# Mental Health and Substance Use Disorder Outcomes across Socio-Demographic Subgroups among a King County Jail Alternative Population

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## Abstract

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**Mental Health and Substance Use Disorder Outcomes across Socio-Demographic Subgroups among a King County Jail Alternative Population**

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**Objective:** The Community Center for Alternative Programs (CCAP) is a jail alternative program that aims to reduce criminal recidivism. It is recognized that mental health and substance use disorders increase one's chances of recidivating. This study sought to determine the prevalence of mental health disorders and substance use disorders overall and by type across socio-demographic subgroups, gender, race/ethnicity, and age among CCAP participants.

**Methods:** Adult offenders who engaged in court-mandated CCAP services from November, 2010 to December, 2011 were included. The prevalence of any mental health and substance use disorders was described overall and across subgroups, gender, race/ethnicity, and age, and the prevalence of type of mental health and substance use disorders was described overall and across subgroups. Comparisons across subgroups were all completed using chi-square tests of independence.

**Results:** Among 908 CCAP participants, 31% had a mental health diagnosis, and 47% had a substance use disorder. Mood disorders were the most prevalent type of mental health disorder, and alcohol use disorders were the most prevalent type of substance use disorder. Prevalence for any and each type of mental health and substance use disorder varied across subgroups.

**Conclusions:** High prevalence of mental health and substance use disorders indicate such disorders should be prioritized in jail alternative programs. Variance across socio-demographic subgroups suggests that it may be beneficial to consider subgroups in approaches to mental health and substance use treatment.

## Introduction

Recidivism within the criminal justice system is considered a major public health problem that can have various impacts on the individual level, as well as on larger group and community levels. Recidivism is an individual's reversion, or relapse, into criminal behavior,[1] and studies from the United States Bureau of Justice report that 67.5% of former inmates are rearrested for a new crime, either a felony or a serious misdemeanor, within three years of their release.[2] Some of the negative effects of recidivism include stress and trauma experienced by offenders, heavy burdens and strains on connected families and communities, increase in crime, decrease in public safety,[3] high financial cost on society, overcrowded facilities, overbooked court dockets, and overall stress on the criminal justice system.[4]

To address high incarceration and recidivism rates in the United States, jail alternative programs have been developed that address barriers faced by both first-time and repeat offenders which contribute to high rates of re-incarceration. Jail alternative programs are correctional programs that intend to divert offenders from jails, correctional facilities that house persons with sentences shorter than one year, and prisons, correctional facilities that house persons with sentences of one year or longer.[5] Existing jail alternative programs have an array of goals and services, including health services.

Among incarcerated populations, mental health and substance use disorders are prevalent,[6] and the prevalence of these disorders varies across subpopulations defined by race/ethnicity, gender, and age.[6,7,8,9,10,11,12,13] Due to the high prevalence of mental health and substance use disorders among incarcerated populations, many jail alternative programs offer mental health and substance use disorder treatment and specifically acknowledge these issues as major barriers to successful re-integration and major causes of recidivism.[14,15] Despite the

focus on mental health and substance use disorders as barriers, and the known high prevalence of these disorders in incarcerated populations, no previous study has described the prevalence of mental health and substance use disorders groups within jail alternative programs, either overall or across subpopulations based on socio-demographic characteristics.

Recent efforts in Washington State's King County have created an alternative jail program[16] that offers an opportunity to describe the prevalence of mental health and substance use diagnoses. Understanding the prevalence of these disorders may be important because jail alternative programs are working to develop solutions to recidivism in the United States; returning offenders with mental health and/or substance use disorders are at an increased risk for recidivism due to inconsistent/insufficient treatment, effects of such disorders on personal judgment, and the disorders' acting as barriers to obtaining needs for daily living.[3,17] In addition, because treatment can be impacted by type of mental health disorder and type of substance, considering variation of type within both mental health and substance use disorders may be important.[18,19, 20]

This program also offers opportunity to describe the prevalence of mental health and substance use diagnoses overall and by type across subgroups based on gender, race/ethnicity, and age. These findings may be particularly important because a disproportionate prevalence of these conditions among vulnerable populations, or subgroups that are at a higher risk of risks because of shared social characteristics (e.g. gender, race/ethnicity, age), may indicate a need for culturally sensitive treatments or programs intended to reduce recidivism.[21,22]

***Literature Review:***

**Current Reporting**

There is substantial literature describing jail alternative programs that focuses on program evaluations and describes various approaches, intended benefits, impacts on recidivism rates, cost analyses, and participants' utilization of services.[23,24] However, likely due in part to the fact that such programs are fairly new and still developing, the literature does not describe the prevalence of mental health and substance use disorders either overall or across socio-demographic characteristics in jail alternative programs as it is found in congressionally mandated reports about other correctional settings that specifically track trends in key characteristics.[25]

**Mental Health Disorders**

Reports suggest that incarcerated populations have elevated rates of mental health disorders compared to the general population.[15] In 2005, over half of all incarcerated persons in state, federal, and local facilities reported a history of mental health disorders and/or described symptoms of mental health disorders.[6] According to one comprehensive literature review, the most common mental health disorders among incarcerated populations include major depressive disorder, bipolar disorder, schizophrenia, and other psychoses, and the prevalence of these illnesses in incarcerated adults is anywhere from three to six times higher than that in the general public.[23, 24]

According to 2002 and 2004 surveys of federal and state prison inmates and local/community jail inmates, 56% of state prison inmates, 45% of federal prison inmates, and 64% of local/community jail inmates had a mental health disorder.[6] A systematic review and meta-analysis of 109 samples (33,558 prison inmates) from studies ranging from years 1966 to

2010 showed steadily high numbers of mental health disorders present among incarcerated persons with depressive disorders among inmates increasing in the United States.[15]

**Substance Use Disorders**

Substance use disorders, including all categories and levels of substance abuse and substance dependence,[26] are prevalent among incarcerated populations. Over 70 percent of incarcerated persons with a mental health disorder also have a co-occurring substance-use disorder.[24] According to surveys of state prison inmates and local/community jail inmates, it is estimated that 74% of state prison inmates and 76% of local/community jail inmates experienced substance use disorders.[6] In the same study, among inmates without clinical history or symptoms of mental health disorders, 56% state prison inmates, 49% federal prison inmates, and 53% local jail inmates experienced substance abuse or dependence. These numbers are consistent with other studies that report 53% of state prison inmates and 45% of federal prison inmates met DSM-IV criteria for drug dependence or abuse.[27] Among inmates who reported clinical history of mental health disorders or symptoms of mental health disorders, 78% percent of local/community jail inmates, 74% of state prison inmates, and 64% of federal prison inmates experienced substance abuse or dependence.[6]

Separate surveys conducted in 1997and 2004 report that one third of state prison inmates self-reported having had committed their current offense while under the influence of drugs or alcohol.[27] According to reports, alcohol is the most common substance used by incarcerated populations,[28] followed by marijuana, cocaine (including crack), opiates (including heroin), and stimulants.[27,28] Between 1997 and 2004, there was little change in the rates of marijuana use

among incarcerated populations, and decreases in use of cocaine and opiates were noted; however, there were noted increases in both stimulant and methamphetamine use.[27]

Chronic untreated substance use disorders are likely to result in high rates of repeated contacts with the criminal justice system and a greater likelihood of incarceration and recidivism.[29] Reports show that incarcerated persons who met criteria for recent substance dependence or substance abuse had criminal records with multiple offenses. According to a Bureau of Justice Statistics survey in 2004, 53% of prison inmates who experienced substance use disorders had at least three prior sentences.[27] In connection to chemical dependency and substance abuse, "released prisoners recognize the many lures in their old neighborhoods that could lead them back into their 'old ways,' such as an active drug trade and former friends and associates embedded in it." [3]

**Socio-Demographic Subpopulations**

Within incarcerated populations, as well as the general population, both mental health and substance use disorders vary across subgroups, defined by gender, race/ethnicity, and age.[6,8,9,10,11,27,28,30] However, when considering socio-demographic subgroups within incarcerated populations, it should also be noted that certain groups are disproportionately represented in these statistics, and more than 60 percent the population in prisons or jails are racial and ethnic minorities. For example, In King County, six percent of the total population identifies as black or African-American – that same group represents about 30 percent of individuals in jail or prison.[31,32,33]

Bureau of Justice Statistics surveys show that 62% of Caucasian state prison inmates, 55% African-American state prison inmates, and 46% of Hispanic state prison inmates experience

mental health disorders,[27] and similar surveys also showed differences in substance use across the same racial/ethnic groups (other racial/ethnic groups were not reported).[6,27]

The most recent reports from the Bureau of Justice Statistics showed that, in 1997 and 2004, female inmates had higher rates of mental health disorders than male inmates, which is similar to comparison rates in the general population (12% of females compared to 9% males).[6] In both 1997 and 2004, male federal prison inmates were slightly more likely than female federal prison inmates to have used substances in the month before offending.[6,27]

Similar surveys reported that, in 2004, inmates age 24 or younger had the highest rate of mental health disorders.[27] Also in 2004, inmates age 55 and older had the lowest rate of mental health disorders.[27] Roughly two-thirds of state and federal inmates age 24 or younger reported drug use in the month before their offense, compared to one fifth of the inmates age 55 or older.[27]

***Conceptual Model:***

The conceptual model shown in **Appendix A** represents a population of those involved in a program intended to reduce recidivism (CCAP), a population at risk for adverse health outcomes,[22] such as mental health and substance use disorders. The main pathways in the model are based on the notion of vulnerable populations and multi-level risk factors for mental health and substance use disorders.[10,22] The notion of vulnerable populations explains that subgroups defined by shared characteristics (gender, race/ethnicity, age) can impact risk factors for health outcomes. Risk factors for the health outcomes are multi-level. Individual risk factors may include, but are not limited to, low self-esteem, internalized biases, cognitive/emotional immaturity, difficulties in communicating, and medical illness.[10,12] Social risk factors may

include, but are not limited to, loneliness, bereavement, personally mediated biases and discrimination, neglect, family conflict, exposure to interpersonal violence/abuse, poverty, difficulties or failure at school, work stress, and unemployment.[10,12] Environmental risk factors include, but are not limited to, poor access to basic services, exposure to violence, institutional injustices and discrimination, and social inequalities.[10,12] Exposure to any of the individual, social, and environmental risk factors varies according to socio-demographic characteristics, thus causing disparities in health outcomes.[22]

***Research Question:***

While previous research suggests that mental health and substance use disorders are common among incarcerated populations and vary across socio-demographic sub-populations, no previous study has described differences across socio-demographic variables specifically in a jail alternative program. The purpose of this study was two-fold: (1) to describe the prevalence of both mental health and substance use disorders among adult offenders who received services though a King County (Washington State) jail alternative program in 2011; and (2) to describe the prevalence of each across subgroups based on socio-demographic characteristics, including race/ethnicity, gender, and age. Based on the high prevalence of mental health and substance use disorders and the variation of such outcomes across socio-demographic characteristics within incarcerated populations, this study hypothesizes that mental health and substance use disorder outcomes will be highly prevalent and vary across socio-demographic characteristics within a jail alternative population.

## Methods

***Study Setting, Population, and Data Source:***

This study was conducted among a subset of adult offenders who were court ordered to a jail alternative program – the Community Center for Alternative Programs (CCAP) – and referred to a contract mental health and substance use treatment agency called Sound Mental Health. CCAP serves as a community corrections program that is an alternative to full-time incarceration and is housed within the King County Department of Adult and Juvenile Detention (DAJD) and the Community Corrections Division.[16] Because, for many repeat offenders, mental health and/or substance use issues contribute to a person's recidivism, CCAP contracts with Sound Mental Health, a community vendor that is a Washington State certified mental health and substance use treatment agency. An individual is court mandated to CCAP because he or she is a repeat offender who the court feels needs a certain level of structure/monitoring and/or evokes concerns about community safety. Thus, all CCAP participants are in contact with Sound Mental Health at the CCAP facility.[17] Therefore, clinical and diagnostic data for this study were obtained from Sound Mental Health.

The subject population is comprised of adult offenders who were court ordered to CCAP attendance and engaged in CCAP services any time between November 18, 2010 and December 29, 2011 (n = 908). Participants in CCAP were eligible for this study if they: (1) had complete information available for mental health disorder or substance use disorder diagnosis status, age, sex, and race/ethnicity; and (2) engaged in services at CCAP. Participants were not eligible to participate in this study if they: (1) were ordered to CCAP but did not engage in services; and (2) were considered outliers through unique and distinctive demographic and/or diagnosis information that might threaten the confidentiality of protected health information of CCAP clients represented in dataset.

***Assessments:***

Clients ordered to CCAP were assigned a DAJD caseworker who set up a CCAP service schedule based on court order and initial intake (conducted by the DAJD caseworker). Chemical Dependency Assessments and Health and Wellness Assessments were ordered by the court and/or recommended by the caseworker with some input from Sound Mental Health (SMH) clinicians. The assessments were conducted by an SMH clinician, and diagnosing only occurred during the assessment. Substance use disorder diagnoses were required to be made by a certified Chemical Dependency Professional (CDP), and mental health disorder diagnoses were required to be made by a certified Mental Health Professional (MHP).[17]

***Measures:***

*Mental Health Disorders*

Mental health disorders refer to any condition that affects or interferes with a person's thinking, feeling, coping strategies, abilities to relate and interact with others, and/or mood in a disruptive manner.[9, 34] A primary (most prominent) mental health disorder diagnosis was made or confirmed by a Sound Mental Health Mental Health Professional using criteria described in the fourth edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR). Any mental health disorders were defined consistent with DSM-IV criteria and were identified using diagnostic codes.[26] Measures were also derived for specific types of mental health disorders, using the following code groupings: Adjustment Disorders (DSM-IV-TR codes 309.0, 309.24, 309.28, 309.3, 309.4, 309.9); Anxiety Disorders (DSM-IV-TR codes 300.01, 300.21, 300.22, 300.29, 300.23, 300.3, 309.81, 308.3, 300.02, 293.84, 300.00); Mood Disorders (DSM-IV-TR codes 296.2x, 296.3x, 300.4, 311, 296.0x, 296.40, 296.4x, 296.6x, 296.5x, 296.7, 296.89,

301.13, 296.80, 296.83, 296.90); Psychotic Disorders (DSM-IV-TR codes 295.30, 295.10, 295.20, 295.90, 295.60, 295.40, 295.70, 297.1, 298.8, 297.3, 293.xx, 298.9).

*Substance Use Disorders*

A primary substance use disorder diagnosis was made or confirmed by a Sound Mental Health Chemical Dependency Professional .Any substance use disorders were defined consistent with DSM-IV criteria and include diagnoses for either substance abuse or substance dependence and identified using diagnostic codes.[26] Measures were also derived for specific types of substance use disorders, using the following groupings: Alcohol Use Disorders (DSM-IV-TR codes 303,90, 305.00); Amphetamine Use Disorders (DSM-IV-TR codes 304.40, 305.70); Cannabis Use Disorders (DSM-IV-TR codes 304.30, 305.20); Cocaine Use Disorders (DSM-IV-TR codes 304.20, 305.60); (DSM-IV-TR codes 304.50, 305.30); Opioid Use Disorders (DSM-IV-TR codes 304.00, 305.50); Other Substance Use Disorders (DSM-IV-TR codes 304.10, 305.40, 304.50, 305.30, 304.80, 304.90, 305.90).

*Race/Ethnicity*

CCAP participant self-report race/ethnicity on a standard SMH Client Demographics form distributed to CCAP participants by an SMH employee or intern at the time of client intake. For this project, race/ethnicity was categorized into the following groupings: African American, American Indian, Asian/Pacific Islander, Caucasian, Multi-Racial/Ethnic, Hispanic, and Unknown/Other. Race is not considered a biological variable; but one that is socially constructed.[30]

*Gender*

Similarly, CCAP participant self-report their gender on the SMH Client Demographics form at the time of client intake. Despite other approaches that consider gender on a spectrum or in categories, for this project, gender was treated as a binary variable (male and female) according to options provided to clients at time of data collection.

*Age*

For this project, age was treated as a categorical variable and referred to a participant's age at the time of intake as calculated from date of birth provided by CCAP participant. Age was categorized according to the following groupings: 18-24, 25-34, 35-44, 45-54, and 55-74.

***Statistical Analyses:***

Descriptive statistics were used to define the socio-demographic characteristics of the sample. The prevalence of any mental health and substance use disorders and 95% confidence intervals was described. Then, the prevalence and 95% confidence intervals of any mental health and substance use disorders was described for and compared across subgroups defined by gender, race/ethnicity, and age group. Finally, among those with a mental health or substance use disorder, respectively, the prevalence of type of each disorder was described for and compared across subgroups defined by gender, race/ethnicity, and age group. Comparisons across subgroups were all completed using chi-square tests of independence.[18, 35]

**Results:**

After removing incomplete observations, the sample total was n = 908. **Table 1** presents the socio-demographic characteristics, gender, race/ethnicity, and age. The sample was 82% male (n = 742) and 18% female (n = 166) (**Table 1**). About half were age 18-34, slightly less than half

of the sample was age 35-54, and the remaining 6% was age 55-74 (**Table 1**). Approximately one-fourth were African-American, another fourth were Caucasian, and another fourth were of unknown/other race/ethnicity (**Table 1**). The remainder of the sample were Hispanic (12%), Multi-racial (12%), American Indian (3%), and Asian/Pacific Islander (3%) (**Table** 1).

**Table 2** presents the prevalence of mental health and substance use disorders overall and by socio-demographic subgroup. Of the total sample, 31% (95% CI 28-34%) (n = 282) of CCAP participants in the sample had a mental health diagnosis, and 47% (95% CI 44-50%) (n = 426) of CCAP participants had a substance use disorder, indicating that about 22% were deferred on Axis I, meaning there was not a diagnosable mental health or substance use disorder) or, for various reasons, an assessment was not completed by a Mental Health Professional and/or Chemical Dependency Professional (**Table 2**).

Mental health disorders were present in 37 % (95% CI 30-45%) (n = 62) of females and in 30% (95% CI 26-33%) (n = 220) of males (p = .05) (**Table 2**); substance use disorders were present in 38% (95% CI 31-46%) (n = 63) of total females and 49% (95% CI 45-53%) (n = 363) of total males (p < .05) with statistically significant differences across gender observed for both mental health and substance use disorders (p-values < .05) (**Table 2**).

The prevalence of mental health disorders across racial/ethnic groups ranged from 9% (95% CI 6-13%) for those of Other/Unknown race/ethnicity to 45% (95% CI 39-51%) for those of African-American ethnicity with statistically significant differences in the prevalence of mental health disorders across race/ethnicity observed (p < .05) (**Table 2**). The prevalence of substance use disorders across racial/ethnic groups ranged from 39% (95% CI 23-58%) among those of Hispanic race/ethnicity to 56% (95% CI 36-74%) among those of Asian/Pacific Islander

ethnicity with no statistically significant differences observed in the prevalence of substance use disorders across race/ethnicity ($p > .05$) (**Table 2**). More than half of the American Indian, Asian/Pacific Islander, and Caucasian participants had a substance use disorder, and nearly half of the African American and Multi-Racial participants had a substance use disorder (**Table 2**).

The prevalence of mental health disorders prevalence across age groups ranged from 20% (95% CI 15-26%) among those age 18-24 to 39% (95% CI 32-45%) among those age 35-44 and among those age 45-54 (95% CI 32-47%) with statistically significant differences in the prevalence of mental health disorders across age groups ($p < .05$) (**Table 2**). There were higher rates of mental health disorders among middle ages (age groups 35-44 and 45-54). The prevalence of substance use disorders across age groups ranged from 40% (95% CI 33-48%) among those age 45-54 to 52% (95% CI 39-65%) among those age 55-74 with no statistically significant differences in the prevalence of substance use disorders across age groups ($p > .05$) (**Table 2**). Rates of substance use disorders slightly decrease among middle ages but are generally high for all groups (**Table 2**).

**Table 3** presents the prevalence of mental health disorders by type and across subgroups among those with diagnosed mental health disorders. Mood disorders were most prevalent at 61% (95% CI 55-66%), and adjustment disorders were least prevalent at 4% (95% CI 2-6%) (**Table 3**). Between genders and for mood disorders, which was the most prevalent mental health disorder, the prevalence rates for females ($n = 38$) and males ($n = 133$) were very similar at 61% (95% CI 49-73%) and 60% (95% CI 54-67%), respectively (**Table 3**). Statistically significant differences were only observed in the prevalence of anxiety and psychotic disorders by gender (p-values $< .05$) and across age groups in the prevalence of adjustment disorders ($p < .05$) (**Table 3**).

**Table 4** presents the prevalence of substance use disorders by type and across subgroups among those with diagnosed substance use disorders. Alcohol use disorders were the most prevalent at 35% (95% CI 30-39%), and other substance disorders were the least prevalent at 1% (95% CI < 1-3%) (**Table 4**). Significant differences were observed in the prevalence of alcohol, amphetamine, cannabis, and cocaine use disorders across race/ethnic groups and across age groups (p-values < .05) (**Table 4**). No statistically significant differences were observed in the prevalence of any type of substance use disorder between genders (p-values > .05) (**Table 4**).

## Discussion:

This study found that the prevalence of both mental health and substance use disorders were high among the sample of 908 CCAP participants, with an especially high prevalence of substance use disorders. The prevalence of mental health disorders identified in this jail alternative program sample – 31% – was not as high as that observed in incarcerated populations (45-64%).[6] The prevalence of substance use disorders identified in this jail alternative program sample – 47% – was only slightly lower than that observed in incarcerated populations (49-56%).[6]

In the present study, the prevalence of any mental health disorders varied across subgroups. Consistent with trends in incarcerated populations, prevalence of mental health disorders was higher among females than males and was highest among African-Americans. Of groups with similar representations in the sample, American Indian (3%), Asian/Pacific Islander (3%), and Hispanic (3%), prevalence of overall mental health disorders showed high variance with prevalence of any mental health disorders highest among Hispanics and lowest among

Asian/Pacific Islanders. Prevalence of overall mental health disorders was highest among age groups 35-44 and 45-54, without variance; prevalence for both age groups was equal at 39%.

While differences in substance use disorders across subgroups were smaller and followed different patterns that those observed for mental health disorders, the prevalence of any substance use disorders also varied across subgroups in the present study. Specifically, substance use disorders were more common among males than females. Prevalence of overall substance use disorders was high across racial/ethnic subgroups, but least common among Hispanics at (39%) and most common among Asian/Pacific Islanders (56%). Across age groups, the prevalence of substance use disorders was generally lower among middle age groups and higher among younger age groups (18-24) and older age groups (55-74).

Findings from this study regarding the high prevalence of both mental health and substance use disorders confirm that mental health and substance use treatment should remain a priority among jail alternative populations. Additionally, the findings suggest that culturally centered treatment that considers gender, race/ethnicity, and age may be beneficial for both mental health disorders and substance use disorders. However, future research in jail alternative programs is needed to confirm findings. In particular, it will be important to assess differences in mental health and substance use disorder diagnoses across socio-demographic subpopulations in larger samples with more equal representation of subgroups. The present study's small sample sizes in some racial/ethnic and age groups are limited to ensure reliable estimates.

Although sample sizes were similarly limited for description and comparison across subgroups of types of mental health and substance use disorders, findings regarding types of disorders may be hypothesis generating. In the present study, the most prevalent mental health

disorders were mood disorders, which is consistent with the high rate of mood disorders among incarcerated populations. The most prevalent substance use disorders were alcohol use disorders, and opioid and cannabis use disorders were also highly prevalent. These findings suggest that it may be beneficial to include treatment protocols that consider specific types of mental health disorders and substance use disorders within similar populations.

The present study also found that type of mental health disorder did not vary by gender for the most prevalent mental health disorder type (mood disorder), but varied greatly by gender for adjustment, anxiety, and psychotic disorders, as well as by gender for opioid and cannabis use disorders. Prevalence of each type of mental health disorder and substance use disorder varied across race/ethnicity, especially among mood disorders. Prevalence of each type of mental health disorder and substance use disorder varied across age group, especially among mood disorders, cannabis disorders, and cocaine use disorders.

However, as above, these findings are limited due to the small cell sizes for comparisons, and further research is needed in larger samples. Future research is also needed regarding whether certain types of mental health and substance use disorders are linked to higher rates of criminal activity and/or recidivism, which combined with findings such as the ones from the present study, could highlight specific areas for resource allocation in jail alternative programs.

This study has several limitations. First, as previously mentioned, small cell sizes limited some comparisons – especially those comparing types of disorders across socio-demographic subgroups – as well as the generalizability of study findings.

Outcome measurement may be subject to several biases in this study. Specifically, this study only measured primary diagnoses, or most prominent mental health and/or substance use

diagnoses, of CCAP participants who were connected with Sound Mental Health. Assuming CCAP participants reflect trends in other incarcerated populations, it is possible that many of the CCAP participants have other mental health and/or substance use diagnoses beyond that of the primary diagnosis, in which case the prevalence of mental health or substance use disorders may be under-estimated in this study, and the prevalence of co-occurring disorders was not described. Additionally, outcome measures used in this study may be subject to biases reflecting clinician experience, opinion, values, and stigma.

There are also limitations related to measures of socio-demographic characteristics. Specifically, the broad racial/ethnic categories used in this study enable comparisons across subgroups but are likely to mask important variation within groups and may be limited in capturing the lived experience and social contexts of individuals. Similarly, gender was considered a binary construct in this study, despite how gender has also been conceptualized as a social construct that encompasses roles, behaviors, and other attributes, that is many times approached differently.[8]

Finally, both the Multi-racial and the Other/Unknown race/ethnicity groups in this study were relatively large, and given their heterogeneity, results related to these groups are difficult to interpret and not clinically useful. This study is, however, hypothesis generating for further research that includes more specific racial/ethnic groups and subpopulations within them.

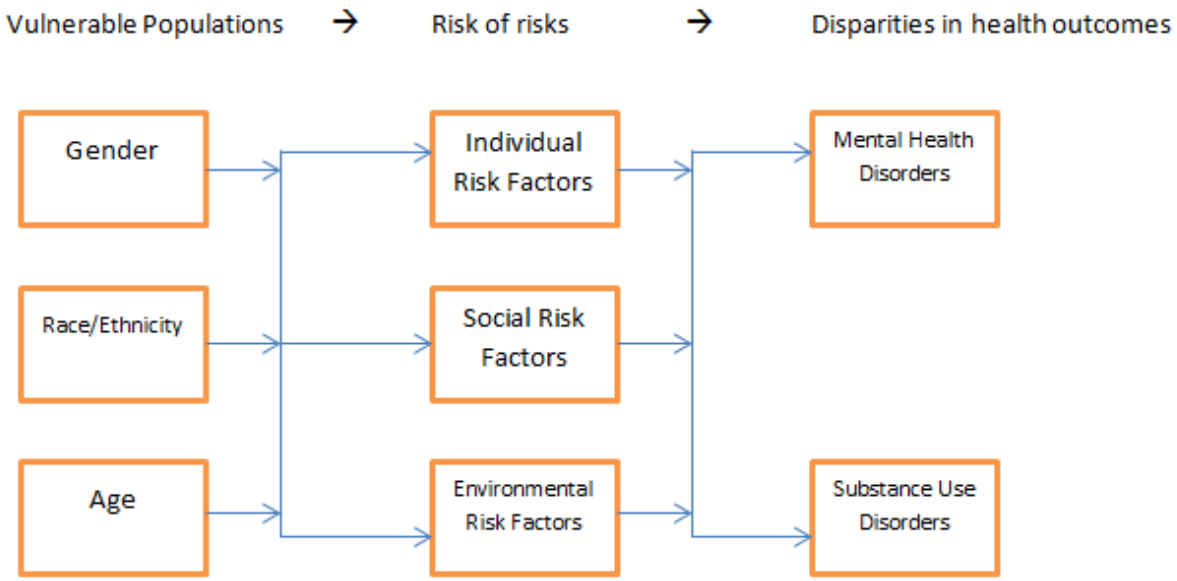
## Conclusion:

This study found that both overall mental health disorders and substance use disorders are highly prevalent among CCAP participants, a jail alternative program population. Variance found across socio-demographic subgroups suggests that it may be beneficial to consider mental

health and substance use treatment that is sensitive to different gender, racial/ethnic, and age identities, but may be less important for substance use treatment. High prevalence rates of mood disorders and alcohol disorders suggest that jail alternative programs should be equipped to treat these disorders accordingly. Future research assessing similar questions is needed in larger sample sizes with amply-sized socio-demographic subgroups.

## Appendix A

**Conceptual model:** The main pathways of socio-demographic characteristics and mental health and substance use disorder outcomes for persons in a jail alternative program based on the notion of vulnerable populations and multi-level risk factors.[10,22]



## Appendix B

**Table 1:** Sample description

| | n | %n |
|---|---|---|
| **Gender** | | |
| Female | 166 | 18% |
| Male | 742 | 82% |
| **Race/Ethnicity** | | |
| African American | 227 | 25% |
| American Indian | 25 | 3% |
| Asian/Pacific Islander | 25 | 3% |
| Caucasian | 250 | 28% |
| Hispanic | 28 | 3% |
| Multi | 106 | 12% |
| Other/Unknown | 247 | 27% |
| **Age** | | |
| 18-24 | 186 | 20% |
| 25-34 | 283 | 31% |
| 35-44 | 215 | 24% |
| 45-54 | 170 | 19% |
| 55-74 | 54 | 6% |

**Table 2:** Prevalence of any mental health disorder and substance use disorder overall and by socio-demographic subgroup

| ***Mental Health Disorder*** | **n** | **%** | **95% CI** | **p-value** |
|---|---|---|---|---|
| **Overall** | 282 | 31% | (28-34) | |
| **Gender** | | | | 0.05 |
| Female | 62 | 37% | (30-45) | |
| Male | 220 | 30% | (26-33) | |
| **Race/Ethnicity** | | | | 0.00 |
| African American | 102 | 45% | (39-51) | |
| American Indian | 9 | 36% | (20-56) | |
| Asian/Pacific Islander | 5 | 20% | (8-40) | |
| Caucasian | 93 | 37% | (31-43) | |
| Hispanic | 12 | 43% | (26-62) | |
| Multi | 39 | 37% | (28-46) | |
| Other/Unknown | 22 | 9% | (6-13) | |
| **Age** | | | | 0.00 |
| 18-24 | 37 | 20% | (15-26) | |
| 25-34 | 77 | 27% | (22-33) | |
| 35-44 | 83 | 39% | (32-45) | |
| 45-54 | 67 | 39% | (32-47) | |
| 55-74 | 18 | 33% | (22-47) | |
| ***Substance Use Disorder*** | **n** | **%** | **95% CI** | **p-value** |
| **Overall** | 426 | 47% | (44-50) | |
| **Gender** | | | | 0.01 |
| Female | 63 | 38% | (31-46) | |
| Male | 363 | 49% | (45-53) | |
| **Race/Ethnicity** | | | | 0.22 |
| African American | 98 | 43% | (37-50) | |
| American Indian | 13 | 52% | (33-71) | |
| Asian/Pacific Islander | 14 | 56% | (36-74) | |
| Caucasian | 133 | 53% | (47-59) | |
| Hispanic | 11 | 39% | (23-58) | |
| Multi | 50 | 47% | (38-57) | |
| Other/Unknown | 107 | 43% | (37-50) | |
| **Age** | | | | 0.14 |
| 18-24 | 93 | 50% | (43-57) | |
| 25-34 | 143 | 51% | (45-56) | |
| 35-44 | 94 | 44% | (37-50) | |
| 45-54 | 68 | 40% | (33-48) | |
| 55-74 | 28 | 52% | (39-65) | |

**Table 3:** Prevalence of any mental health disorder type among diagnosed mental health disorders by socio-demographic subgroup

| ***Adjustment Disorder*** | **n** | **% MH** | **95% CI** | **p-value** |
|---|---|---|---|---|
| **Overall** | 10 | 4% | (2-6) | |
| **Gender** | | | | 0.09 |
| Female | 0 | 0% | | |
| Male | 10 | 5% | (2-8) | |
| **Race/Ethnicity** | | | | 0.29 |
| African American | 5 | 5% | (2-11) | |
| American Indian | 0 | 0% | | |
| Asian/Pacific Islander | 0 | 0% | | |
| Caucasian | 0 | 0% | | |
| Hispanic | 1 | 8% | (1-44) | |
| Multi | 3 | 8% | (2-22) | |
| Other/Unknown | 1 | 5% | (1-27) | |
| **Age** | | | | 0.01 |
| 18-24 | 5 | 14% | (6-29) | |
| 25-34 | 2 | 3% | (1-10) | |
| 35-44 | 1 | 1% | (0-8) | |
| 45-54 | 2 | 3% | (1-11) | |
| 55-74 | 0 | 0% | | |
| ***Anxiety Disorder*** | **n** | **%MH** | **95% CI** | **p-value** |
| **Overall** | 61 | 22% | (17-27) | |
| **Gender** | | | | 0.00 |
| Female | 23 | 37% | (26-50) | |
| Male | 38 | 17% | (13-23) | |
| **Race/Ethnicity** | | | | 0.95 |
| African American | 19 | 19% | (12-27) | |
| American Indian | 3 | 33% | (10-69) | |
| Asian/Pacific Islander | 1 | 20% | (2-75) | |
| Caucasian | 22 | 24% | (16-33) | |
| Hispanic | 3 | 25% | (8-57) | |
| Multi | 8 | 21% | (10-36) | |
| Other/Unknown | 5 | 23% | (10-45) | |
| **Age** | | | | 0.22 |
| 18-24 | 10 | 27% | (15-44) | |
| 25-34 | 20 | 26% | (17-37) | |
| 35-44 | 20 | 24% | (16-35) | |
| 45-54 | 8 | 12% | (6-22) | |
| 55-74 | 3 | 17% | (5-42) | |

**Table 3 (continued):** Prevalence of any mental health disorder type among diagnosed mental health disorders by socio-demographic subgroup

| ***Mood Disorder*** | **n** | **% MH** | **95% CI** | **p-value** |
|---|---|---|---|---|
| **Overall** | 171 | 61% | (55-66) | |
| **Gender** | | | | 0.91 |
| Female | 38 | 61% | (49-73) | |
| Male | 133 | 60% | (54-67) | |
| **Race/Ethnicity** | | | | 0.62 |
| African American | 60 | 59% | (49-68) | |
| American Indian | 6 | 67% | (31-90) | |
| Asian/Pacific Islander | 4 | 80% | (25-98) | |
| Caucasian | 61 | 66% | (55-75) | |
| Hispanic | 7 | 58% | (30-82) | |
| Multi | 19 | 49% | (33-64) | |
| Other/Unknown | 14 | 64% | (42-81) | |
| **Age** | | | | 0.05 |
| 18-24 | 19 | 51% | (35-67) | |
| 25-34 | 38 | 49% | (38-60) | |
| 35-44 | 54 | 65% | (54-75) | |
| 45-54 | 47 | 70% | (58-80) | |
| 55-74 | 13 | 72% | (47-88) | |
| ***Psychotic Disorder*** | **n** | **% MH** | **95% CI** | **p-value** |
| **Overall** | 40 | 14% | (11-19) | |
| **Gender** | | | | 0.00 |
| Female | 1 | 2% | (0-1) | |
| Male | 39 | 18% | (13-23) | |
| **Race/Ethnicity** | | | | 0.27 |
| African American | 18 | 18% | (11-26) | |
| American Indian | 0 | 0% | | |
| Asian/Pacific Islander | 0 | 0% | | |
| Caucasian | 10 | 11% | (6-19) | |
| Hispanic | 1 | 8% | (1-44) | |
| Multi | 9 | 23% | (12-39) | |
| Other/Unknown | 2 | 9% | (2-31) | |
| **Age** | | | | 0.16 |
| 18-24 | 3 | 8% | (3-23) | |
| 25-34 | 17 | 22% | (14-33) | |
| 35-44 | 8 | 10% | (5-18) | |
| 45-54 | 10 | 15% | (8-26) | |
| 55-74 | 2 | 12% | (3-36) | |

**Table 4:** Prevalence of any substance use disorder type among diagnosed substance use disorder by socio-demographic subgroup

| ***Alcohol Use Disorder*** | **n** | **% SUD** | **95% CI** | **p-value** |
|---|---|---|---|---|
| **Overall** | 148 | 35% | (30-39) | |
| **Gender** | | | | 0.97 |
| Female | 22 | 35% | (24-48) | |
| Male | 126 | 35% | (30-40) | |
| **Race/Ethnicity** | | | | 0.26 |
| African American | 27 | 28% | (20-37) | |
| American Indian | 7 | 54% | (27-78) | |
| Asian/Pacific Islander | 7 | 50% | (25-75) | |
| Caucasian | 49 | 37% | (29-45) | |
| Hispanic | 5 | 45% | (19-74) | |
| Multi | 14 | 28% | (17-42) | |
| Other/Unknown | 39 | 36% | (28-46) | |
| **Age** | | | | 0.04 |
| 18-24 | 28 | 30% | (22-40) | |
| 25-34 | 41 | 29% | (22-37) | |
| 35-44 | 37 | 39% | (30-50) | |
| 45-54 | 33 | 49% | (37-60) | |
| 55-74 | 9 | 32% | (17-52) | |
| ***Amphetamine Use Disorder*** | **n** | **% SUD** | **95% CI** | **p-value** |
| **Overall** | 55 | 13% | (10-16) | |
| **Gender** | | | | 0.96 |
| Female | 8 | 13% | (6-24) | |
| Male | 47 | 13% | (18-26) | |
| **Race/Ethnicity** | | | | 0.00 |
| African American | 2 | 2% | (1-8) | |
| American Indian | 3 | 23% | (7-54) | |
| Asian/Pacific Islander | 2 | 14% | (3-44) | |
| Caucasian | 31 | 23% | (17-31) | |
| Hispanic | 1 | 9% | (1-46) | |
| Multi | 8 | 16% | (8-29) | |
| Other/Unknown | 8 | 7% | (4-14) | |
| **Age** | | | | 0.00 |
| 18-24 | 6 | 6% | (3-14) | |
| 25-34 | 28 | 20% | (14-27) | |
| 35-44 | 18 | 19% | (12-28) | |
| 45-54 | 2 | 3% | (1-11) | |
| 55-74 | 1 | 4% | (0-22) | |

**Table 4 (continued):** Prevalence of any substance use disorder type among diagnosed substance use disorder by socio-demographic subgroup

| ***Cannabis Use Disorder*** | **n** | **% SUD** | **95% CI** | **p-value** |
|---|---|---|---|---|
| **Overall** | 86 | 20% | (17-24) | |
| **Gender** | | | | 0.11 |
| Female | 8 | 13% | (6-24) | |
| Male | 78 | 21% | (18-26) | |
| **Race/Ethnicity** | | | | 0.00 |
| African American | 28 | 29% | (20-38) | |
| American Indian | 1 | 8% | (1-41) | |
| Asian/Pacific Islander | 1 | 7% | (1-40) | |
| Caucasian | 13 | 10% | (6-16) | |
| Hispanic | 4 | 36% | (14-68) | |
| Multi | 12 | 24% | (14-38) | |
| Other/Unknown | 27 | 25% | (18-34) | |
| **Age** | | | | 0.00 |
| 18-24 | 35 | 38% | (28-48) | |
| 25-34 | 32 | 22% | (16-30) | |
| 35-44 | 7 | 7% | (4-15) | |
| 45-54 | 9 | 13% | (7-24) | |
| 55-74 | 3 | 11% | (3-29) | |
| ***Cocaine Use Disorder*** | **n** | **% SUD** | **95% CI** | **p-value** |
| **Overall** | 55 | 13% | (10-16) | |
| **Gender** | | | | 0.96 |
| Female | 8 | 13% | (6-24) | |
| Male | 47 | 13% | (10-17) | |
| **Race/Ethnicity** | | | | 0.00 |
| African American | 27 | 28% | (20-37) | |
| American Indian | 0 | 0% | | |
| Asian/Pacific Islander | 1 | 7% | (1-39) | |
| Caucasian | 10 | 8% | (4-13) | |
| Hispanic | 0 | 0% | | |
| Multi | 7 | 14% | (7-27) | |
| Other/Unknown | 10 | 9% | (5-17) | |
| **Age** | | | | 0.00 |
| 18-24 | 3 | 3% | (1-10) | |
| 25-34 | 7 | 5% | (2-10) | |
| 35-44 | 19 | 20% | (13-30) | |
| 45-54 | 17 | 25% | (16-37) | |
| 55-74 | 9 | 32% | (17-52) | |

**Table 4 (continued):** Prevalence of any substance use disorder type among diagnosed substance use disorder by socio-demographic subgroup

| ***Opioid Use Disorder*** | **n** | **% SUD** | **95% CI** | **p-value** |
|---|---|---|---|---|
| **Overall** | 76 | 18% | (14-22) | |
| **Gender** | | | | 0.09 |
| Female | 16 | 25% | (16-38) | |
| Male | 60 | 17% | (13-21) | |
| **Race/Ethnicity** | | | | 0.46 |
| African American | 11 | 11% | (6-19) | |
| American Indian | 2 | 15% | (4-47) | |
| Asian/Pacific Islander | 2 | 14% | (3-44) | |
| Caucasian | 29 | 22% | (16-30) | |
| Hispanic | 1 | 9% | (1-46) | |
| Multi | 9 | 18% | (10-31) | |
| Other/Unknown | 22 | 21% | (14-29) | |
| **Age** | | | | 0.22 |
| 18-24 | 19 | 20% | (13-30) | |
| 25-34 | 31 | 22% | (16-29) | |
| 35-44 | 13 | 14% | (8-22) | |
| 45-54 | 7 | 10% | (5-20) | |
| 55-74 | 6 | 21% | (10-41) | |
| ***Other Substance Use Disorder*** | **n** | **% SUD** | **95% CI** | **p-value** |
| **Overall** | 6 | 1% | (1-3) | |
| **Gender** | | | | 0.90 |
| Female | 1 | 2% | (0-11) | |
| Male | 5 | 1% | (1-3) | |
| **Race/Ethnicity** | | | | 0.33 |
| African American | 3 | 3% | (1-9) | |
| American Indian | 0 | 0% | | |
| Asian/Pacific Islander | 1 | 7% | (1-39) | |
| Caucasian | 1 | 1% | (0-5) | |
| Hispanic | 0 | 0% | | |
| Multi | 0 | 0% | | |
| Other/Unknown | 1 | 1% | (0-6) | |
| **Age** | | | | 0.28 |
| 18-24 | 2 | 2% | (1-8) | |
| 25-34 | 4 | 3% | (1-7) | |
| 35-44 | 0 | 0% | | |
| 45-54 | 0 | 0% | | |
| 55-74 | 0 | 0% | | |

## Appendix C:

***Glossary:***

**Community Center for Alternative Programs (CCAP):** A King County Community Corrections jail alternative program that aims to assist offenders in changing behaviors that contribute criminal activity.[13]

**Diagnostic and Statistical Manual of Mental Disorders (DSM):** The standard classification of mental health diagnoses in the United States.[26] The most recent edition of the DSM is the fifth edition (DSM-V). However, because the data was collected at the time the fourth edition (DSM-IV) was in standard use, the DSM-IV will be used as a reference.

**Incarcerated populations:** The population of inmates confined in a prison or a jail.[5]

**Jail alternative program:** A court mandated program that diverts offenders from full-time incarceration.

**King County:** Washington State county and location of CCAP.

**Mental Health Disorder:** A disorder that affects or interferes with one's thinking, feeling, coping strategies, abilities to relate and interact with others, and/or mood in a disruptive manner.[9,33]

**Primary Diagnosis:** An individual's most prominent Axis I diagnosis, recognizing individuals may experience comorbidities.[26]

**Recidivism:** An individual's reversion, or relapse, into criminal behavior.[1]

**Sound Mental Health (SMH):** A Washington State certified mental health and substance use treatment agency that serves as a CCAP community vendor.

**Substance abuse:** "A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period: (1) recurrent substance use resulting in failure to fulfill major role obligations; (2) recurrent substance use in situations in which it is physically hazardous; (3) recurrent substance-related legal problems; (4) continued substance use despite having persistent or recurrent social/interpersonal problems caused/exacerbated by the effects of the substance."[26]

**Substance dependence:** "A maladaptive pattern of substance use, leading to clinically significant impairment or distress as manifested by three (or more) of the following, occurring at any time in the same 12-month period: (1) tolerance; (2) withdrawal; (3) the substance is often taken in larger amounts or over a longer period that was intended; (4) there is a persistent desire or unsuccessful efforts to reduce or control use; (5) a great deal of time is spent in activities necessary to obtain the substance; (6) important activities are given up or reduced because of substance use; (7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance."[26]

**Substance Use Disorder:** A DSM Axis I diagnosis that can be described as either substance abuse or substance dependence .[24]

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