.0001**
Female		REF	
Age group (yrs.)			
12-17*	5.36	0.78-36.88	0.09
18-25	**6.74**	**1.23-36.99**	**0.03**
26-34	1.87	0.33-10.49	0.48
35-49	2.62	0.45-15.43	0.29
50 or Older		REF	
Race/ethnicity			
White non-Hispanic		REF	
Black non-Hispanic	0.72	0.50-1.05	0.09
Hispanic	0.69	0.42-1.12	0.13
Asian	0.58	0.29-1.17	0.19
Other	0.78	0.54-1.11	0.08
Academic year			
1st year	1.10	0.77-1.55	0.61
2nd Year, 3rd year	0.90	0.67-1.21	0.49
4th Year, 5th or higher year		REF	
Self-rated health status			
Excellent/Very Good/ Good		REF	
Fair/Poor	**2.80**	**1.70-4.36**	**<0.0001**
Nicotine dependence in the past month			
No		REF	
Yes	**3.77**	**2.44-5.89**	**<0.0001**

[a] Results adjusted for disability status, gender, age, race/ethnicity, academic year, self-rated health status, and nicotine dependence in the past month.
AOR = Adjusted odds ratio
CI = Confidence interval
*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Table 10. Results of adjusted logistic regression modeling[a] of the association between disability status, sociodemographic characteristics, and illicit drug or alcohol dependence or abuse in the past year among college students. 2015 National Survey on Drug Use and Health.

Demographic characteristics	Illicit drug or alcohol dependence or abuse in the past year		
	AOR	95%CI	p
Disability status			
No disability		REF	
Any disability	**2.10**	**1.63-2.71**	**<0.0001**
Gender			
Male	**1.50**	**1.19-1.88**	**0.0006**
Female		REF	
Age group (yrs.)			
12-17*	**5.90**	**1.09-31.93**	**0.04**
18-25	**4.48**	**1.36-14.74**	**0.01**
26-34	2.22	0.67-7.38	0.19
35-49	1.49	0.46-4.83	0.51
50 or Older		REF	
Race/ethnicity			
White non-Hispanic		REF	
Black non-Hispanic	**0.65**	**0.47-0.88**	**0.006**
Hispanic	0.80	0.60-1.07	0.13
Asian	**0.42**	**0.25-0.71**	**0.001**
Other	0.76	0.50-1.14	0.18
Academic year			
1st year	**0.72**	**0.55-0.95**	**0.02**
2nd Year, 3rd year	0.92	0.75-1.12	0.38
4th Year, 5th or higher year		REF	
Self-rated health status			
Excellent/Very Good/ Good		REF	
Fair/Poor	**1.87**	**1.34-2.61**	**0.0002**
Nicotine dependence in the past month			
No		REF	
Yes	**2.79**	**1.98-3.93**	**<0.0001**

[a] Results adjusted for disability status, gender, age, race/ethnicity, academic year, self-rated health status, and nicotine dependence in the past month.
AOR = Adjusted odds ratio
CI = Confidence interval
*This group comprised of: 17-year-old students (n=100) and 16-year old students (n=2)

Mental illness

Mental illness was a significant factor in this population of college students (Table 11). Over half of the students reporting a disability had a mental illness in the previous year while a fifth of students without a disability reported a mental illness (53.2% vs.19.9%; $p<0.0001$). Disabled college students had four times the odds of reporting a mental illness than students without a disability (AOR = 4.17; 95% CI 3.42-5.07). The likelihood of mental illness and drug or alcohol dependence or abuse in the past year was nearly four times that of their non-disabled peers (AOR = 3.87; 95% CI 2.80-5.36).

Students with mental illness had increased odds of past month use of tobacco (AOR = 1.25), alcohol (AOR =1.32), and any illicit substance (AOR = 1.58) compared with students with no mental illness (Table 12). Similarly, students with mental illness or disability had higher odds of being current users of tobacco, alcohol, and illicit substances (Table 13).

Table 11. Prevalence of mental illness by disability status among college students and results of adjusted logistic regression modeling[a] for mental illness variables. 2015 National Survey on Drug Use and Health.

Mental illness variables	Disability status		AOR 95% (CI)	p-value
	No disability % (95% CI) (n=5814)	Any disability % (95% CI) (n=867)		
College students who had mental illness in the past year [a,b]	19.9 (18.5-21.2)	53.2 (48.8-57.7)	**4.17 (3.42-5.07)**	**<0.0001**
College students who had mental illness and drug/alcohol dependence or abuse in the past year [a,c]	3.9 (3.17-4.7)	15.6 (12.1-19.0)	**3.87 (2.80-5.36)**	**<0.0001**

[a] The referent group is college students with no disability.
[b] Results are adjusted for gender, age, race/ethnicity, self-rated health status, and academic year.
[c] Results are adjusted for gender, age, race/ethnicity, academic year, self-rated health status, and nicotine dependence in the past month.
AOR = Adjusted odds ratio
CI = Confidence interval

Table 12. Prevalence of substance use by mental illness among college students, and results of adjusted logistic regression modeling[a] for mental illness and odds of substance use.2015 National Survey on Drug Use and Health.

Past month substance use	Mental illness		AOR 95% (CI)	p-value
	No mental illness % (95% CI) (n=4993)	Any mental illness % (95% CI) (n=1586)		
Tobacco	23.4 (21.5-25.4)	29.9 (26.7-33.1)	**1.25 (1.04-1.50)**	**0.0195**
Alcohol	58.7 (56.6-60.7)	64.5 (61.5-67.5)	**1.32 (1.11-1.56)**	**0.0016**
Illicit substances	16.3 (14.8-17.8)	24.8 (21.8-27.9)	**1.58 (1.32-1.89)**	**<0.0001**

[a] The referent group is college students with no mental illness.
[b] Results are adjusted for gender, age, race/ethnicity, self-rated health status, academic year, and disability status.
AOR = Adjusted odds ratio
CI = Confidence interval

Table 13. Prevalence of substance use by mental illness or disability among college students, and results of adjusted logistic regression modeling[a] for mental illness or disability and odds of substance use. 2015 National Survey on Drug Use and Health.

Past month substance use	Mental illness or disability		AOR 95% (CI)	p-value
	No mental illness or disability % (95% CI) (n=4696)	Any mental illness or disability % (95% CI) (n=1985)		
Tobacco	22.8 (20.8-24.8)	29.9 (27.0-32.8)	**1.37 (1.16-1.61)**	**0.0002**
Alcohol	58.9 (56.8-60.9)	62.5 (59.7-65.3)	**1.19 (1.03-1.37)**	**0.0182**
Illicit substances	16.2 (14.6-17.7)	23.7 (21.1-26.3)	**1.63 (1.39-1.91)**	**<0.0001**

[a] The referent group is college students with no mental illness or disability.
[b] Results are adjusted for gender, age, race/ethnicity, self-rated health status, and academic year.
AOR = Adjusted odds ratio
CI = Confidence interval

Table 14 summarizes past month tobacco, alcohol, and illicit drug use among college students by various disability types. Students with hearing or vision impairments had 41% higher odds of tobacco use. Those reporting cognitive disability had significantly higher prevalence of tobacco use (AOR = 1.70; 95% CI 1.26-2.29) and illicit drugs (AOR =1.94; 95% CI 1.44-2.60). Conversely, students with independent living impairment reported significantly lower odds of alcohol use (AOR = 0.61; 95% CI 0.38-0.96). No other statistically significant patterns were observed for current substance use by disability type.

Table 14. Results of adjusted logistic regression modeling[a] for past month tobacco, alcohol and illicit drug use by disability type among college students. 2015 National Survey on Drug Use and Health.

Disability type[b]	Tobacco AOR 95% (CI)	Alcohol AOR 95% (CI)	Illicit drugs AOR 95% (CI)
Hearing/vision	**1.41 (1.01-1.98)***	1.24 (0.85-1.81)	1.13 (0.77-1.67)
Cognition	**1.70 (1.26-2.29)***	1.20 (0.87-1.65)	**1.94 (1.44-2.60)***
Mobility/self-care	0.87 (0.47-1.62)	0.95 (0.45-1.99)	1.40 (0.49-3.97)
Independent living	1.01 (0.66-1.55)	**0.61 (0.38-0.96)***	1.05 (0.68-1.62)

[a] The referent group is college students with no disability.
[b] Results are adjusted for gender, age, race/ethnicity, self-rated health status, and other disability types.
AOR = Adjusted odds ratio
CI = Confidence interval
*p<0.05

Qualitative study of factors affecting health care utilization by college students with disabilities

Participants

Ten full-time university staff participated in the study. Three individuals –

including a faculty member – worked for the Office of Disability Services (ODS). Three

were licensed mental health clinicians and addiction specialists. Two health educators

who worked at Health, Outreach, Promotion, and Education (H.O.P.E.). One person

from the Office for Academic Affairs and a faculty representative who was a disability

law attorney from the Office of Student Conduct were also interviewed. Half of the

respondents held executive positions in their respective departments. To ensure

anonymity, no other demographic information was provided. The average length of each

interview was 37 minutes.

Themes that emerged from the interviews are illustrated by examples of quotes

from interviewees and organized as:1) Types of services available to college students

with disabilities; and 2) Perceived barriers to and facilitators of service utilization by

students with disabilities.

Types of services available to college students with disabilities

While respondents cited myriad on-campus and off-campus services available to

college students with disabilities, services were categorized into seven general themes.

The most frequently referenced were mental health and addiction services. The Office of

Disability Services was second. They were followed by other on-campus services such

as tutoring centers, and H.O.P.E. services. Medical and pharmacy services, off-campus

services, and the Graduate School of Applied and Professional Psychology (GSAPP)
were also referenced, but with lower frequency.

Mental health and addiction services were mentioned in the context of the high
prevalence of students with mental health concerns on campus. Every respondent
referenced psychological or emotional issues during interviews, and most cited substance
use or abuse. According to respondents, the reasons students seek counseling services
are varied. The most commonly cited were issues of school-related stress, anxiety,
depression, post-traumatic stress disorder (PTSD), relationship concerns, test-taking
anxiety, eating disorders, family demands/conflicts, roommate issuers, and concerns with
substance use.

> "I've had students with physical disabilities, but the majority of students have
> mental disability. Students have had accommodations for mostly psychological
> or mental illness, such as depression, anxiety, attention deficit disorder. One
> student was a veteran who has PTSD." (Faculty)

> "Some students come with what we call 'invisible disabilities.' We do have a few
> students who are non-able bodied, and they may require usage of wheelchairs.
> They may require readers because of visual difficulties. We have a few who
> might be deaf and require an interpreter, who lip read etc. That's not the lion
> share of the people we serve. I will say that the vast majority of people we serve
> have invisible disabilities, anxiety, depression, some sort of developmental
> disability that is impacting their ability to be the types of learners they want to
> be." (Clinician)

> "We do have students with disabilities, primarily mental health. Probably
> secondary to learning disabilities such as Attention Deficit Disorder. The more
> common is co-occurring substance use and mental health disorder, because that's
> within our scope of care. The most common psychological problems are
> depression, anxiety and trauma… We were surprised too when it comes to the
> prevalence of trauma." (Clinician)

ODS was almost always discussed in the context of students receiving
accommodations to help them succeed in their educational pursuits. Overall, ODS was

positively viewed and consistently perceived as the place where students can get help

with necessary accommodations and other support. Respondents reported actively

encouraging students to register with ODS if they had a disability. If students thought

they had a disability, but did not have a diagnosis, they were encouraged to contact ODS

for an assessment.

> "We are fortunate to have at Rutgers, the Office of Disability Services so that needed accommodations and/or supportive resources can be developed on an individualized basis." (Clinician)

> "I think ODS does a great job with the academic side. Making sure that students have exactly what they need and that they're supported." (Health Educator)

> "People don't realize that there's nothing "special" about accommodations. And accommodations are simply to level the playing field, so they have an equal opportunity. People don't realize that somebody with a traumatic brain injury has to search around their brains twice as long to find an answer. So, if they were given the same time or equal treatment with that brain injury, they would be at a disadvantage. So, the extra time accommodation puts them on a level playing field." (Disability Specialist)

Other on-campus services included academic support resources such as those

provided by the Offices of Student Affairs, the Cognitive Skills Program,

career/vocational counseling, cultural centers, residence life, the Office of Veteran and

Military Programs and Services, and International Student Services. H.O.P.E. provided a

variety of training and consultation services including substance use counselling. Off-

campus services included psychiatric evaluations through independent service providers,

intensive outpatient or inpatient psychiatric/substance use treatment, the Department of

Vocational Rehabilitation and the Commission for the Blind. Figure 2 represents a word

cloud with the words most frequently cited by respondents to describe services provided
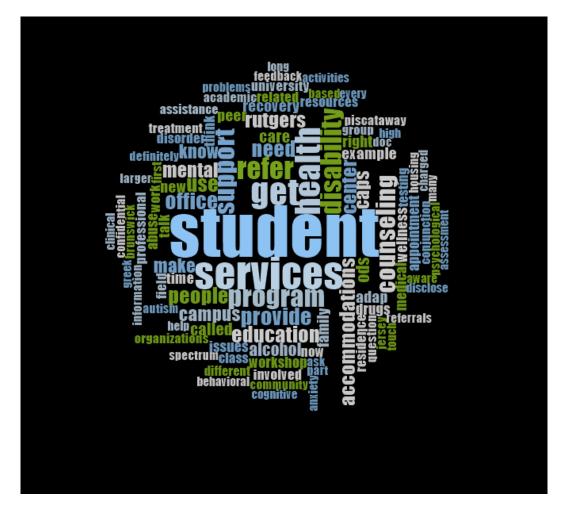
to students with disabilities.

Figure 2. Words most frequently used by participants to describe services available to students with disabilities.

Perceived barriers to and facilitators of service utilization by students with disabilities.

Four superordinate themes were produced to examine perceived barriers to and facilitators of service utilization by students with disabilities: personal, interpersonal, institutional, and policy. Four subordinate themes emerged from the 'personal' theme: knowledge of policies, laws, and services; personal beliefs or personal agency; sociodemographic characteristics; and stigma (Table 15).

Table 15. Frequency of themes reported by respondents for perceived barriers to and facilitators of service utilization by students with disabilities.

Themes	Description	Number of references
Personal	Knowledge of policies, laws, and services; personal beliefs and agency in accessing health care; sociodemographic characteristics; and stigma associated with accessing counselling and other support services	**117**
Knowledge of policies, laws, and services	Students' knowledge of disability policies, laws, and services that are available at the university	**39**
Personal beliefs and personal agency	Personal beliefs about support services and agency in accessing support services	**38**
Sociodemographic characteristics	Age, gender, racial/ethnic identity, economic status, financial resources, and values	**25**
Stigma	Stigma associated with having a disability or accessing counselling and other support services	**15**
Interpersonal	Formal and informal social networks and social support systems that can influence utilization of support services	**34**
Institutional	University rules and regulations for operations that affect how, or how well, services are provided to an individual or group; the built environment; and campus community	**93**
Policy	Implications of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 on service utilization	**41**

Personal barriers and facilitators

Personal barriers to and facilitators of service utilization by students with disabilities were the most commonly referenced (117 times). They included sociodemographic factors such as age, gender, racial/ethnic identity, knowledge, beliefs, financial resources, personal agency in accessing health care, and stigma associated with accessing counselling and other support services.

Knowledge of policies, laws, and services

Lack of knowledge and understanding of policies, laws, and services were identified by the majority of participants as significant barriers to service utilization by students with disabilities. Interviewees specifically identified students' lack of knowledge of the types of accommodations and various other resources that were available for students with disabilities, and the laws that conferred rights to reasonable accommodations. Even for students who were aware of the services, there was concern that they may have difficulty navigating the system.

> "A lot of people are unaware of diversity of resources that exist. Perhaps the larger institution could be more proactive in making people aware of the resources that are available." (Clinician)

> "Some students are not aware that their professors must grant them accommodations. They think that it is the professor's choice whether or not to accommodate them. They are often surprised and are appreciative that I grant it. I tell them that it is their right by law to receive accommodations if they are registered with Office of Disability Services." (Faculty)

> "Not a lot of students who come in with disabilities are aware of the fact that they have something called the ADA. So, a lot of students are unaware and they're afraid to ask for the accommodations." (Clinician)

Facilitators to service utilization through transfer of knowledge about policies, laws, and services included informational presentations on support services by university staff (e.g., during orientation), university websites, and notifications on course syllabi regarding reasonable accommodations.

> "The good part is, through the media these days, there's a lot of education that's happening that's online. As long as people are cued in to those resources. So that's the key, being mindful of these resources and where they happen to be." (Clinician)

"I know that students do use the services, and it's a great support service, but in class when I teach, I also remind students and it's in the syllabus that if accommodations are needed, let me know." (Health Educator)

Personal beliefs or personal agency

Personal beliefs or personal agency were reported to be equally important factors. Although it was generally believed that educating students about resources at the university was valuable in that it would lead to greater access to services, attitudinal barriers and personal belief sometimes presented obstacles. Many participants recounted experiences with students who chose not to seek services, because they believed they could manage without registering with ODS or seeking treatment. Some students were also fearful of the way they would be perceived by others if their disability was disclosed.

"But the one barrier, I think is still, even though they hear this, and keep seeing reminders about accommodations, they might not think that they're something for them. Or they might not think that their condition warrants something special, or special accommodations." (Disability Specialist)

"I mean, they're just usually late in getting services, in most cases. Not that they don't do it. But if they had accommodations in high school, usually they will try to get it in college. It's just that they might not do it initially. It might be the second semester or the second year. What happens in a lot of cases is that they won't do well without accommodations. Then they'll mention something, be referred and then get accommodations." (Disability Specialist)

"We know that there are students who come to campus who don't want accommodation. They're like 'No, no. I'm gonna do this on my own. I am not going to ask for any accommodations.' In a sense, they just want assimilation. So maybe they are feeling they're not accepting accommodation." (Health Educator)

According to respondents, having personal agency was a key facilitator to students accessing services. Participants stated that students who were knowledgeable

about their rights to accommodations were more proactive in requesting them. Although

students may not be fully aware of laws governing accommodations, students who were

used to advocating and had strong support systems were perceived as being well prepared

for postsecondary education.

> "The ones coming forward already know that's their right. They learned that at
> some point." (Faculty)

> "Most of these students have a lot of agency in that they had pretty severe
> addictions. Most of them have been in rehab, sometimes more than once. So,
> these are those dramatic stories where someone nearly overdoses and dies. And
> now they're in college. There's a lot of motivation associated with having had
> those problems." (Clinician)

Sociodemographic characteristics

Nine respondents referenced sociodemographic characteristics. The prevailing

theme was that participants did not notice significant racial, ethnic or gender differences

in students' utilization of support services. The consensus was that the university has a

very diverse student body, and requests for services reflect this diversity. However, one

participant reported students of color articulated facing greater challenges in accessing

services.

> "Race/color discrimination in getting disability services has come up. A few
> weren't happy with the disability accommodation services. The topic has come
> up both in one-on-one conversations with students, and during classroom
> discussion when we cover the topic of reasonable accommodations and
> discrimination. Students of color have referred generally to an impression that
> they were not assisted as much than if they were white. However, a lot depends
> on who the University representative is …if that person too is of color, then
> students have reported having been treated in a more sympathetic and caring
> manner." (Faculty)

Several participants noted intersectionality between lack of knowledge and demographic factors such as age, generational status, and international student status. These were viewed as risk factors for underutilization of services.

> "Probably, they're uneducated about what their rights are or what they're able to receive. Especially if they're coming from high school. If they're coming from high school, they have to seek themselves. They might not seek immediately. Sometimes they're international students where there weren't accommodations in their original countries, so they really don't know about that." (Disability Specialist)

> "A lot of students, they don't know the extent of things that are available. Well, a lot of the students, especially in their freshman year sophomore year are just finding out what is available here in this huge place, is often a challenge, especially with five campuses. Like maybe a first-generation student. They may not have heard of ODS, that it's here and available." (Health Educator)

Stigma

Eight respondents stated that stigma was a significant barrier to service utilization by many students with disabilities, especially in seeking counseling support services. Fear of being labeled by others (e.g., peers and faculty) for having a disability was frequently expressed. Moreover, the notion of seeking help was often perceived as a personal weakness. Substance use was viewed by some participants as being more stigmatizing than disability status for students.

> "I think the students that I deal with are a little more sensitive to what it means for their professors or clinical or clerkship site to know that they have a disability. There's more of a stigma. Most often it's an internal feeling (they've never been exhibited by professors). They're just afraid. Our professors here are very understanding, but that doesn't take away what the students feel." (Disability Specialist)

> "I think the biggest barrier is stigma. One, they don't want to be labeled. But, also, they want to feel like they can handle it. I've run into a couple of cases

where students have accommodations, but they're reluctant to use them. It's stigma and 'I can do this on my own, I don't need accommodations.' It's not just stigma from the faculty. It's also self-imposed." (Faculty)

"I think there is more stigma attached to drug use than alcohol use. And I think there is definitely stigma attached if you are somebody who has an addiction. Even just the way people talk about it." (Health Educator)

Participants were optimistic that many students were overcoming stigma. Respondents described students being more upfront about discussing their disability and proactive in seeking support services.

"There are some that feel stigma, but I find more and more that's becoming less of an issue with students." (Faculty)

"It's the stigma, and it's been around forever. But fortunately, I do see a change that's kind of happening." (Clinician)

"I think that stigma is a barrier to some students. We certainly have a lot of students who are willing to walk right in… They don't seem put off. Our building actually says Counseling Center on it. But, some people aren't put off by that at all. Other people are. I think it's just a matter of trying to stay on top of what are the issues keeping people from accessing care." (Clinician)

Interpersonal barriers and facilitators

Interpersonal factors that were considered to have the greatest influence on service utilization were family and friends. Family influence was generally mixed with respect to being a barrier or facilitator. Participants were evenly divided on whether family helped or hindered service utilization. Respondents frequently noted that some students did not inform their families of their psychological problems or addiction, because they may not be receptive. Some students have reportedly been dissuaded from receiving accommodations by family members who felt that it was not appropriate. On the other hand, parents were facilitators in that many were highly motivated taking an

active part in health care making decisions and communicating with health care

providers. Friends were also identified as being important sources of support for students

with disabilities, even in terms of encouraging students to seek services.

> "Students have mentioned how a parent didn't understand their psychiatric disability. Whereas a friend, more their age was more sympathetic to a disability issue, than parents who perhaps do not understand disability-related issues. I think for most of them, though, their families were a source of support. But a few said their parents really didn't understand what they were going through. In fact, a couple hadn't even reported to their parents, a psychiatric condition. They told me they had just been diagnosed at Rutgers, and they hadn't told them yet." (Faculty)

> "We know that some of our students are willing to come in for care, even be willing to be on medication. But they don't want their parents to know because their parents would disapprove. Parents can sometimes be an impediment." (Disability Specialist)

> "Like we had a student yesterday who came in for an interview. His mother has been emailing us, making arrangements, driving him here… Things like that. There's often a lot of family support and motivation in these situations." (Clinician)

Institutional barriers and facilitators

The size of the university was the most consistently reported institutional barrier

to service utilization by students with disabilities. The second most reported institutional

barrier was a lack of training for faculty and staff on the Americans with Disabilities Act

as it relates to students. The consensus was that the university was generally accessible.

However, two participants pointed out that some buildings were not wheelchair

accessible, and that there was not enough handicap parking. Two participants mentioned

problems with CAPS providing adequate levels of care — specifically, being unable to

care for the large volume of students accessing services. Lack of coordination between departments, centers, and campuses was also identified as being a barrier.

> "Our New Brunswick campus actually span five physical campuses and 2300 acres and a river. I think just the sheer size of our campus can be a barrier to students with disabilities… We have between our graduates and undergraduate students over forty thousand students. 32,000 are undergrads and between 8,000 to 10,000 are graduate students." (Health Educator)

> "We operate in silos oftentimes. We have Disability Services here at Rutgers, but we don't often interact unless we have a client who has multiple needs. But it doesn't work quite as well for those students, I believe." (Clinician)

> "In general, and to my knowledge, professors at Rutgers are not provided with much or any guidance on this topic, until and unless the professor receives a 'letter of accommodation' from ODS relating to a specific student." (Faculty)

The majority of participants identified university efforts to increase awareness of services including creating websites, conducting informational sessions with students, and outreach efforts involving coordination with cultural centers at the university. These were perceived as facilitators to service utilization. Two participants mentioned the recent restructuring of ODS to improve access to services, while another participant discussed free services and extended hours at some facilities to accommodate students' schedules. Further, with few exceptions, faculty was described as "bending over backwards to help students."

> "Our school has stuff on the website. We have the admissions checklist that reminds them that if they need accommodations, where to go. And we have mandatory welcome sessions during orientation that students attend either online or in person. Disability Services speak during that. So, at least our school, we have so many ways that students can learn where to go for accommodations." (Disability Specialist)

> "So what Rutgers did was form this one centralized office so that my office is the only department that's reading the documentation, and also has a more in-depth

knowledge. So, I think there was a barrier, but Rutgers has taken care of it."
(Disability Specialist)

Policy barriers and facilitators

The Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 are the primary laws associated with student access to services in postsecondary institutions. While most of the respondents referred to the ADA and the rights of students to accommodations, only two mentioned Section 504 of the Rehabilitation Act of 1973. Several participants pointed to the lack of knowledge of the laws and their implications as barriers to service utilization. Others identified the dual burden that students have not only in providing documentation to support their accommodation request, but also for assuming responsibility for seeking and accessing services. One of the most salient ways in which these laws facilitated service utilization was that colleges and universities were responsible for the financial costs associated with reasonable accommodations.

> "One thing that I just thought of as far as barriers from a law standpoint. One of the biggest barriers was that Kindergarten through 12, it's the school's job to identify students. So, students don't self-disclose. The school has to figure out who has a disability. They have to do the testing. They have to ensure the accommodations are being followed. At the time that they either graduate from the 12th grade or when they reach 21 or 22, all of a sudden, it's their responsibility." (Disability Specialist)

> "There's no segue to teach the students to advocate for themselves. They go from those 13 years of education where they have virtually no say. They're not told what their disability is. They don't know strengths and weaknesses, but all of a sudden, in the length of a summer, the law says that they have to be responsible for everything that somebody else has done for them for 13 years. There's no point where there's a transitional period." (Disability Specialist)

"The ADA, and Section 504 of the Rehabilitation Act -- the laws give us guidelines to ensure that we are making just and equivalent access related accommodations across the board. There's an assurance that we're not favoring people because we have to meet certain guidelines. The law is very good in that the burden of payment is on the school. So, students don't usually have to worry about any costs associated with accommodations. If there are personal devices or personal services like wheelchairs, hearing aids, that, the students have to pay for. Other types of accommodations, we pay for. So, I think that's a big help for students who could not afford the items they need to be successful." (Disability Specialist)

Figure 3 and Figure 4 represent the most frequently cited words participants used to describe barriers to and facilitators of service utilization, respectively.

Figure 3. Words most frequently used by participants to describe barriers to service utilization.

Figure 4. Words most frequently used by participants to describe facilitators of service utilization.

CHAPTER 5: DISCUSSION

**Quantitative study of substance use behaviors among a nationally representative
Sample of college students with disabilities**

Disability prevalence among college students

To my knowledge, this is the first study to examine the prevalence of substance use in a nationally representative sample of college students with disabilities and their nondisabled counterparts, using the National Survey on Drug Use and Health. Results show that thirteen percent of college students have a disability. These results are supported by recent statistics from the U.S. Department of Education (Snyder et al., 2016), but are significantly lower than estimates from the American College Health Association - National College Health Assessment II (ACHA-NCHA II) (American College Health Association, 2016). This discrepancy is attributed to a tendency for the ACHA-NCHA II to report higher rates of disability (Leake, 2015). On the other hand, prevalence estimates of disability in college students were similar to the prevalence of disability in the general U.S. population (Erickson, Lee, & von Schrader, 2018; Kraus, 2017; Kraus, Lauer, Coleman, & Houtenville, 2018; Stevens, Carroll, et al., 2016). As is often the case with population estimates, there is generally wide variability based on operational definitions of disability used and other methodological considerations.

Three quarters of students with any disability reported only one disability type, with one-fifth reporting two functional disabilities. These results confirm a U.S. Department of Education longitudinal study of post-high school outcomes of young adults with disabilities, which found that postsecondary enrollment was significantly

lower for those with multiple disabilities (Newman et al., 2011). Consistent with previous findings, cognitive limitations were the most commonly reported disability among college students (American College Health Association, 2016; Bernert et al., 2012; Blanco et al., 2008; Hunt & Eisenberg, 2010; Newman et al., 2011; Raue & Lewis, 2011). In contrast, mobility limitations are more prevalent in the larger U.S. population (Brault, 2012; Centers for Disease Control and Prevention, 2009; Courtney-Long et al., 2015; Erickson et al., 2018; Kraus et al., 2018). Age is the main contributing factor for the difference in disability type prevalence. One study of U.S. adults aged 18-49 years also reported cognitive limitation as the primary form of disability (Courtney-Long et al., 2014). Independent living and vision limitations were the next most frequently reported disability types, followed by mobility and self-care.

Disability prevalence is generally higher for females (Altman & Bernstein, 2008; Brault, 2012; Centers for Disease Control and Prevention, 2009; Courtney-Long et al., 2015; Stevens, Carroll, et al., 2016), and this was borne out in the current study as well. Prevalence was higher for first year students. However, by the fourth academic year and beyond, the percentage of young adults with disabilities significantly decreased. There were no significant differences in age, race/ethnicity, family income, marital status, or full-time versus part-time college enrollment status between students with disabilities and their nondisabled counterparts.

The percentage of students with disabilities who rated their health status as fair or poor was three times that of students without disabilities. Although it is well documented that individuals with disabilities in the general population are more likely to assess their health status as fair or poor (Altman & Bernstein, 2008; Centers for Disease Control and

Prevention, 2008; Gulley & Altman, 2008; Havercamp & Scott, 2015), the author has yet to find this information in a peer-reviewed publication as it pertains to college students. This finding is especially important since self-rated health status is a leading indicator of morbidity and mortality (Chandola & Jenkinson, 2000; DeSalvo, Bloser, Reynolds, He, & Muntner, 2006; Rohrer, Arif, Denison, Young, & Adamson, 2007; Singh-Manoux et al., 2007). Hence, it is frequently used as an outcome in determining health disparities.

Mental illness was quite prevalent in the college population with nearly a quarter of students diagnosed with a mental illness in the previous year. The proportion of students with any disability who also reported mental illness was more than twice that of students without disability. This finding is supported by research showing an increase in students with psychiatric problems on college campuses (American College Health Association, 2016; Blanco et al., 2008; Hunt & Eisenberg, 2010; Xiao et al., 2017). Further, students with mental illness were more likely to use substances and to have substance use disorders.

Prevalence of substance use among college students with and without disabilities

Prevalence of tobacco use was found to be significantly higher among students with disabilities. However, when individual tobacco products were analyzed, only differential use of cigarettes was consistently found to be significant. Indeed, over a quarter of students with disabilities were current cigarette smokers, compared to eighteen percent of students without disabilities. The survey did not ask respondents about use of water pipes (hookah) or electronic nicotine delivery systems (ENDS), which have proven to be very popular with young adults (Gathuru, Tarter, & Klein-Fedyshin, 2015;

Giovenco et al., 2016; S. S. Hu et al., 2016; Loukas et al., 2015; Saddleson et al., 2016).

As a result, prevalence of tobacco use may have been underestimated. Surprisingly,

prevalence of alcohol use behaviors was similar for both groups. Over one third of

students — regardless of disability status — engaged in past month binge drinking, and

approximately ten percent in heavy drinking. These findings mirror previous research on

the general population of postsecondary students, and highlight the problematic use of

alcohol on college campuses nationwide (American College Health Association, 2016;

Blanco et al., 2008; Center for Behavioral Health Statistics and Quality, 2015; Johnston

et al., 2016; Lipari & Jean-Francois, 2013; Substance Abuse and Mental Health Services

Administration, 2014). Notably, Altman and Bernstein (2008) found rates of heavy

drinking were equal or lower for individuals with disabilities compare with those without

disabilities in the larger U.S. population.

College students with disabilities had significantly higher prevalence of illicit

drug use behaviors than nondisabled college students. They were more likely to be

current marijuana users, 21% had used cocaine, and were three times more likely to have

ever used heroin. Over one quarter of disabled students reported current illicit drug use.

A higher prevalence was also observed for misuse of psychotherapeutic medications.

About 1 in 10 were current users, while 21% reported past year misuse. The most

popular psychotherapeutics for past year misuse were prescription pain relievers,

followed by tranquilizers, stimulants, OxyContin, and sedatives. In fact, students with

disabilities were two and a half times more likely to have misused OxyContin. While

students with disabilities reported higher prevalence of currently using prescription pain

relievers, tranquilizers and sedatives, current use of stimulants was not different from that

of their nondisabled peers. This result is somewhat surprising as previous research has shown an increasing trend in stimulants use in college students (Johnston et al., 2016).

In sum, the results showing higher prevalence of substance use in this population are supported by previous studies of young adults and college students with disabilities (Bernert et al., 2012; DuPaul, Weyandt, O'Dell, & Varejao, 2009; Groenman et al., 2013; Janusis & Weyandt, 2010; Lee et al., 2011). They do, however, contradict an earlier study which found lower substance use among young adults with a range of disabilities (Yu et al., 2008).

Substance dependence and abuse was also more prevalent among students with disabilities compared to their nondisabled peers. Thirteen percent met criteria for past month nicotine dependence based on the Nicotine Dependence Syndrome Scale and the Fagerstrom Test of Nicotine Dependence. Dependence or abuse of substances other than nicotine are based on criteria in the DSM-IV (American Psychiatric Association, 1994). Alcohol dependence or abuse was documented in 16%, while 1 in 8 met criteria for illicit drug use in the past year. Twenty-two percent of students with disabilities had either alcohol or drug dependence, with 7% meeting criteria for both illicit drug and alcohol dependence. Although college students are less likely to have a diagnosis of drug use disorder or nicotine dependence than their non–college-attending peers (Blanco et al., 2008), the current study found high prevalence of the disorders among students with disabilities.

Associations between disability status, sociodemographic characteristics, and substance use among college students

A number of demographic characteristics were significantly associated with substance use among college students. The most consistently salient were disability status, gender, age, race, academic level, and self-rated health status. There was a significant positive association between tobacco use and illicit drug use. Disability status, gender, age, race, academic level, and self-rated health status were also correlates of substance use disorders. Indeed, students who reported having a disability and those who reported fair or poor self-rated heath status had a higher likelihood of meeting criteria for substance use. The likelihood of being nicotine dependent was higher for students with illicit drug or alcohol dependence or abuse, and vice versa.

Limitations of the Quantitative Analysis

A potential limitation of this study is that results are based on self-reported survey data. Hence, the extent of underreporting or overreporting of behaviors cannot be determined. Most substance use prevalence estimates, including those produced for NSDUH, are based on self-reports of use. Although studies generally have supported the validity of self-report data, it is well documented that these data may be biased. Bias varies by several factors, including mode of administration, setting, population under investigation, and the type of drug (Brener, Billy, & Grady, 2003; Brener et al., 2006; Center for Behavioral Health Statistics and Quality, 2016a).

Research has found self-report data regarding substance use for young adults to be most reliable in studies that guarantee confidentiality (Brener et al., 2003; Brener et al.,

2006). To that end, the survey utilized widely accepted methodological practices for increasing the accuracy of self-reports. Most of the questions in NSDUH were administered with ACASI, which is designed to provide the respondent with a highly private and confidential mode for responding to questions in order to increase the level of honest reporting of illicit drug use and other sensitive behaviors. Confidentiality was emphasized in all written and oral communications with potential respondents, and respondents' names were not collected with the data. To aid respondent recall, the prescription drug questions in NSDUH 2015 also allowed respondents to report any use or misuse of specific medications by providing both brand and generic names of medications. Nevertheless, most youths and young adults report their recent substance use accurately in self-reports (Harrison, Martin, Enev, & Harrington, 2007).

Questions on functional disability were also self-reported. These items were only added to NSDUH in 2015. However, self-report of disability is well validated and predictive of mobility-related limitations and other impairments, as well as mortality (Goldman, Glei, Rosero-Bixby, Chiou, & Weinstein, 2014; Reuben et al., 2004). Poor self-rated health has been shown to be predictive of chronic conditions such as diabetes, heart diseases, gastric ulcers, and chronic obstructive pulmonary disease (W. Hu & Lu, 2015). Moreover, although physician-evaluated data are typically considered the gold standard for measuring morbidity, self-reports of conditions may be as good as, if not better than, medical examinations or performance-based assessments of physical limitations in predicting disability (Ferraro & Su, 2000; Goldman et al., 2014).

Additionally, the survey is cross-sectional rather than longitudinal. As such, it provides an overview of the prevalence of drug use at a specific point in time rather than a view of how substance use changes over time.

Qualitative study of factors affecting health care utilization by college students with disabilities

The aims of this study were twofold: 1) Describe the types of services available to college students with disabilities; and 2) Examine the perceived barriers to and facilitators of service utilization by students with disabilities. Surprisingly, mental health and addiction services were the most frequently cited type of support on the university campus. Every interviewee discussed some aspect of student mental health. Indeed, the number of references to mental health and addiction services was considerably higher than references to the Office of Disability Services (ODS), which was the second most cited. Overall, ODS was well regarded and seen as an important resource for students and university employees. According to the interviews, the vast majority of students presented with neurodevelopmental disorders (e.g., ADD/ADHD), or psychological disorders such as anxiety, depression, school-related stress (Newman et al., 2011; Perez-Rojas et al., 2017; Raue & Lewis, 2011; Xiao et al., 2017). Respondents stated that they had little interaction with students who had physical disabilities.

A number of barriers to and facilitators of service utilization were identified that were consistent with previous research. Indeed, findings from this study are supported by in-depth interview research with college students (Lightner, Kipps-Vaughan, Schulte, &

Trice, 2012; Stein, 2014). Personal barriers and facilitators emerged as dominant themes for service utilization by students with disabilities. The lack of knowledge and understanding of the various resources available to students were viewed by respondents as significantly impacting service use. Participants reported that student knowledge of such services did not guarantee that students could successfully navigate the university bureaucracy in order to access them. Previous studies on help-seeking behavior and access to services among college students have identified as major barriers the lack of awareness of services and inability to access services (Cawthon & Cole, 2010; Eisenberg, Golberstein, & Gollust, 2007; Jennings et al., 2017; Lightner et al., 2012; Nash, Sixbey, An, & Puig, 2017). Another prominent barrier was personal beliefs held by students with disabilities that they did not need services and could manage symptoms on their own. Unfortunately, students typically only seek services when their academic performance begins to suffer (Lightner et al., 2012). Results suggest that these personal beliefs are often related to sociodemographic factors such as age, ethnicity, and economic status (Eisenberg et al., 2007). Even having international student status may play a role in service utilization.

Stigma associated with service utilization is well documented (Gulliver, Griffiths, & Christensen, 2010). In this study, stigma was reported as a barrier, but to a lesser degree. Participants acknowledged the specter of stigma in service utilization. However, there was a consensus that many students were not affected by it as much as in previous generations. This may indicate that the role of stigma and other beliefs regarding help-seeking are changing (Czyz, Horwitz, Eisenberg, Kramer, & King, 2013; Givens & Tjia,

2002; Xiao et al., 2017). On the other hand, students who are affected by stigma may be less likely to disclose their disability.

The influence of family and friends in students' help-seeking behavior is highlighted in this study. Students' families were often portrayed as discouraging them from registering with ODS or seeking mental health services. Alternatively, some families who were engaged and supportive were credited as being key facilitators to service utilization. Friends, for the most part, were seen as sympathetic endorsers of help-seeking, and were often the first people to introduce the idea.

The university is spread across six thousand acres, has three main campuses, and enrolls nearly 70,000 students. The New Brunswick campus itself has five smaller campus. Respondents stated that the size and geography contribute greatly to underutilization of services by students. The barriers reported were not necessarily related to physical inaccessibility, but were programmatic in nature. That students were unaware of service options, or even where to search for such information was also regarded as an institutional barrier. Several participants discussed initiatives at the university to increase awareness of mental health, substance use, and disabilities services. They include conducting ongoing education, outreach, and advertising campaigns to inform and encourage students to use the services. Some promising approaches include speaking with students where they socialize (e.g., residence halls, sororities/fraternities), and recruitment of peer educators.

Another institutional barrier to service utilization was lack of training for faculty and staff on supporting students with disabilities. Consistent with previous research, although faculty and staff expressed a genuine willingness to provide accommodations,

they also indicated a need for professional development regarding student with disabilities (Murray, Flannery, & Wren, 2008; Stein, 2013, 2014). This was compounded by lack of coordination between departments within the university. For example, substance use, disability, and mental health experts rarely interact at the university, even though students often have treatment needs that overlap all three of these specialties.

Limitations of the Qualitative Analysis

Although most mixed methods research combine surveys with interviews, there are certain limitations with this exploratory research. First, by their very nature, data from interviews are self-reported. Potential for biases are present including in the collection and interpretation of data. Several steps were taken to address potential biases in this study. Triangulation was utilized by purposefully interviewing people in various roles within the university to get myriad perspectives (Palinkas, 2014), and websites of their organizations were reviewed. The interview protocol was standardized so that interviewees were asked the same questions. Additionally, to encourage forthrightness, the interviewees were not asked sensitive questions. Consensus coding was also used to mitigate bias in the interpretation of results.

Second, the small sample of exclusively Rutgers University staff and faculty means that findings cannot be readily generalized. However, the purpose of qualitative methods is to attain maximum insight from the data that are collected (Palinkas, 2014). Even with these limitations, getting the perspectives of individuals who provide direct services to students with disabilities contributes to extant literature on service utilization by college student with disabilities. One strength of this exploratory study is that

findings are supported by previous studies with college students with disabilities (Lightner et al., 2012; Stein, 2013, 2014). In-depth interviews were also used in those studies adding to the validity of the current research.

Synthesis of the studies and public health implications

As far as the author knows, this is the only study which uses data from a nationally-representative sample that has examined substance use among college students with disabilities and explores the views of university personnel who provide services to these students. Results from the 2015 NSDUH show that there is a large population of students with disabilities in colleges and universities across the U.S. Additionally, the high prevalence of mental health problems and substance use in this population as documented by the qualitative interviews with university employees suggest this poses significant challenges for students, staff, faculty and administrators. The combination of mental health problems and high prevalence of substance use is consistent with global statistics. By 2020, mental illness and substance use disorders will surpass all physical diseases as major causes of disability worldwide (Rosenberg, 2012). In the U.S., health behaviors play a major role in the leading causes of death (Johnson et al., 2014), and according to a National Research Council and Institute of Medicine report, almost half of annual deaths are attributable to behavioral and other preventable factors (National Research Council and Institute of Medicine, 2015). In sum, behavioral health has become a public health crisis with substance use responsible for much of the morbidity and mortality in the country today.

Promoting mental health and preventing substance use disorders are essential to reducing the impact of behavioral health conditions. Therefore, assessing the prevalence of and risk factors for these health behaviors is fundamental to achieving that objective. This study highlights the need for additional research in this little-studied area. Students with disabilities were found to engage in substance use significantly more than their non-disabled peers. However, based on the interviews, postsecondary institutions may not have the capacity to provide the necessary addiction and other mental health services.

Tobacco use was positively and significantly associated with illicit drug use. This suggests that any intervention targeting substance use should be comprehensive and directly address both behaviors. Further, the significantly higher prevalence of opioid use in college students with disabilities is a cause for serious concern. The use and abuse of opioids such as heroin and prescription pain relievers — including OxyContin — have been declared a national public health crisis (National Institute on Drug Abuse, 2018; Substance Abuse and Mental Health Services Administration, 2017; U.S. Department of Health and Human Services, 2017)

Higher prevalence of substance use may be due, in part, to individuals with disabilities self-medicating. In that case, referral to health care providers is necessary for medical screening and intervention. If students are already under the supervision of a health care provider and are using illicit drugs or misusing psychotherapeutics, then they are putting themselves at risk for contraindication or overdose.

Substance use disorders can be harmful to the health and well-being of individuals with disabilities. When it comes to college students, these disorders can affect the neurodevelopment of the still developing brains of young adults — impairing cognition,

inhibiting coordination, and negatively impacting academic achievement. Substance use

disorders contribute to social isolation. They can increase medical noncompliance and

thus contribute to comorbid conditions and poor health. Finally, they can interact with

prescribed medications and interfere with successful adherence and completion of

rehabilitation of services (Substance Abuse and Mental Health Services Administration,

2011).

Mental illness and substance use disorders affect the health of individuals, their

families, and their communities. In 2014, an estimated 9.8 million adults aged 18 and

older in the U.S. had a serious mental illness, 1.7 million of whom were aged 18 to 25.

Further, an estimated 22.5 million reported needing treatment for alcohol or illicit drug

use, and 11.8 million reported needing mental health treatment or counseling in the past

year (Center for Behavioral Health Statistics and Quality, 2015). These disorders are

among the main contributors to disability and carry a high burden of disease, resulting in

significant costs to families, employers, and health systems. Another consequence of

drug and alcohol use is that they can lead to other chronic diseases, such as diabetes and

heart disease. Addressing the impact of substance use alone is estimated to cost

Americans more than $700 billion each year (National Institute on Drug Abuse, 2017).

Preventing mental illness, substance use disorders, and related problems in young

adults is critical to behavioral and physical health. As this study suggests, college

students with mental illness are more likely to use alcohol or drugs than those not

affected by mental illness. These results mirror that of the larger U.S. population where

adults with mental illness had significantly more substance use disorder than adults with

no mental illness (Center for Behavioral Health Statistics and Quality, 2015). If families,

friends and colleges can intervene early, these behavioral health disorders might be prevented or symptoms may be mitigated. Since findings from this research suggest the strong role of social support in service utilization, educational awareness campaigns (especially those that are culturally appropriate) aimed at family members may be effective in reducing the unmet needs of students. Focusing on younger adults can allow increased time for health improvement if cessation of substance use occurs and could result in better prognosis for overall health in later adulthood.

Importantly, the high prevalence of students with mental health problems directly coincides with a reported increase in the number of students seeking mental health services on campus (Xiao et al., 2017). In fact, some respondents discussed mental health offices as being overburdened and unable to appropriately accommodate the needs of students seeking services. Some students reported having to wait several weeks to see a clinician. Such challenges with mental health treatment delivery are widespread. According to the Association for University and College Counseling Center Directors Annual Survey, directors whose centers have psychiatric services reported needing more hours of psychiatric services than were currently available to meet student needs (LeViness, Bershad, & Gorman, 2017). Additionally, 34% of centers reportedly had a waitlist, and the average wait for a first appointment for students on the waitlist was 17 business days.

It is evident from participants' narratives that university-wide efforts to raise awareness of services and facilitate access are essential to removing personal knowledge barriers. Participants enumerated several such activities as part of their outreach efforts. In general, promotional activities that have been shown to be effective are campus

partnerships, advertisements on school websites, large-scale events (e.g., orientation for incoming students), and more targeted events at university cultural centers (Golightly et al., 2017). Such campaigns should emphasize: 1) ways to identify disabilities and mental health problems; 2) ways to reduce stigma; 3) types of services available; 4) how to access services; 5) cost of services; and 6) confidentiality. One caveat is that institutions must have the resources and infrastructure in place to provide the necessary services to students, especially since another finding from this study indicated that CAPS was not providing the appropriate level of care for students, resulting in extended wait times for appointments.

Findings suggest that outreach campaigns targeting faculty, staff, and administrators would be beneficial in educating the community on disability, mental health, and substance use services available at the university. New hire orientation presents a key opportunity to fully engage attendees. These results indicate the need for robust coordination between offices of disability services and substance use services on college campuses. Although many students with disabilities do not register with disability support services for various reasons (Cortiella & Horowitz, 2014; Megivern, Pellerito, & Mowbray, 2003; Newman et al., 2011; Salzer, Wick, & Rogers, 2008), those who do should be advised about the availability of substance use services in an informational session. Furthermore, the university can address the issue of lack of coordination by convening a committee or working group to study how to best serve students with co-occurring disability, mental health problems, and addiction.

Any educational effort focusing on university employees needs to specifically address the Americans with Disabilities Act (ADA) and Rehabilitation Act of 1973 in a

comprehensive manner. These laws were enacted to secure the rights of people with

disabilities and ensure that they have access to the same opportunities and benefits

available to people without disabilities. Although all respondents understood that the

ADA requires provision of accommodation to students who have registered with ODS,

most showed little understanding of the practical ramifications of the laws as they apply

in college and university settings. In fact, Stein (2014) found similar results in interviews

of college students with disabilities regarding perceptions of faculty. Moreover, the

Rehabilitation Act of 1973 was not familiar to the vast majority of participants.

Participants' narratives also highlighted the need for transition programs for

students with disabilities who utilized wraparound services and Individualized Education

Program (IEP) plans in high school. Access to these plans and services are invaluable

during elementary and secondary school. However, when those students enter

postsecondary institutions, most of these specialized services are no longer available. It

is then incumbent on the student to seek out services and reasonable accommodation.

Students must also present the appropriate documentation in order to receive services. As

previous studies have found, many are ill-prepared to assume such responsibilities

(Cawthon & Cole, 2010). Although some students do well with the accommodations

provided by on-campus disabilities support services, others may need more intensive

intervention such as transition programs. On the other hand, while many students enter

college with previously-diagnosed disabilities, others arrive with undiagnosed disabilities

or develop symptoms while living on campus. These students have no experience of

utilizing accommodations and may not recognize their own need for services. Therefore,

postsecondary institutions should consider providing additional resources to support these students.

**CHAPTER 6: CONCLUSION AND RECOMMENDATIONS FOR FUTURE
RESEARCH**

Understanding the risk factors for substance use and strategies for prevention and

treatment are important to people with disabilities, disability service providers, and public

health policymakers. Therefore, it is essential that mechanisms are in place to monitor

risk factors for substance use and other behaviors in this population. The dearth of

research on people with disabilities is well documented and compounds the many levels

of disparity in this group. People with disabilities have been virtually absent from public

health surveys, data analyses, and health reports. Indeed, recent data indicate that

individuals with disabilities experience health disparities such as poorer health outcomes

and higher prevalence of engaging in health risk behaviors. Improving aspects of

disability assessment and monitoring is key to addressing this huge gap the scientific

literature.

Findings from this research also suggest that while a large proportion of college

freshmen report having a disability, there are fewer students with disabilities in the fourth

college year or higher. This may indicate that they are more likely to enroll in two-year

or community colleges than young adults without disabilities (Newman et al., 2011).

Additionally, it may also suggest that students with disabilities are not completing

bachelor's degree programs due to higher dropout rates. This hypothesis warrants further

investigation into the reason there are fewer students with disabilities at the senior class

levels (upper classmen).

Planning effective public policies requires an understanding of the size and

characteristics of the population to be served. Hence, another area for future research is

comparing prevalence of substance use disorders between college students with disabilities and non-college attending counterparts. The author has yet to find literature on the topic, although studies comparing substance use in non-disabled college-attending individuals with their non-disabled, non-college-attending peers are common.

Finally, results from this research highlight the importance of interpersonal factors on service utilization among college students. Examining the role of interpersonal factors, especially family and friends may prove particularly insightful. Future areas of research at postsecondary institutions may also include in-depth interviews with students with disabilities and service providers at the same institution to compare their perceptions on barriers to and facilitators of service utilization.

It is widely documented that young adults are especially vulnerable to mental and substance use disorders. Young adults with disabilities and substance use disorders face an even more difficult transition to adulthood than their peers. As a result, it is important to identify these young people, develop appropriate outreach and engagement processes, and create access to effective clinical and supportive interventions, especially in the college/university setting. As more young adults with disabilities are encouraged to pursue a postsecondary education, the number of students with disabilities in these institutions will continue to rise, thereby increasing the need for services and supports.

One of the purposes of this study was to examine risk factors for various substance use and dependence behaviors. These nationally representative data highlight disability as a significant predictor of substance use, abuse, and dependence among college students. A health disparity is defined as "*a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health*

disparities adversely affect groups of people who have systematically experienced greater

obstacles to health based on their racial or ethnic group; religion; socioeconomic status;

gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation

or gender identity; geographic location; or other characteristics historically linked to

discrimination or exclusion" (US Department of Health Human Services, 2008).

According to the World Health Organization, "*health disparities are health inequalities*

that are considered unnecessary, avoidable and unfair/unjust" (Commission on Social

Determinants of Health, 2008). Results from this study have made it quite evident that

significant health disparities exist in the form of substance use and disorders in this

subpopulation of college students with disabilities.

The results of this dissertation contribute to the literature in terms of the

development of health improvement plans that integrate inclusive policy, systems, and

environmental strategies on college campuses. Both quantitative and qualitative studies

provide important information on the participation of students with disabilities in

postsecondary education. The magnitude of that participation highlights the importance

of addressing the varied and unique barriers faced by students with disabilities.

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APPENDIX A.

Interview protocol

1. Welcome and introduction

2. Acquisition of informed consent

3. Please tell me about your center and the services that you provide

   Probe:

   Tobacco use, alcohol, marijuana and other substance use in students with

   disabilities

4. Please describe some of the characteristics of students who receive

   services

   Probe:

   Students with disabilities who use tobacco use, alcohol, marijuana, and

   other   substances

5. Based on your experience, what are your estimates of the extent of

   substance use in this population?

   Probe:

   Unique characteristics of students with disabilities who also use

substances

6. What, in your view, are barriers and facilitators faced by students with

   disabilities?

   Probes:

   - **Personal** (e.g., age, gender, academic level, racial/ethnic identity,

     financial resources, expectations, resiliency, coping skills, time

management skills, perception of health, substance use, personal
agency in accessing health care, and stigma associated with
accessing counseling and other support services)

- **Interpersonal** (e.g. family, friends, peers, co-workers, religious
networks, customs, or traditions, roommates, supervisors, resident
advisors, rituals, diversity, athletics, recreation, intramural sports,
clubs, and Greek life)

- **Institutional** (e.g., the ways in which college students with
disabilities utilize assistance provided by disability support
services; and mechanisms in place for college students with
substance use and mental health issues to access available services
and supports. What types of coordination, if any, do you engage in
with other agencies, centers, etc.?

- **Community** (e.g., the built environment, on/off-campus housing,
bars, fast food restaurants, commuting, parking, transportation, and
walkability)

- **Policy** (e.g., school policies, ADA and Section 504 of the
Rehabilitation Act of 1973)

- **Other barriers and facilitators**

7. What, in your view, are barriers and facilitators faced by students with
disabilities who engage in substance use?

Probes:

- **Personal** (e.g., age, gender, academic level, racial/ethnic identity, financial resources, expectations, resiliency, coping skills, time management skills, perception of health, substance use, personal agency in accessing health care, and stigma associated with accessing counseling and other support services)

- **Interpersonal** (e.g. family, friends, peers, co-workers, religious networks, customs, or traditions, roommates, supervisors, resident advisors, rituals, diversity, athletics, recreation, intramural sports, clubs, and Greek life)

- **Institutional** (e.g., the ways in which college students with disabilities utilize assistance provided by disability support services; and mechanisms in place for college students with substance use and mental health issues to access available services and supports. What types of coordination, if any, do you engage in with other agencies, centers, etc.?

- **Community** (e.g., the built environment, on/off-campus housing, bars, fast food restaurants, commuting, parking, transportation, and walkability)

- **Policy** (e.g., school policies, ADA and Section 504 of the Rehabilitation Act of 1973)

- **Other barriers and facilitators**

8. Is there anything else you would like to add?

9. Conclusion and thank you

10. Do you know of any health care or disability service providers at Rutgers who may be interested in participating in this study?