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The Prison Social Milieu, Cell Overcrowding and Correlates to Inmate Substance Use: A Study of Drug Using Inmates in Three Mexican Prisons

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
In the Hubert Department of Global Health
2013

Abstract

The Prison Social Milieu, Cell Overcrowding and Correlates to Inmate Substance Use: A Study of Drug Using Inmates in Three Mexican Prisons

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Background: Individuals with a history of incarceration experience higher rates of infectious and chronic diseases, mental illness and trauma than the general population. Inmate misconduct, particularly drug infractions, is a reliable correlate for these negative inmate health outcomes. Very little research has explored the incarceration experience as a predictor of inmate substance use.

Objectives: (1) Identify the prevalence, type and frequency of drug use in three Mexico City prisons, (2) identify the aspects of prison social life that have a significant association with the increased likelihood of inmates reporting drug use, and (3) identify whether overcrowding is associated with inmate substance use.

Methods: Four logistic regression models were fitted for four outcomes of interest: any drug usage; heavy use of any drug; heavy marijuana usage; and heavy usage of multiple drugs. Covariates of interest were related to the prison experience and overcrowding.

Results: 350 male inmates were included in this study. Nearly 84% of inmates reported any drug use in prison. Respondents that reported having secondary education (OR: 0.3, 95% CI: 0.1-0.8) and respondents that reported being married/ in a committed relationship (OR: 0.4, 95% CI: 0.1-0.99) were less likely to report any drug use. Inmates with registered conjugal visitors were less likely to report any drug use (OR: 0.5, 95% CI: 0.2-0.9), heavy drug use of any kind (OR: 0.5, 95% CI: 0.3-0.9), and heavy marijuana use (OR: 0.6, 95% CI: 0.3-0.97). Those employed in prison were less likely to report any drug use (OR: 0.4, 95% CI: 0.2-0.9). Alcohol users were more likely to report the heavy use of any drug (OR: 2.8, 95% CI: 1.2-6.6), heavy marijuana use (OR: 3.0, 95% CI: 1.3-7.2), and the heavy use of multiple drugs (OR: 5.9, 95% CI: 2.1-16.1).

Discussion: The results indicate that there is a high prevalence of substance use among inmates in Mexican City prisons. Prison programming in Mexico must aggressively explore avenues to curtail use within correctional facilities. In addition to drug treatment programs, encouraging inmate participation in activities that provide avenues for positive social reinforcement (e.g. intimate partner visits and vocational programs) may provide a buffer to the negative social pressures within prison that encourage substance use.

Acknowledgements

First and foremost, I would like to thank my thesis advisor, Rob Stephenson. As my faculty mentor, Rob has taught me so much about the mechanics of conducting sound quantitative and qualitative research. He kept his office door open, was always eager to provide counsel, and listened to my concerns. Words fail to express my gratitude for his patient tutelage throughout the course of my time as an M.P.H. candidate. His indefatigable efforts guided me the completion of this thesis.

Secondly, I am deeply grateful to my family and friends for their support. My sister, Nonye Madu and my oldest friend, Roosevelt Offoha, assisted with the formatting of the final version of this thesis. I thank my mother, Gladys Madu, for her encouragement and support to complete this study.

Lastly, I would like to thank Sergio Bautista Arredondo of the Instituto Nacional de Salud Pública (INSP) for making the data from the parent study available to the Rollins School of Public Health.

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Chapter 1: Introduction

1.1: Study Setting— Prisons and Drug-Related Incarceration in Mexico

In 2011, an estimated 10.1 million men, women, and children were being held in penal institutions around the world (Walmsley, 2011). When set against a world population of 7 billion, the world prison population rate is 146 per 100,000 persons (Walmsley, 2011). While prison population rates vary considerably by country and region, prison populations are growing in all five continents. When the current World Prison Population List is compared to previous editions, prison populations have risen in 78% of countries (71% of countries in Africa, 82% in the Americas, 80% in Asia, 74% in Europe and 80% in Oceania)(Walmsley, 2011).

Currently, Mexico is witnessing a prison boom comparable to that of the United States. Since the mid-1990s, the proportion of the population in prison has doubled, increasing from 103 inmates per 100,000 Mexicans in 1996, to 204 per 100,000 in 2012. The reasons for the rise are multifaceted: citizens report crimes more frequently and legal changes have resulted in stiffer penalties for these crimes. However, a lot of the increase can be attributed to the ubiquitous nature of drug-related organized crime in specific regions of the country. A large presence of organized crime is especially prevalent in the cities of Tijuana and Ciudad Juárez, as well as the states of Baja California, Durango, Sinaloa, Guerrero, Chihuahua, Michoacán, Tamaulipas, and Nuevo León (Aguilar, 2007). There is a high prevalence of organized crime both inside and outside of correctional facilities—largely informed by drug-trafficking and black market activity (Aguilar, 2007; US Department of State, 2011). Additionally, more than 50% of the population lives below the national poverty line, with increasingly limited legitimate avenues for social mobility (The World Bank, 2013).

As in most regions of the world, the Mexican prison system is plagued by the problem of overcrowding (US Department of State, 2011). In 2006, then President Felipe Calderon launched a national campaign on organized crime and many federal penitentiaries have seen their inmate population swell as a result mass of drug-related incarcerations. As of July 2011, there were over 214,000 prisoners in all of Mexico's 429 facilities. The system was operating at 26 percent above capacity (Walmsley, 2011). Approximately 95 percent of Mexican prisoners are male and 60 percent are serving sentences for drug-trafficking related crimes (Lacey, 2009).

Furthermore, Mexico's federal prison population has more than doubled in recent years amid the crackdown on drug cartels. In 2008, the federal prison system had about 4,500 inmates in six locations. In 2011, there were 11,000 inmates in eight penitentiaries. In its 2008-12 Strategic Plan, Mexico's Secretariat of Public Security described the penitentiary system as "*one of the most underdeveloped and abandoned components of public security*" (US Department of State, 2011). In 2011, Mexico's Comision Nacional de los Derecho Humanos (CNDH) visited over 100 of the 429 of the nations correctional facilities. CNDH found that administrative corruption, overcrowding, prisoner abuse, alcoholism, and drug addiction were prevalent in most facilities (US Department of State, 2011).

The intersection of the rapidly increasing drug-related incarceration rate and an overcrowded system has been a source of worry for Mexican public safety and public health officials. In a 2010 interview, Mexico's Public Safety Secretary Genaro Garcia Luna stated that one prison in particular, Islas Marias, had seen its inmate population quadruple since the start of Calderon's campaign. In 2010, Islas Marias had a population of 3,946 inmates, up from 915. Garcia Luna concluded, "where more disorder exists, there will be more violence…

penitentiaries can be places where not only people complete their punishments, but where future delinquent conduct is prevented" (Long, 2010).

1.2: The Problem—Incarceration is associated with Negative Health Outcomes

While the topic of recidivism often dominates the public and academic discourse on incarceration, it has also been well documented that incarcerated individuals experience disproportionately negative health outcomes when compared to the general population (Clements, 1979; Goodstein, MacKenzie, & Shotland, 1984; Hensley, struckman-Johnson, & Eigenberg, 2000; Singh, 1999). Contemporary social behavioral sciences research regarding correctional health has demonstrated that individuals with a history of incarceration experience higher rates of infectious and chronic diseases, mental illness and trauma than the general population (Adjei, 2008; K. K. Dolan, Ben; Black, Emma; Aceijas, Carmen; Stimson, Gerry V; , 2007; Massoglia, 2008). Inmate misconduct, most notably drug infractions, has consistently been found to be a reliable correlate for these negative health outcomes during incarceration (Gillespie, 2005; Pearson, 2008; Zamani et al., 2010).

Dr. Wayne Gillespie stated that "*one of the great paradoxes in the field of corrections involves drug abuse inside prison*" (Gillespie, 2005). If one were to make assumptions about the nature of incarceration, it would seem unlikely that prisoners would have opportunities to partake in substance use while serving a prison sentence. Most prisons are extremely surveilled environments that restrict the movement of inmates and monitor their behavior; therefore, one would reasonably come to the conclusion that under such conditions, it would be unlikely for inmates to possess, use, or sell controlled substances. In actuality, drug trafficking and abuse has been and continues to be a prominent characteristic of the prison environment (Gillespie, 2005; Mumola & Karberg, 2006; Pearson, 2008).

1.3: Thesis Aims and Objectives

Most existing correctional health research has focused on substance abuse as a predictor of other health outcomes (Andía et al., 2005; Beyrer, 2003; Booth, Watters, & Chitwood, 1993; Swartz, Lurigio, & Weiner, 2004). With the exception of an inmate's mental health, there is a void in the literature examining the predictors of what makes an inmate more likely to engage in substance abuse. Prisons house disproportionate numbers of individuals with a history of substance use, yet not all individuals with such a history continue to use during the course of their incarceration. This indicates that there may be something beyond the inmate's individual characteristics that inform an inmate's likelihood to engage in substance use during incarceration, such as the prison environment.

Substance use during incarceration is a form of inmate misconduct that is indicative of an inmate's maladjustment to prison life (Gillespie, 2005; Kinlock, O'Grady, & Hanlon, 2003; Yap, 2011). Existing literature shows that prison rehabilitative services, particularly prison employment programs, have the potential to reduce inmate maladjustment to imprisonment (McCorkle, Miethe, & Drass, 1995). The literature also suggests that overcrowding may exacerbate the number of infractions prisoners commit (Huey & Mcnulty, 2005). Given previous findings of the literature on prisoner misconduct, it stands to reason that rehabilitative services and overcrowding may have an association with inmate substance use in prison. However, very little research has explored the incarceration experience as a predictor of drug-related inmate infractions.

Research Objective

The primary objective of this study is to explore whether or not the prison environment informs a particular type of prisoner misconduct, inmate substance use. It explores two major dimensions of the prison environment identified to potentially impact prisoner misconduct: prison social life and overcrowding. This thesis aims to identify characteristics of the prison environment that correlate to an inmate's likelihood to report substance use and contribute to a largely ignored area of correctional research. Specifically, this research aims to:

1. Identify the prevalence, type and frequency of drug use in three Mexico City prisons.
2. Identify the aspects of prison social life that have a significant association with the increased likelihood of inmates reporting drug use.
3. Identify whether overcrowding is associated with inmate substance use.

1.4 Significance of This Research

While a fair amount of correctional research has attempted to predict the type of inmate that is more likely to engage in violent misconduct, considerably less attention has been paid to drug use or drug-related infractions (Gillespie, 2005). Moreover, when drug use is actually studied, it is typically a study exploring injecting drug use as a predictor of another health outcome (Booth et al., 1993; K. Dolan, 2010; Zamani et al., 2010). This study will contribute to a relatively small pool of studies that explore the prevalence of non-injecting drug use among inmates. Additionally, this is one of very few studies that attempt to draw a direct association between the prison environment and the probability of inmates engaging in substance use during incarceration.

Chapter 2: Literature Review

This chapter serves as a summary of three domains of correctional health literature: drug use during incarceration, rehabilitative prison services and its relationship to inmate behavioral outcomes, and prison overcrowding. Given that literature on the study setting, Mexico, is limited, the studies included in this section examine similar prison populations—male inmates in non-maximum security institutions. The literature review is divided into three sections. The first section provides an overview of the associations between inmate substance use/abuse and negative health outcomes. The second section discusses aspects of prison life that may inform health outcomes and prisoner misconduct. Lastly, the third section discusses overcrowding and its potential impact on an inmate's prison experience and health. At the end of each section, there will be discussion that identifies the gaps in the existing literature regarding that topic as well as recommendations for what research needs to take place to further elucidate these issues. The intention of this literature review is to give an overview of the state of correctional health literature as it relates to the outcome of interest in this study, drug use, and the two categories of potential correlates analyzed in this study, prison life and overcrowding.

2.1 Substance Use and Abuse in Prison

Drugs are associated with addictions, and substance use/abuse is a process that is embedded over the span of one's lifetime. Drug use while incarcerated is "an expression along this continuum" (Gillespie, 2005). Upon incarceration, inmates often seek out ways to comfort themselves from the "pains of imprisonment" (Bondeson, 2011). To that end, drugs and alcohol are the most highly valued commodities within the covert prison market (Einat & Einat, 2000; Parisi, 1982). Being an active participant in the prison market also serves an important psychological function for inmates—"creating a sense of control over their destiny and

satisfaction at outwitting the prison supervision system" (Einat & Einat, 2000). Though many inmate argots have a prevailing theme of loyalty, the importance of drugs in the prison may serve to override those established ties between inmates (Einat & Einat, 2000; Hensley, Wright, Tewksbury, & Castle, 2003). It is not uncommon for inmates to state in their own narratives that for the sake of a drug, they would readily betray their friends and the established inmate code of conduct (Einat & Einat, 2000). Drug use is such a fundamental part of daily prison life that it can be characterized as the "backbone of inmate culture" (Einat & Einat, 2000). The high demand for drugs in particular can be attributed to the fact that there is substantial profit to be gained from drug sales inside and outside of prison (Einat & Einat, 2000; McCarthy & Hagan, 2001; Uggen & Thompson, 2003), the fact that inmates are more likely to be regular drug users than the general population (Gillespie, 2005), and the tendency of inmates without an extended history of drug use to seek a temporary escape from the stress of prison life (Einat & Einat, 2000; Parisi, 1982).

Substance Use as an Outcome of Interest

The overwhelming majority of studies pertaining to inmate substance use analyze the incidence as a potential correlate or a predictor of another behavior. Very few correctional health studies have examined inmate substance use as an outcome of interest. In the synthesis of this literature review, only two studies examining inmate substance use as an outcome, rather than an exposure, were located.

The first of the two studies was conducted by The Alliance for Research in El Barrio and Bayamón (the ARIBBA Project), a collaborative project between the National Development and Research Institutes, Inc., of New York and the Center for Addiction Studies at the Universidad Central del Caribe in Puerto Rico (Andía et al., 2005). It examined factors related to injection

and non-injection drug use during the last incarceration among injection drug users in East Harlem, New York (n = 555), and Bayamón, Puerto Rico (n = 241). A total of 41% in the New York sample and 38% in the Puerto Rico sample reported any drug use (excluding alcohol) during the last incarceration. Injection drug use during the last incarceration episode was more likely in the Puerto Rico sample (31% vs. 12%, $p < .001$), and non-injection drug use was more likely in the New York sample (37% vs. 14%, $p < .001$) (Andía et al., 2005). Gang affiliation and length of incarceration were found to be related to both injection and non-injection drug use during last incarceration (Andía et al., 2005). HIV risk behavior was common amongst the participants. Among those who injected, three fourths of the Puerto Rico sample and approximately half of the New York sample reported sharing injection-related equipment (74% vs. 52%, $p < .01$) (Andía et al., 2005).

The second study was a cross-sectional analysis of 1,054 prisoners from 30 correctional facilities across Kentucky, Tennessee, and Ohio. Dr. Wayne Gillespie employed hierarchical linear modeling to examine the impact of correctional context on individual behavior. His results indicated that drug abuse inside prison varies significantly across different correctional institutions (Gillespie, 2005). The effect of prior street-drug use on drug abuse in prison also varied across prison settings (Gillespie, 2005). Moreover, an aggregate measure of crowding was found to be a significant predictor of both drug abuse in prison as well as the effect of prior street-drug use on substance abuse in prison (Gillespie, 2005). This meant that inmates who reported a history of using drugs on the street prior to incarceration were especially likely to report drug abuse inside crowded prisons (Gillespie, 2005).

Substance Use as a Correlate of Infectious Disease among IDUs

The overwhelming majority of research regarding inmate substance use patterns examines use as a correlate or predictor of two things: negative health outcomes or prisoner misconduct, most notably in the expression of aggression and violent behavior during incarceration.

The most documented association of substance abuse with a negative health outcome is that of injecting drug users (IDUs) and infectious diseases. Most notably, being an IDU during incarceration is a well-known risk factor for HIV, HBV, and HCV infection (Beyrer, 2003; Bonnycastle & Villebrun, 2011; Booth et al., 1993; Watkins, 2011; Zamani, 2006). Through the 1990s, incarceration rates for drug-related offenses rose sharply in many regions of the world although the availability of infectious disease prevention and drug treatment programs in prisons did not increase accordingly (Beyrer, 2003). In a study of a large drug treatment cohort in northern Thailand, male IDUs and men who have sex with men (MSM) were most likely to have a history of incarceration. In the study's multivariate model, incarceration and having ever been an IDU remained independently associated with HIV infection (Beyrer, 2003).

The disproportionate over-representation of IDUs in prisons combined with the HIV risk behavior of sharing needles and unprotected sex create a dire need for a public health intervention within correctional institutions, as well as the communities in which they are found (K. K. Dolan, Ben; Black, Emma; Aceijas, Carmen; Stimson, Gerry V; , 2007). In an analysis of 152 middle and low-income country data on imprisonment, HIV prevalence, and the proportion of prisoners who are IDUs, it was found that substance use patterns are not often monitored within penitentiary systems, though evidence suggests that it is a rampant problem throughout most regions of the world (K. K. Dolan, Ben; Black, Emma; Aceijas, Carmen; Stimson, Gerry V;

, 2007). Despite the significant amount of available data, the HIV prevalence of the prison population was greater than 10% in prisons in 20 countries (K. K. Dolan, Ben; Black, Emma; Aceijas, Carmen; Stimson, Gerry V; , 2007). Eight countries reported prevalence of IDUs in prison of greater than 10%; the HIV prevalence among IDU prisoners was reported in all eight of these countries – and was greater than 10% in all but one. Though the availability of comprehensive data is scarce in most of these countries, evidence of HIV transmission in prison was found for seven of the countries analyzed (K. K. Dolan, Ben; Black, Emma; Aceijas, Carmen; Stimson, Gerry V; , 2007).

IDU Inmates that are also MSM are Particularly Vulnerable to Infectious Disease

MSM inmates who are also IDUs have been demonstrated to be particularly vulnerable to being at increased risk for HIV, HBV, and HCV (Adjei, 2007; Babudieri, 2005; Beyrer, 2005). MSM with a history of incarceration have been shown to be likely to have injected drugs at some point either during or outside of incarceration, to have sold drugs, and to have used heroin and opium at some point (Beyrer, 2005; Zamani, 2006).

Non-Injection Drug Use as a Correlate of Infectious Disease

While injection drug use overwhelmingly dominates the discourse on substance use in prison, drug use other than by injection (non-IDU) is slowly being recognized as a major risk factor in the transmission of HIV. Needles do not need to be shared for drugs to affect an individual's risk for infectious disease. Non-injecting drug use has been demonstrated to reduce sexual inhibitions and affect personal decision-making regarding sexual partners or risky sexual practices (Pearson, 2008; Rodríguez, Gil, Santana, Cañal, & Sánchez, 1998). Additionally, existing literature on the use of non-injection drugs has demonstrated it to be associated with a

significantly higher number of sexual partners in users, inconsistent condom use, and trading sex for drugs (Farabee & Cartier, 2002; Molitor, Truax, Ruiz, & Sun, 1998).

The most researched area of non-injection drug use and its association with infectious disease risk is the use of methamphetamines. Methamphetamine (MA) is a Schedule II, highly addictive stimulant derived from amphetamine that strongly affects the body's central nervous system by increasing dopamine levels while simultaneously blocking dopamine reuptake in the brain (Department of Health and Human Services, 2006). Methamphetamine use is rising in the general population as well as the offender population throughout the United States and Mexico (Brouwer et al., 2006; Mumola & Karberg, 2006). A special report authored by the U.S. Department of Justice stated that between 1997 and 2004, the percentage of offenders who used MA in the month prior to committing their offense rose from 6.9% to 10.8% while offenders reporting the use of cocaine/crack and opiates declined significantly (Mumola & Karberg, 2006). This pattern of use was similar when offenders reported drug use at the time of the offense over the same time period.

While much of this research on MA has focused on MSM who are also IDUs, methamphetamine use has been demonstrated to be a vector of infectious disease independent of injection drug use and the user's gender or sexuality. In a study of 258,567 sexually active clients of publicly funded HIV testing sites in California with zero history of injected drug use, it was found that among gay, bisexual, and heterosexual men as well as heterosexual women, users of methamphetamines reported more sexual partners than non-methamphetamine users (Molitor et al., 1998). Among heterosexuals, methamphetamine users were more likely to participate in anal intercourse compared to nonusers (Molitor et al., 1998). Methamphetamine use was independently related to decreased condom use during vaginal and anal intercourse, prostitution,

and sex with known injection drug users. Moreover, methamphetamine users were more likely to have received an STI diagnosis (Molitor et al., 1998). After the analysis controlled for race/ethnicity age, possible exposure to infected blood or blood products, and the use of cocaine, alcohol, or marijuana during sex, methamphetamine-using bisexual men were more likely to test positive for HIV than those reporting no history of methamphetamine use (Molitor et al., 1998).

Drugs other than MA have virtually been ignored in this discussion. Additionally, despite the research that has shown that MA is rapidly becoming the drug of choice for a large number of substance-abusing offenders and is associated with significantly higher levels of HIV risk behaviors outside of incarceration, there has been little follow-up research on how this manifests in prison populations.

During the synthesis of this literature review, only one study exploring non-injection drug use and infectious disease risk could be located. This study of 807 state prison inmates in California (32% of whom reported using methamphetamine prior to incarceration) examined the associations between methamphetamine use and HIV risk behaviors (Farabee & Cartier, 2002). Methamphetamine users in this sample were found to be significantly more likely than nonusers to have injected drugs during the six months prior to their current incarceration (Farabee & Cartier, 2002). Importantly, among injectors, injection-related risks (such as dirty needles and needle sharing, etc.) were not significantly associated with methamphetamine use. However, past six-month sex-related risks were dramatically higher for methamphetamine users (Farabee & Cartier, 2002). These patterns persisted even after controlling for background differences between the two groups.

Gaps in Literature Related to Substance Use during Incarceration

Existing literature makes it clear that substance use during incarceration has a profound effect on prisoner health. While much of the literature studies substance use as a correlate or a predictor of other health outcomes, there is a dearth of literature examining the predictors of what makes an inmate more likely to engage in substance abuse in the first place outside of the domain of mental health. Identifying the demographics and characteristics of the incarceration experience that have a positive and negative association with an inmate's likelihood of engaging in drug use during incarceration is necessary to curtail the negative health outcomes closely associated with this behavior.

Additionally, non-injection drug users make up the majority of the study populations of correctional health studies addressing substance use. It has been demonstrated that non-injection drug users have an increased risk for infectious diseases when compared to the general population, even though not as elevated as IDUs (Booth et al., 1993; Molitor et al., 1998). More research examining this relationship within a correctional facility context is essential. Currently, where health interventions exist for substance using inmates, they are targeted towards IDUs. Not only is a significant portion of the drug using population being ignored by current health messaging, non-injection drug users are increasingly outnumbering IDUs because of the disproportionate amount of attention given to deterring injection drug use throughout the course of the HIV/AIDS pandemic (Zamani et al., 2010). To keep prison substance use/abuse interventions relevant and effective, more research on non-injection drug use during incarceration, as both an exposure and a correlate, needs to be explored in the future.

2.2 Rehabilitative Programs and Inmate Adjustment

Reducing the adverse social effects associated with substance abuse for incarcerated offenders with histories of drug abuse should be a priority for prison officials aiming to curtail disruptive activity within their institutions and curb recidivism (Kinlock et al., 2003). Substance use during incarceration is a form of inmate misconduct and maladjustment (Fleisher & Decker, 2001; Uggen & Thompson, 2003). Additionally, drug using offenders are often amongst the most disruptive segments of a prison population (Fleisher & Decker, 2001; Kinlock et al., 2003). These types of offenders tend to be responsible for a disproportionately large share of the gang violence and other assaults that occur within many correctional facilities (Fleisher & Decker, 2001; Kinlock et al., 2003; Uggen & Thompson, 2003).

Maintaining safe and orderly institutions is a high priority of correctional administrators (Bottoms, 1999; McCorkle et al., 1995).The evaluation of prison order is informed, in part, by the prevalence of inmate misconduct, and there is a growing body of empirical studies designed to distinguish inmate and/or environmental predictors of misconduct at both the individual and facility levels of analysis. Information about which inmate characteristics and which features of prison environments contribute to increased levels of misconduct can be informative for both security and treatment classification procedures.

Studies of inmate misconduct primarily focus on the individual level risk factors, typically with a focus on either individual-level aggression or large-scale collective acts. Moreover, there is often not a distinction between the different forms of misconduct being observed; counts of inmate infractions are simply performed with no differentiation examining the reasons they were incurred (e.g. violent misconduct vs. drug misconduct). Much of the research on prisoner misconduct is preoccupied with linking inmate characteristics to their

likelihood of engaging in rule infractions (Steiner & Wooldredge, 2009). However, practitioners and academics recognize the potential influence of both inmate and environmental characteristics on misconduct during incarceration (French & Gendreau, 2006; Goodstein et al., 1984). Contemporary studies have recently begun to reliably examine the relative influences of these two levels of factors (Camp, Gaes, Langan, & Saylor, 2003; Huebner, 2003). These few studies have provided evidence that both inmate and environmental characteristics are significant predictors of misconduct, suggesting that properly specified models should include both levels of predictors.

Measuring and Predicting Prison Rehabilitation Program Efficacy

Of the hundreds of management recommendations for maintaining order in prisons that have been published, the most frequently suggested provision is treatment and rehabilitation programs, e.g. drug treatment, in-prison vocational training, and the availability of recreational activities. The efficacy of these rehabilitative services on inmate adjustment and recidivism has been the subject of debate for decades (Andrews et al., 1990; Wagner, McBride, & Crouse, 1999). Surprisingly, despite the increased support of the rehabilitative agenda in corrections literature and policy in recent years and the accumulation of a large database on "what works" with offender recidivism as the criterion (French & Gendreau, 2006; Huebner, 2003), evaluations of the effect of treatment programs on prison misconduct have been rare. For example, Wortley (2002) uncovered only a dozen studies, some of them based on aggregate data, that had some sort of assessment of program activities and prison misconduct. Even now, finding studies for the synthesis of this literature review proves to be difficult.

Despite the limited research on the subject of reducing prison misconduct, the literature has been able to identify three principles of effective intervention that have reported impressive

reductions in recidivism via meta-analyses. The principles are summarized by the Risk-Need-Responsivity (RNR) model. The RNR model has been one of the most influential models for the assessment and treatment of offenders (Ward, Melser, & Yates, 2007). First formalized in 1990 (Andrews et al., 1990), the RNR model has been elaborated upon and contextualized within a general personality and cognitive social learning theory of criminal conduct (Ward et al., 2007). The model includes three principles that should guide intervention with offenders. First, the 'risk' principle states that offenders considered higher-risk have a greater need for treatment—and thus yield greater observations of improvement—while low-risk offenders require little to no services. In other words, inmates with the greatest needs are also associated with the greatest risk. Hence, appropriately assessing the risk of offenders is imperative for the development of a supervision and programming intervention (Andrews et al., 1990). Second, the 'need' principle highlights the importance of addressing the needs of offenders. There are two types of criminogenic needs: dynamic and static. Dynamic needs, such as substance abuse and unemployment, are criminogenic needs that are malleable to programmatic intervention. Static needs, such as criminal history, cannot be changed by participating in treatment. Third, the 'responsivity' principle states that correctional programs should be matched to offender characteristics such as learning style, level of motivation, and the individual's personal and interpersonal circumstances.

The evidence in support of the RNR model has largely been derived from meta-analytic examination of rehabilitation evaluation research, beginning with Andrews et. al.'s (1990) seminal paper. The Andrews et. al. meta-analysis, which provides the greatest empirical evidence for the RNR model, was conducted as a rebuttal to the 'nothing works' perspective that was popularized by Robert Martinson's (1974) famous report (Martinson, 1981). In this analysis,

treatment that complied with the RNR principles demonstrated significantly greater effectiveness than criminal sanctions, inappropriate treatment, or unspecified treatment. Subsequent meta-analyses by Andrews and Dowden have provided similar evidence from a variety of offender populations including juvenile delinquents (Craig Dowden & Andrews, 2003), violent offenders (C. Dowden & Andrews, 2000),and female offenders (Craig Dowden & Andrews, 1999). Additionally, adherence to the RNR principles provides context within which increased "program integrity, organizational adherence to integrity standards, and better staff practice can improve treatment outcomes" (Ward et al., 2007). Cumulatively, this research provides a powerful empirical foundation for the RNR model.

Some penologists have asserted that prison misconduct behavior is a reasonable proxy for criminal behavior in the community (French & Gendreau, 2006). That is, an inmate's inclination for antisocial behavior permeates social situations. Consequently, an empirical demonstration of the efficacy prison rehabilitation programs, using RNR principles, has profound implications for prison managers. This section of the literature will discuss previous findings on the associations between characteristics of the prison environment and prisoner misconduct, with a focus on prison employment and visitation privileges.

In-Prison Employment and Prison Misconduct

Prison employment is often discussed in the literature in the context of post-release life and its potential reduction of recidivism amongst released individuals (Gillespie, 2005; Uggen & Thompson, 2003). In addition to the demonstrated benefit of reducing recidivism among released offenders, in-prison work and education programs are often believe to reduce disruptive behavior within penitentiaries by providing constructive activities and an avenue for the reinforcement of positive social behaviors (Wilson, Gallagher, & MacKenzie, 2000). Indeed, even legislators and

policymakers often have the support of the public in regard to vocational opportunities for inmates, especially when it is provided to younger, non-violent offenders (Wilson et al., 2000).

While not as popular of an area of research, it has been demonstrated that the prison environment, particularly in-prison employment, can impact violent inmate misconduct. McCorkle, Miethe, and Drass used data from the U.S. Department of Justice's 1984 and 1990 prison census to study of 371 adult male prisons. Using measures for both individual and collective violence, McCorkle et. al. attempted to identify the structural, managerial, and environmental determinants of prison disorder. Their findings show that across all security levels, poor prison management was a predictor of rates of assault toward inmates and staff (McCorkle et al., 1995). Moreover, regardless of security level, prisons reporting larger percentages of their inmate population being involved in education, vocational, and prison industry activities reported lower rates of prisoner violence perpetrated against fellow inmates and staff (McCorkle et al., 1995).

Dr. Beth M. Huebner did a similar analysis with the U.S. Department of Justice Prison Census from 1991. Huebner's sample included 4,168 male inmates nested within 185 state correctional facilities. Prisoners involved in work programs were significantly less likely to assault staff, net of control variables (Huebner, 2003). A significant relationship was not found between coercive control or remunerative controls as predictors of inmate-on-inmate assault (Huebner, 2003).

Family Visitation, Conjugal Visits, and Prison Misconduct

Strain and deprivation-based models to explain prison misconduct are prominent in the literature describing inmate adjustment to prison life. These models posit that poor prison

conditions raise the risk of misconduct by exhausting inmates' coping skills and creating pressures to act out against the prison staff they feel are responsible for imposing those conditions (Blevins, Listwan, Cullen, & Jonson, 2010). Therefore it is believed that prison staff could potentially reduce misconduct by providing inmates with diversions from the ''pains of imprisonment" by reducing the contrast between incarcerated life and the outside world (Blevins et al., 2010; Goodstein et al., 1984; Huey & Mcnulty, 2005; Parisi, 1982).

Existing literature has demonstrated that inmates often find being separated from their social support network (e.g. family) a particularly difficult area of adjustment (Craig Dowden & Andrews, 2003; Turney, Wildeman, & Schnittker, 2012). According to strain theory, this separation may represent the loss of valued social contact, which in turn forces the inmate to contend with social isolation (Blevins et al., 2010). A correctional facility's allowance of visitors could reduce the chances of misconduct by providing inmates with emotional support, relief from isolation, and serving as a diversion from the unpleasant nature of imprisonment (Tewksbury & DeMichele, 2005).

Prison visitation is a fairly popular means of attempting to use an inmate's social connections to the 'outside world' to improve their behavior during incarceration. For example, visitation programs are commonplace in American correctional institutions because they are widely perceived to reduce recidivism; some recent research supports this notion (Minnesota Department of Corrections, 2011) . However, all theoretical discussion aside, there is currently not a very large body of scholarship exploring how visits actually affect inmates' behavior. Where the studies do exist, they are typically observing female inmates or juveniles in juvenile detention facilities as opposed to detention facilities for adult males (Siennick, Mears, & Bales, 2012). The gender of the facility's inmates dramatically changes the dynamics of a prison,

particularly the management style and social order within the facility (Siennick et al., 2012); therefore, differences in the prison environment along gender lines may impact the effect of visitation programs (Jiang & Winfree, 2006; Siennick et al., 2012). An additional hurdle to research on this topic is the likelihood that inmates who receive visitors differ in substantive ways from inmates who do not receive visitors. For example, the odds of particular inmates receiving visitors and committing infractions may vary by the social demographics of the given inmates, their personal relationships, or by varying policies from prison to prison (DeLisi, 2003; Steiner & Wooldredge, 2009; Turney et al., 2012). These potential confounders are not often taken into consideration during analysis.

The Positive Effects on Inmate Behavior May Be Temporary

Few studies examining male adult inmate populations exist on the topic of visitation. In the synthesis of this literature, only one study was located. Siennick et al. (2012) examined the effect of prison visitation on the probability of inmate misconduct in mostly male prison populations. Their sample was an admissions cohort of approximately 7,000 inmates admitted to Florida correctional facilities between 2000 and 2002. The researchers conducted multilevel analyses of the week-to-week association between recorded disciplinary infractions and prison visits by significant others, spouses, friends, and family. Siennick et al. (2012) found that the probability of an inmate committing a reported infraction declined prior to a known visit but then increased immediately following visits. As time goes on, the likelihood to commit infractions eventually declines back to average levels. This pattern was consistent across different types of visitors received and infraction types but was most significant for spousal visits and contraband infractions. Lastly, inmates with more frequent visitors were associated with a swifter "post-visit decline" (Siennick et al., 2012).

Gaps in the Literature Related to Prison Rehabilitative Programs

Rehabilitative services are intended to provide an outlet for inmates to exercise positive social behaviors. There needs to be more research that explores whether or not this is actually the case, particularly with male inmates. While there is a lot of theoretical discourse about the value and efficacy of prison rehabilitation programs in reducing post-release recidivism, there is very little empirical data on how these programs actually impact the experience of incarceration for inmates. Where such empirical data exists, it focuses largely on violent inmate misconduct rather than other types of inmate infractions.

2.3 Overcrowding and Prison Misconduct

Several psychological and sociological frameworks have been used to describe the mechanisms by which overcrowding may impact inmate behavior. The theoretical framework informing this study is the deprivation theory. Deprivation theory holds that when placed in an environment that denies them access to the means of satisfying certain needs, some inmates may seek illegitimate alternatives (Sykes, 1958). Being in an environment with massive restrictions on freedoms forces inmates to adapt using the few resources available to them (Steiner & Wooldredge, 2009; Sykes, 1958). During this process of adaptation (termed "prisonization"), a value system emerges which simultaneously strengthens inmate solidarity while insulating the group from administrators and staff (Steiner & Wooldredge, 2009). Prison social orders develop, which serve to provide materials and services denied by the prison administration, such as alcohol, drugs, sex, and protection (Steiner & Wooldredge, 2009). Within this sociological perspective, overcrowding may be considered a "deprivation" that has the potential to shape an inmate's adjustment to imprisonment (Camp et al., 2003; McCorkle et al., 1995).

Prison overcrowding is currently an extremely pertinent theoretical and policy issue. In the past several decades, prison overcrowding has become a common phenomenon around the globe (Gaes, 1994; Levy & Herzog, 1974). The rapid increase in global incarceration rates provides little hope of a reversal of this trend (Walmsley, 2011). It is widely assumed in the academic and prison policy discourse that overcrowding has detrimental effects on the psychological, behavioral, and physical well-being of inmates (Clements, 1979; Huey & Mcnulty, 2005; Jürgens, 2011). In the earliest literature on the topic of overcrowding, academics argued that overcrowding is tantamount to warehousing and creates environments where inmates are denied essential subsistence and rehabilitative services (Sheldon, 1986; Toch, 1985). These assumptions about overcrowding on inmate behavior have continued to inform contemporary research and public policy recommendations.

As prisons populations continue to swell, scholars and prison officials have been prompted to consider overcrowding as a potential environmental obstruction to the safety of inmates and prison staff (Gaes, 1985; Huey & Mcnulty, 2005). However, much of the academic discourse on overcrowding and prisoner misconduct is theoretical. In fact, in the synthesis of this literature review, it was extremely difficult to locate empirical studies that attempt to measure levels of overcrowding's impact on prisoner misconduct. Conclusions drawn from studies on mental health and overcrowding have been used to suggest that overcrowding likely impacts an inmate's likelihood to engage in prisoner misconduct (Huey & Mcnulty, 2005), but few actually study the association directly.

Defining 'Overcrowding'

Klofas, Stojkovic, and Kalinich (1992) recognized that correctional crowding, particularly at facility level, is an ambiguously defined concept. In an attempt to address this

problem, they conducted a focus group at the 1991 annual meeting of the American Jail Association with 20 correctional experts from across the country. On average, the participants had 20 years of experience in criminal justice and 4.4 years in correctional management (Klofas et al., 1992). The group members included sheriffs, jail administrators, a police commander, a jail inspector, a program specialist from the National Institute of Corrections, and a compliance consultant. They met for the purpose of trying to identify variables for inclusion in an index measuring the severity of jail crowding. At the end, the focus group came to a consensus that crowding effects on facility operations are realized when a facility's population exceeds 80% of its intended capacity (Klofas et al., 1992). However, measures for overcrowding typically reference beyond 100% of capacity (Steiner & Wooldredge, 2009).

Individual-level measures of overcrowding relying on inmate perceptions of their environment and are incredibly subjective by nature, particularly because the inmate's response to this inquiry could vary by the day (Gaes, 1985). Alternatively, definitions of crowding at the facility-level often use population or capacity-based measures that are limited for multiple reasons. Its usefulness for research and management is limited because the variety in measurement techniques does not facilitate comparisons over time or across facilities (Klofas et al., 1992). Furthermore facility-level measurements make the assumption that overcrowding observed beyond a particular threshold has a linear relationship with an observation of consequential differences in detention conditions or inmate outcomes (Steiner & Wooldredge, 2009). Even with these limitations, observations using objective measures, such as facility based models, are most relevant for understanding and predicting variation in inmate behaviors. Results drawn from facility-level measurements provide the most readily actionable results that can be addressed with policy and program recommendations.

Overcrowding's Unclear Relationship with Overcrowding

There are very few studies that actually examine the association between overcrowding and inmate misconduct. The few studies that have been conducted define 'misconduct' as violent misconduct, and collectively, have produced inconsistent findings. However, the methodological discrepancies present within this domain make study-to-study comparisons extremely difficult (Gaes, 1994; Steiner & Wooldredge, 2009). Steiner and Wooldredge (2009) attempted to conduct a systematic review of studies done since 1990, however they found the methodological inconsistencies to be so great that it made the effective synthesizing of findings across studies an impossible task.

Gaps in the Overcrowding Literature

The biggest gap identified was the fact that most of the literature discussing inmate misconduct in the context of prison overcrowding was written in the 1980s and 1990s. While some newer studies exist, there has not been much research on the topic in the last 15 years. This is important because the landscape of prison crowding has changed dramatically during that time (Walmsley, 2011).

Moreover, most of the overcrowding literature available is the discussion of psychological or sociological theory. There have been an extraordinarily few empirical studies that have attempted to draw an association between different forms of prisoner misconduct and overcrowding. Instead, most empirical studies on overcrowding focus on the impact on inmate mental health. Studies have shown that overcrowding can meaningfully impact the mental health of inmates (Huey & Mcnulty, 2005). Additionally, inmate mental health has been demonstrated to be able to meaningfully inform inmate behavioral outcomes and likeliness to engage in misconduct (Blevins et al., 2010; Pearson, 2008). Given these already established associations,

research that explores whether or not there is an association between overcrowding and inmate misconduct makes sense as an area of further inquiry.

2.4 Summary of the Literature

Substance use/abuse is a problem in prison systems all around the world. Beyond substance abuse being a proximal cause of a whole host of issues, within the context of prison, it has an association with a slew of other health problems. Most notably, substance use in prison correlates with a vulnerability to infectious disease—the most documented of which being HIV. Existing literature shows that prison rehabilitative services, particularly prison employment programs, have the potential to reduce inmate maladjustment to imprisonment. Several psychological and sociological theoretical frameworks delineate potential causal pathways for overcrowding to exacerbate inmate misconduct. However, the literature on overcrowding has yielded mixed findings due to methodological inconsistencies. Substance use is a form of prisoner maladjustment and inmate misconduct. Given the existing findings on inmate misconduct, it stands to reason that rehabilitative services and overcrowding may have an association with substance use/abuse in prison and is a logical area of scientific inquiry.

Chapter 3: Study Design and Methodology

3.1: Study Design

This study was reviewed and conducted in accordance with the policies of the National Public Health Institute of Mexico, or El Instituto Nacional de Salud Publica (INSP), and the contracting government agencies in Mexico (the Ministry of Health and the Penitentiary System). In addition, the study also complies with international standards of research permissible with involuntarily incarcerated persons, such as Resolution Nr. 15 of the National Human Rights Commission, concerning OAS Resolution 1/08, and US Federal Code 45 CFR Part 46 subpart C, §46.306 (ii) and (iii). As defined in the latter, the proposed study involves no more than minimal risk and inconvenience to the subjects.

The total population was composed of 22,338 adult male prisoners from three Mexico City prisons. All inmates who could understand spoken and written Spanish were invited to participate in the study. While none of the facilities included in the study were maximum security facilities, some prisoners required special supervision and were confined in areas with restricted access because of the nature of their criminal background and their increased potential for aggressive behavior. These individuals amount to less than 5% of the total population of Mexico City's prison system, the target of this project. The procedures that were taken to guarantee access to the study for these inmates were established on a facility by facility basis upon agreement and in collaboration with the relevant authorities.

This study was a mixed-methods design that consisted of a cross-sectional survey and periodic biomedical specimen collection. Using weighted randomization, inmates that were selected for participation in the study were randomized into two groups. 90% of the sample population was placed in the biomedical testing only group and 10% were selected for both

biomedical testing and the completion of ACASI self-applied questionnaires. A total of 3,772 inmates were selected for the biomedical testing and questionnaire group. Inmates in this group were asked to complete a 40-60 minute questionnaire covering 5 domains: demographics and socio-economic background, childhood and violence background, HIV/STI risk behaviors (inside and outside of prison), diet and physical activity, and mental health and attitudinal correlates of health-risk.

Of the 3,772 participants, a total of 350 inmates (9.3% of all respondents) had complete data for all covariates and were included in the final analysis.

3.2: Methodology and Analysis

The reported use of marijuana, crack, heroin, inhalants, injections, and pills by inmates were used to define the drug use and the heavy use outcomes. The respondents' incarceration experience and prison environment were examined for their influence on the likelihood to report drug use during incarceration. Additionally, variables describing the respondents' social demographics and history of drug use were considered as potential correlates to the outcomes of interest.

Drug Use: Participants were asked about their patterns of drug use during the six months prior to incarceration and during the month preceding completion of the questionnaire. Drugs included are pills, marijuana, crack, heroin, and inhalants (e.g. thinner, adhesive, glue-sniffer or any stimulant). When reporting frequency, the options of "did not consume", "less than once a month", "once a month", "one every two weeks", "once a week", "three times a week", and "everyday" were provided. In this analysis, "any use" refers to use of any drug at any frequency. Heavy drug use is characterized as either "3 times a week" or "everyday" responses. The reported use of marijuana was analyzed as a unique variable because of its high prevalence.

Social Demographics and History: The social demographics of the sample were characterized with the data collected for age, educational level, employment status prior to incarceration, marital status, and the respondent's children. Age was divided into six groups: 18-24 years, 25-29 years, 30-34 years, 35-39 years, 40-44 years, and ≥45 years. Educational level was categorized as none or primary school, some or completed secondary, and above secondary. Employment status prior to incarceration was defined by the respondent reporting being employed or unemployed in the month before incarceration. Marital status was described as single, married or in a committed relationship, and divorced/widowed/separated. Having children was described by a 'yes/no' binary. The history of the respondents was defined by the reporting of past drug use. Any reported use of pills, marijuana, crack/cocaine, heroin, or inhalants in the six month preceding incarceration was defined as "past drug use".

Prison Experience: Data related to the amount of time served and to be served, having a registered conjugal visitor on file, received visitors of any kind in the preceding week, in-prison employment, membership on a recreation team, violence in prison, and alcohol consumption were used to describe the respondent's prison experience. The amount of detention served was divided into four categories: less than 2 years, greater than 2 years but less than four years, greater than 4 years but less than 6 years, and 6 or more years. The amount of detention left to be served was divided into categories: yet to be sentenced, less than one year, greater than 1 year but less than 3, greater than 3 years but less than 5, and 5 or more years left. Having a conjugal visitor on file, received visitors in the previous week, in-prison employment, membership on a recreation team, and been physically attacked at any time during incarceration were analyzed as a 'yes/no' binary. The respondent reporting being a member of either a sports team or workshop was characterized as membership on a recreational team. The being physically attacked variable

reflects the respondent reporting being attacked at least once during incarceration. As with the drug use variables, data on in-prison alcohol use and frequency during the month preceding the survey was collected. Any reported use of alcohol was coded on a 'yes/no' binary.

Overcrowding: Capacity of the cells, number of cellmates, and cellmate-cell capacity ratio variables were used to characterize overcrowding. The capacity of the cell was determined by the number of inmates the respondent reported that their cell was built for. The number of people the respondent reports sharing his cell with the previous week is used as a proxy for determining the number of cellmates. The cellmate-cell capacity ratio is the number of people that the respondent reported sharing the cell with divided by the number of people they believed the cell was actually built to house.

All data was analyzed using STATA 11 Data Analysis Software. Four logistic regression models were fitted for the four binary outcomes of interest: any drug usage, heavy drug use of any kind, heavy marijuana usage, and heavy usage of multiple drugs. Covariates of interest were the prison experience and overcrowding. Each model controlled for known covariates to drug use: demographic characteristics, prison environment, and alcohol use in prison.

Chapter 4: Study Results

4.1 Prevalence of Drug Use

The prevalence of reported drug use and heavy drug use are illustrated in Figures 1 and 2. Nearly 84% of inmates report some drug use in prison, regardless of frequency. The most common drug used is marijuana (80.9%), followed by crack/cocaine (52.3%), inhalants (49.7%), and pills (37.7%) [Figure 1]. Sixty-two percent of respondents report the use of two of more drugs in prison. Nearly 53% of inmates report the heavy use of at least one drug in the past month. The most frequently reported was marijuana (50.0%), followed by crack (9.1%), pills (3.7%) and other (2.3%) [Figure 2]. About 11% of respondents reported the heavy use of two or more substances in the past month.

4.2 Significant Correlations

Observed differences in outcome variables by social demographic and history characteristics, prison experience, and the in-prison social network data of the sample are illustrated in Figure 3.

Social Demographics and History: Heavy marijuana use was the only outcome to vary significantly by age ($p=.03$). A significant correlation was found with marital status in the reporting of any drug use, heavy drug use of any kind ($p<.01$), and heavy marijuana use ($p=.02$). Additionally, a significant correlation with having children was found with some heavy drug use ($p<.01$) and heavy marijuana use ($p=.01$). No significant correlations were found with education, employment prior to incarceration, and having had multiple arrests.

Prison Experience: The reporting of any drug use during incarceration was significantly correlated to having conjugal visitors ($p<.01$) and the reported use of alcohol in prison ($p=.03$).

Heavy drug use was found to be correlated with the amount of time left to be served (p=.03), having registered conjugal visitors (p<.01), having had visitors in the past week (P=.01), and reported alcohol use during incarceration (p=.03). Heavy marijuana use was significantly correlated with having conjugal visitors (p<.01) and the reported use of alcohol in prison (p<.01). No significant correlations were found for the amount of detention served, being employed in prison, being a member of a recreation team, or having been physically attacked in prison variables.

Overcrowding: No significant correlations were found for the cell capacity, number of cellmates, or overcrowding ratio variables.

4.3 Significant Adjusted Odds Ratios

The adjusted odds ratios and 95% CIs for modeled outcomes are illustrated in Figure 5.

Social Demographics and History: Compared to respondents who reported having primary education or less, respondents that reported having secondary education were 70% less likely to report any drug use (OR: 0.3, 95% CI: 0.1-0.8). Compared to those that reported being single, respondents that reported being married on in a committed relationship were 60% less likely to report any drug use during incarceration (OR: 0.4, 95% CI: 0.1-0.99).

Prison Experience: Having a registered conjugal visitor was protective against reporting any drug use (OR: 0.5, 95% CI: 0.2-0.9), heavy drug use of any kind (OR: 0.5, 95% CI: 0.3-0.9), and heavy marijuana use (OR: 0.6, 95% CI: 0.3-0.97). Compared to those who are unemployed during their incarceration, those who have in-prison employment were 60% less likely to report any drug use during incarceration (OR: 0.4, 95% CI: 0.2-0.9). Compared to those who did not report the use of alcohol during incarceration, respondents that did were 2.8 times as likely to

report heavy drug use of any kind (OR: 2.8, 95% CI: 1.2-6.6), three times as likely to report heavy marijuana use (OR: 3.0, 95% CI: 1.3-7.2), and 5.9 times as likely to report the heavy use of multiple drugs (OR: 5.9, 95% CI: 2.1-16.1).

Overcrowding: No significant adjusted odds ratios were found for the variables in this domain.

Chapter 5: Discussion and Conclusions

5.1 High Prevalence of Non-Injecting Drug Use

It has already been demonstrated that inmates with a history of drug use are especially more likely to report use while incarcerated (Gillespie, 2005). Every single inmate in this study reported a history of drug use prior to incarceration, and many continued their use while incarcerated. Nearly 84% reported some drug use during the 6 months of incarceration preceding the survey; 62% reported the simultaneous use of two or more drugs. Marijuana use was the most popular (81%), followed by inhalants (50%), and "pills" (38%). Crack use was reported by 52% of respondents; while crack is typically not injected, that is a means of administration that has been seen within a prison environment (Booth et al., 1993). Over half of the inmates reported heavy drug use during the 6 months preceding the survey. Marijuana was once again the most commonly reported at 50%, followed by crack, pills, and other substances. About 11% of inmates report the simultaneous heavy use of two or more drugs during this timeframe.

A key finding here is the notably high prevalence of non-injecting drug use during incarceration. In this particular study population, only 6 inmates (1.7% of respondents) reported injecting drugs in the past six months. As discussed in chapter 2, correctional research is preoccupied with injecting drug using inmates. Studies exploring the association of injecting drug use as a risk factor for HIV, HBV, and HCV infection dominate he literature; non-injecting drug use has largely been ignored (Beyrer, 2003; Bonnycastle & Villebrun, 2011; Booth et al., 1993; Watkins, 2011; Zamani, 2006). However, these results demonstrate that in at least some prison settings, non-injecting drug is far from an uncommon occurrence; therefore this should be a more common area of inquiry in correctional research.

Drug Use is a Potential Source of Social Vulnerability for Inmates

Ideally, this research would have explored the correlation between prison gang affiliation and inmate substance use. However, this data was not collected as it was beyond the scope of the original study. Gangs and drug cartels are known to have strong influence on the prison power structure of Mexican penitentiaries (Brouwer et al., 2006; US Department of State, 2011). It has even been reported that 60% of Mexican prisons are self-ruled by inmate gangs (Rossi & Hannah, 2012). Whatever the exact level of influence these gangs have, it is high enough to be an area of concern when discussing inmate substance use in this setting.

To engage in heavy drug use requires an inmate to have easy access to a regular supply. The possession of drugs, in or outside of a correctional facility, is often associated with engagement in other forms of criminal activity (Uggen & Thompson, 2003). Within the confines of a prison, the strong association of drugs and gang activity is far more well-established (Andía et al., 2005; Gaes, Wallace, Gilman, Klein-Saffran, & Suppa, 2002). Drug dependency that continues during incarceration likely increases an inmate's vulnerability to being a participant in prison gang activity. Gang recruitment is particularly widespread within correctional facilities, and drugs are a common currency to attract new members (Fleisher & Decker, 2001).

Curtailing drug use in prison potentially serves to diminish the power of prison gangs within correctional facilities, who have been demonstrated to be one of the most problematic groups in regards to in-prison violence and inmate infractions (Fleisher & Decker, 2001; Gaes et al., 2002). Moreover, the activity of prison gangs typically goes beyond the walls of correctional facilities, impacting the surrounding communities (Andía et al., 2005). It is in the interest of public safety to explore avenues of how to best address this very vulnerable prison population.

5.2 The Prison Experience and Inmate Drug Use

Alcohol Use and Drug Use

Alcohol abuse and drug use are inextricably linked, inside and outside of prison (Haggård-Grann, 2006; Pearson, 2008; Steiner & Wooldredge, 2009). In a setting where there is such a high prevalence of drug use, a reasonable expectation would be to see staggering reports of alcohol use. Surprisingly, less than 10% of inmates reported any alcohol use in the six months preceding the survey. Containers and bottles of alcohol are likely far more difficult to conceal on one's person. A bag of marijuana, cocaine, or some non-descript pills can be more easily hidden; therefore, alcohol is a less common commodity than other substances. The number of respondents reporting alcohol use was not sufficient enough to be examined in a unique logistical regression model.

While alcohol use was not an outcome of interest in this study, it was used as a covariate. Consistent with existing knowledge on the relationship between drug dependency and alcohol dependency, the reported use of alcohol was the strongest predictor of heavy drug use during incarceration. While not significant for "any drug use", inmates that reported alcohol use during incarceration were 2.8 times as likely to report heavy drug use of any kind, 3 times as like to report heavy marijuana use, and 5.9 times as likely to report the simultaneous abuse of multiple drugs. This demonstrates that if an inmate is identified to be consuming alcohol in prison, it is likely that he is dealing with another form of substance dependence. When prison substance use interventions are being designed in this study setting, these results indicates that alcohol using inmates should probably be identified as 'high risk'.

Intimate Relationships

While the report of any kind of visitor had no association with inmate substance use, inmates in a married or in a committed romantic relationship were 70% less likely to report any drug use in the past 6 months of incarceration—even after controlling for all other covariates. Additionally, inmates with registered conjugal visitors were half as likely to report "any drug use", "any heavy drug use", and heavy marijuana use.

With who these inmates were having sexual relationships during incarceration is unclear. While all but one of the inmates reported sex with women during incarceration, 18 inmates also reported at least one male sex partner during incarceration as well. Another 17 report a history of sex with men outside of prison. Moreover, while inmates were asked "*was the last person you had sex with [during incarceration] someone who's actually registered for a conjugal visit*", only 98 respondents (32% of the study population) actually responded to the question. Of all those that did respond, 93% reported that their last sexual partner was their registered conjugal visitor. With this, the conclusion can be drawn that the majority of these relationships are heterosexual and that they are likely with individuals they had a relationship with outside of prison.

Inmates often find being separated from their significant others to be the most difficult aspect of adjustment to prison life (Craig Dowden & Andrews, 2003; Turney et al., 2012). Strain and deprivation theory purport that this separation represents the loss of social contact, which in turn forces the inmate to either contend with social isolation and fall in line with the prison social milieu (Blevins et al., 2010; Steiner & Wooldredge, 2009). Turning to drugs is not an uncommon way for inmates to attempt to combat the social isolation they experience in prison. In addition,

joining a prison gang—and participation in their drug-related activities— can serve the purpose of providing an inmate with a source of community and social support.

This finding should not be reduced to the sexual nature of conjugal visits. A correctional facility's allowance of visitors could reduce the chances of misconduct by providing inmates with emotional support, relief from isolation, and serve as a diversion from the unpleasant nature of imprisonment (Tewksbury & DeMichele, 2005). The presence of the intimate partner may provide a positive social influence and an impetus for reform (Minnesota Department of Corrections, 2011). The positive social pressure can potentially act as a buffer to the negative influences within a prison. The protective effect of conjugal visitors from drug use in this study suggests that allowing inmates a connection to their social-network can be used to not only reduce drug use, but reduce an inmate's vulnerability to the negative social pressures associated with drug use during incarceration.

Prison Employment

Inmates who reported some form of in-prison employment were 60% less likely to report "any drug use"; however, it did not have an association with heavy drug users. Still, this finding is reminiscent of McCorkle et al. (1995). McCorkle et al. found that across all security levels, poor prison management was a predictor of violent inmate infractions (McCorkle et al., 1995). Despite that, prisons reporting larger percentages of their inmate population being involved in education, vocational, and prison industry activities reported lower rates of violent infractions (McCorkle et al., 1995). Like many countries, Mexico's prison system is beset with managerial problems and is overwhelmed by influence of gang activity on prison operations (US Department of State, 2011). Regardless of those institutional issues, prison employment is still

found to be significantly associated with a reduced likelihood to reported substance use while incarcerated.

This is a somewhat surprising result, as one could assume that someone employed during incarceration may have more money to spend on drugs compared to their unemployed counterparts. In-prison work and education programs have often been believed to reduce disruptive behavior within penitentiaries by providing constructive activities and a avenue for the reinforcement of positive social behaviors (Wilson et al., 2000). While limited research has explored this topic, it is a plausible explanation. Moreover, in-prison vocational programs have been demonstrated to reduce recidivism among released offenders, as they provide technical skills for the individual to obtain a legitimate source of income (Wilson et al., 2000).

Another potential reason for the protective effect of inmate employment on the reporting of drug use is that it may disrupt the continuation of an inmate's criminal career behind bars. For the same reasons that people assume that drug use does not take place in prison, the assumption is also made that criminal careers are temporarily placed on hold while an individual offender is imprisoned. More contemporary criminology research has demonstrated that this is not true and that some inmates continue to engage in the same criminal activity that landed them in jail (DeLisi, 2003). The majority of Mexican inmates are imprisoned for drug-trafficking related charges (Lacey, 2009), and some may seek to engage in drug-related activity while incarcerated. Having another form of employment available may serve as a deterrent to participating in the in-prison drug economy.

5.3 Overcrowding and Inmate Drug Use

None of the variables in the overcrowding domain were found to be significantly associated with the reporting of drug use. Even so, it is difficult to use the results of this study to reject the hypothesis that overcrowding has a meaningful effect on inmate substance use. The aforementioned methodological issues with the measurement of overcrowding impacted this study. Moreover, the overcrowding variables relied exclusively on self-reported data, which may or may not have appropriately captured an accurate picture of overcrowding within these prisons.

Individual-level measures of overcrowding rely on inmate perceptions of their environment and are highly subjective, making it difficult to interpret policy implications based on their analysis. Gaes (1985) addressed concerns about the generalizability and policy relevance of researchers using subjective measures of crowding. He convincingly argued that an inmate's perception of the same exact environment can change from one day to the next, which means this sort of measure lacks stability (Gaes, 1985). He makes the suggestion that it may be worthwhile to assess the validity of subjective measures by comparing them with objective measures in the same model, followed by an analysis of whether or not perceptions of crowding differ across institutions with different structural characteristics. I am in agreement with this suggestion.

5.4: Limitations of this Study

The most problematic aspect of this research is the low response rate to the survey questions used for analysis. After cleaning the dataset and omitting respondents who had missing answers, the sample size dropped from 3772 to a total of 350 inmates (9.3% of all respondents). While some of this can be attributed to non-response, it should be noted that the questionnaire used for this study required inmates to answer over 200 questions over a wide range of topics.

The variables identified for inclusion in this study were not necessarily applicable to all inmates; therefore, they did not answer all questions.

Prior to the completion of the logistic regression models, the social demographic and history variables between the total population and the study population were compared and no significant differences were observed. Even so, there may be fundamental differences in the characteristics of the inmates that successfully completed the entire questionnaire versus those who did not answer all of the questions that went unnoticed by the researcher. These differences may be effect modifiers for the associations observed in this analysis. For example, completion of this survey required that the inmate be fluent and literate in Spanish. Illiterate inmate substance use patterns differ significantly when compared to literate inmates.

Additionally, this entire analysis is reliant on self-reported data. Self-report studies have their advantages but are prone to several biases, specifically social desirability bias. Given the sensitive nature of inmates discussing the use of contraband substances during incarceration, there is a concern for the underreporting of substance abuse. There has been previous research that suggests deception and social desirability can meaningfully bias inmate reporting of substance use (Richards & Pai, 2003). Also, self-reports rely on memory; respondents may forget or misreport relevant details, particularly for the substance use questions where they were asked to recall over a period of six months.

Related to the issues of self-reported data, the metrics used for the overcrowding domain could be greatly improved on a future study. Overcrowding was determined by how many people an inmate believed his cell was built for, rather than an official cell-capacity report. Access to official cell-capacity figures was not available to be used for this study's analysis but would a more internally valid measure of overcrowding. However, even with official capacity numbers,

the ambiguous nature of measuring overcrowding and extreme overcrowding makes it difficult to collect generalizable data in this domain. “Overcrowding” is subject to the definition of the researcher conducting the study.

5.5: Recommendations for Future Research

The majority of the research on substance use in prison is pre-occupied with intravenous drug use. As discussed in chapter 2, non-injecting drug use has its own associations with other negative health outcomes. Marijuana, crack, inhalants, and pills were popularly reported by inmates in this study. Moreover, crack use was reported by 52% of respondents and is typically smoked or inhaled. The high prevalence of non-injecting drug use in these prisons speaks to the need for more empirical research in this area.

Studies on visitation typically focus on general family/friend visitation and have yielded inconsistent results in regards to inmate misconduct (Minnesota Department of Corrections, 2011; Siennick et al., 2012). Visitation of any kind was not significant in this study, and was associated with both an increased and decreased likelihood to report any of the drug using outcomes of interest. However, conjugal visits consistently demonstrated a protective effect. The protective effect of conjugal visitors on the reporting of substance use in this study is grounds for additional research on this subject area.

Lastly, future research on prison overcrowding should attempt to formulate a model that can be generalized across multiple settings. The psychological and environmental pathways for overcrowding to be associated with negative health outcomes has been demonstrated in research outside of the realm of correctional health (Levy & Herzog, 1974; Sheldon, 1986). However, a standard measurement of different levels of overcrowding within a correctional facility has yet to be established, which makes study-to-study comparisons a rather difficult task.

5.6 Public Health Recommendations

Given the dire implications of inmate substance use on correctional health, community health, and public safety, it is imperative that prison program interventions must take place to reduce the ubiquitous nature of drugs in Mexican prisons. The expansion of drug rehabilitation and treatment programs is an obvious recommendation. However, based on the results of this study and already existing literature, two other primary areas of intervention have been identified by the researcher.

The first recommendation is that prison officials aim inmate participating aim employment and vocational activities to be as close to 100% as possible, with the caveat that prisoners are engaged in humane labor. This is a source of pride for the inmate and is an opportunity to reinforce positive social behaviors (Wilson et al., 2000). A common way of employing inmates is to have them be primarily responsible for the housekeeping within a correctional facility. If inmates are already not responsible for most of the housekeeping in Mexican penitentiaries, then that responsibility should be given to them under the supervision of a correctional staff member. Since there only so many housekeeping jobs within a prison, a second means of increasing employment is the pursuit of creative partnerships with community members that give inmates the opportunity to produce something of value. I have personally witnessed an example of this in Kisii town, Kenya. The Kisii central prison has paired with a local manufacturer to teach woodworking classes where inmates learn to make furniture. The furniture made by the inmates is then sold to the general public. While a portion of the proceeds go back to the manufacturer because they provided the raw materials, a portion also goes to a bank account for the inmate. While incarcerated, the inmate has limited access to the funds; however upon release from prison, they gain control of the account.

The second recommendation is to increase the frequency with which inmates interact with their intimate partners. Advocating for the increased frequency of conjugal visits in most settings can be a bit of a political landmine (Tewksbury & DeMichele, 2005). So alternatives should be explored. A potential option is to incentivize good behavior by allowing inmates the opportunity to have video chat appointments with their loved ones.

Lastly, while having conjugal visitors was associated with less drug use, it should be noted that 80% of inmates that reported sex in prison also reported not using condoms at last intercourse. Given the high prevalence of infectious diseases among prison populations, it is important to not allow conjugal visits to become a vector for the transmission of disease into the general population. Condoms should be widely distributed within Mexican prisons, with a particular emphasis on those receiving conjugal visits.

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Tables and Figures

Figure 1

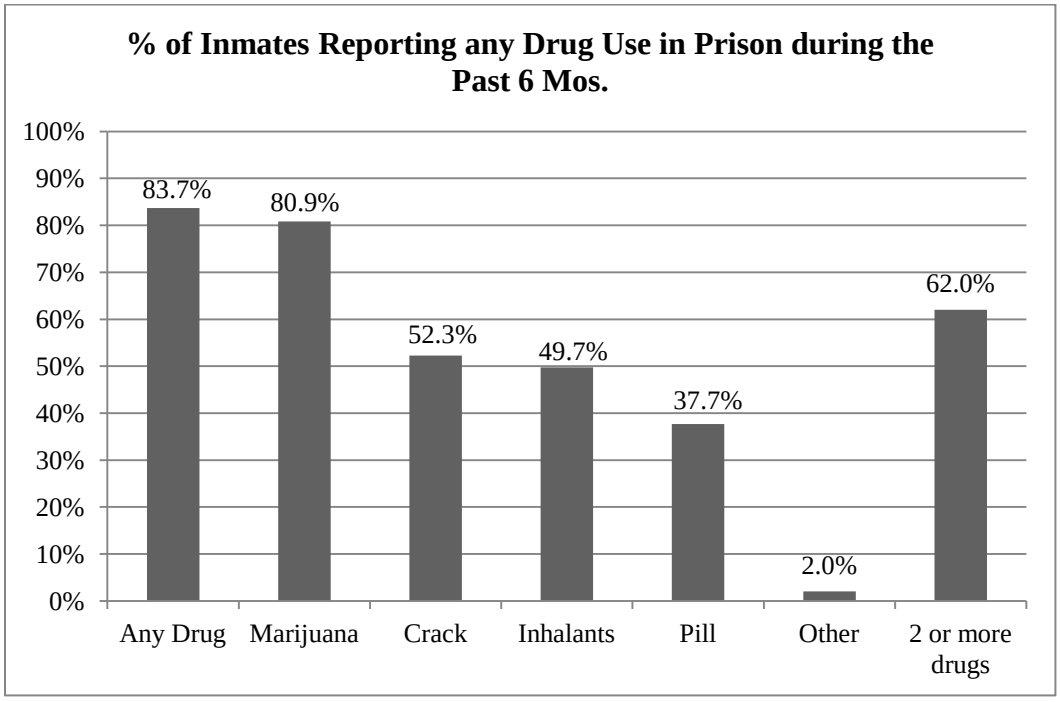

Figure 2

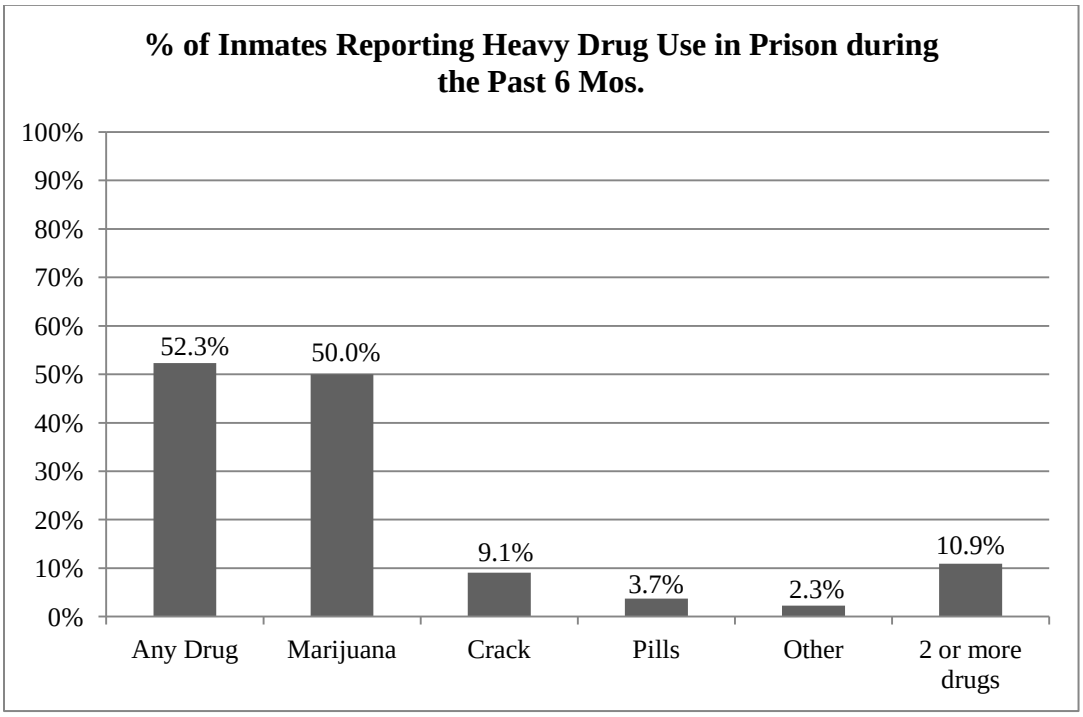

Figure 3. Frequency Distribution of Correlates

Variable	Total N=350	Reported Use of Any Drug N=293	Heavy Users of Any Drug N=183	Heavy Marijuana Users N=175	Heavy Users of Multiple Drugs N=38
Social Demographics and History					
Age:					
18-24 years old	78 (22.3)	69 (88.5)	*45 (57.7)*	*43 (55.1)**	5 (6.4)
25-29 years old	135 (38.6)	114 (84.4)	*79 (58.5)*	*77 (57.0)*	21 (15.6)
30-34 years old	84 (24.0)	72 (85.7)	*39 (46.4)*	*38 (45.2)*	9 (10.7)
35-39 years old	30 (8.6)	20 (66.7)	*11 (36.7)*	*9 (30.0)*	1 (3.3)
40-44 years old	14 (4.0)	10 (71.4)	*5 (35.7)*	*4 (28.6)*	1 (7.4)
≥45 years	9 (2.6)	8 (88.9)	*4 (44.4)*	*4 (44.4)*	1 (11.1)
Education:					
None/Primary	88 (25.1)	80 (90.9)	53 (60.2)	51 (58.0)	12 (13.6)
Secondary	157 (44.9)	127 (80.9)	77 (49.0)	74 (47.1)	16 (10.2)
Above Secondary	105 (30.0)	86 (81.9)	53 (50.5)	50 (47.6)	10 (9.5)
Marital Status:					
Single	116 (33.1)	*106 (91.4)**	*76 (65.5)**	*70 (60.3)**	14 (12.1)
Married/In Committed Relationship	203 (58.0)	*158 (77.8)*	*93 (45.8)*	*91 (44.8)*	21 (10.3)
Divorced/Widowed/Separated	31 (8.9)	*29 (93.6)*	*53 (45.2)*	*14 (45.2)*	3 (9.7)
Children:					
Doesn't Have Children	99 (28.3)	87 (87.9)	*65 (65.7)**	*60 (60.6)**	15 (15.2)
Has Children	251 (71.7)	206 (82.1)	*118 (47.0)*	*115 (45.8)*	23 (9.2)
Past Drug Use:					
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Yes	350 (100.0)	293 (83.7)	183 (52.3)	175 (50.0)	38 (10.9)
Prison Experience					
Amount of Detention Served:					
Less than 2 years	49 (14.0)	40 (81.6)	21 (42.9)	21 (42.9)	3 (6.1)
2-4 years	117 (33.4)	100 (85.5)	69 (59.0)	65 (55.6)	13 (11.1)
4-6 years	85 (24.3)	72 (84.7)	44 (51.8)	42 (49.4)	11 (12.9)
6 or more years	99 (28.3)	81 (81.8)	49 (49.5)	47 (47.5)	11 (11.1)
Amount of Detention Left to be Served:					
Yet to be Sentenced	4 (1.1)	4 (100.0)	*1 (25.0)**	1 (25.0)	0 (0.0)
Less than year	73 (20.9)	65 (89.0)	*46 (63.0)*	42 (57.5)	11 (15.1)
1-3 years left	114 (32.6)	96 (84.2)	*63 (55.3)*	61 (53.5)	13 (11.4)
3-5 years left	66 (18.9)	56 (84.9)	*36 (54.6)*	35 (53.0)	9 (13.6)
5 or more years left	93 (26.6)	72 (77.4)	*37 (39.8)*	36 (38.7)	5 (5.4)
Has Registered Conjugal Visitors:					
No	205 (58.6)	*182 (88.8)**	*124 (60.5)**	*117 (57.1)**	25 (12.2)
Yes	145 (41.4)	*111 (76.6)*	*59 (40.7)*	*58 (40.0)*	13 (8.3)
Received Visitors in the Past Week:					
No	98 (28.0)	85 (86.7)	*62 (63.3)**	57 (58.2)	13 (13.3)
Yes	252 (72.0)	208 (82.5)	*121 (48.0)*	118 (46.8)	25 (9.9)
Employed in Prison:					
No	144 (41.1)	124 (86.1)	74 (51.4)	72 (50.0)	17 (11.8)
Yes	206 (58.9)	169 (82.0)	109 (52.9)	103 (50.0)	21 (10.2)
Recreation Team Member:					
No	69 (19.7)	57 (82.6)	36 (52.2)	33 (47.8)	9 (13.0)
Yes	281 (80.3)	236 (84.0)	147 (52.3)	142 (50.53)	29 (10.3)
Reported Being Physically Attacked in Prison:					
Never	185 (52.9)	151 (81.6)	94 (50.8)	90 (48.7)	18 (9.7)
Once	165 (47.1)	142 (86.1)	89 (53.9)	85 (51.5)	20 (12.1)
Reported Alcohol Use In Prison:					
No	316 (90.3)	*260 (82.3)**	*159 (50.3)**	*151 (47.8)**	*28 (8.9)**
Yes	34 (9.7)	*33 (97.1)*	*24 (70.6)*	*24 (70.6)*	*10 (29.4)*
Prison Crowding					
Number of People Cell Was Built For:					
Less than 3 people	27 (7.71)	21 (77.8)	*10 (37.0)*	9 (33.3)	7 (7.4)
3-6 people	`183 (52.3)	156 (85.3)	*104 (56.8)*	99 (54.1)	15 (8.2)
6-9 people	123 (35.1)	101 (82.1)	*59 (48.0)*	57 (46.3)	19 (15.5)
9 or people	17 (4.9)	15 (88.2)	*10 (58.8)*	10 (58.8)	2 (10.9)
Number of Cellmates:					
Less than 3 people	47 (13.4)	37 (78.7)	22 (46.8)	20 (42.6)	3 (6.4)
3-6 people	108 (30.9)	90 (83.3)	56 (51.9)	55 (50.9)	7 (6.5)
6-9 people	78 (22.3)	65 (83.3)	37 (47.4)	35 (44.9)	10 (12.8)
9-12 people	33 (9.4)	25 (75.8)	17 (51.5)	16 (48.5)	4 (12.1)
12 people or more	84 (24.0)	76 (90.5)	51 (60.7)	49 (58.3)	14 (16.7)
Cellmates-Cell Capacity Ratio:					
Ratio <1	108 (30.9)	87 (80.6)	56 (51.9)	54 (50.0)	8 (7.4)
Ratio =1	54 (46.3)	46 (85.2)	26 (48.1)	25 (46.3)	5 (9.3)
1<Ratio≤2	107 (30.6)	87 (81.3)	54 (50.5)	50 (46.7)	13 (12.2)
Ratio>2	81 (23.1)	73 (90.1)	47 (58.0)	46 (56.8)	12 (14.8)

*****Statistically significant correlation, α=.05. Fisher's Exact test used where observed values <5.

† Omitted from outcome models because 100% of the sample reports past drug use.

Figure 4. Unadjusted Odd Ratios

Variable	Reported Use of Any Drug	Heavy Users of Any Drug	Heavy Marijuana Users	Heavy Users of Multiple Drugs
Social Demographics and History				
Age:				
18-24 years old	1.0	1.0	1.0	1.0
25-29 years old	0.7 [0.3-1.6]	1.0 [0.6-1.8]	1.1 [0.6-1.9]	2.7 [0.97-7.4]
30-34 years old	0.8 [0.3-2.0]	0.6 [0.3-1.2]	0.7 [0.4-1.2]	1.6 [0.6-5.5]
35-39 years old	0.3 [0.1-0.7]	0.4 [0.2-1.0]	*0.3 [0.1-0.9]**	0.5 [0.1-4.5]
40-44 years old	0.3 [0.1-1.3]	0.4 [0.1-1.3]	0.3 [0.1-1.1]	1.1 [0.1-10.4]
≥45 years	1.0 [0.1-9.3]	0.6 [0.1-2.4]	0.7 [0.2-2.6]	1.8 [0.2-17.6]
Education:				
None/Primary	1.0	1.0	1.0	1.0
Secondary	*0.4 [0.2-0.96]**	0.6 [0.4-1.1]	0.6 [0.4-1.9]	0.7 [0.3-1.6]
Above Secondary	0.5 [0.2-1.1]	0.7 [0.4-1.2]	0.7 [0.4-1.2]	0.7 [0.3-1.6]
Marital Status:				
Single	1.0	1.0	1.0	1.0
Married/In Committed Relationship	*0.3 [0.1-0.99]**	*0.4 [0.3-0.7]**	*0.5 [0.3-0.8]**	0.8 [0.4-1.7]
Divorced/Widowed/Separated	1.4 [0.3-6.6]	*0.4 [0.2-0.96]**	0.5 [0.2-1.2]	0.8 [0.2-2.9]
Children:				
Doesn't Have Children	1.0	1.0	1.0	1.0
Has Children	0.6 [0.3-1.3]	0.5 [0.3-0.8]*	*0.5 [0.3-0.9]**	0.6 [0.3-1.1]
Prison Experience				
Amount of Detention Served:				
Less than 2 years	1.0	1.0	1.0	1.0
2-4 years	1.3 [0.5-3.2]	1.9 [1.0-3.8]	1.6 [0.9-3.3]	1.9 [0.5-7.1]
4-6 years	1.2 [0.5-3.2]	1.4 [0.7-2.9]	1.3 [0.6-2.6]	2.3 [0.6-8.6]
6 or more years	1.0 [0.4-2.5]	1.3 [0.7-2.6]	1.2 [0.6-2.4]	1.9 [0.5-7.2]
Amount of Detention Left to be Served:				
Yet to be Sentenced	†	1.0	1.0	†
Less than year	†	5.1 [0.5-51.6]	4.1 [0.4-41.0]	†
1-3 years left	†	3.7 [0.4-36.7]	3.5 [0.4-34.2]	†
3-5 years left	†	3.6 [0.4-36.4]	3.4 [0.3-34.3]	†
5 or more years left	†	2.0 [0.2-19.8]	1.9 [0.2-18.9]	†
Has Registered Conjugal Visitors:				
No	1.0	1.0	1.0	1.0
Yes	*0.4 [0.2-0.7]**	*0.4 [0.3-0.7]**	*0.5 [0.3-0.8]**	0.7 [0.3-1.4]
Received Visitors in the Past Week:				
No	1.0	1.0	1.0	1.0
Yes	0.7 [0.4-1.4]	*0.5 [0.3-0.9]**	0.6 [0.4-1.0]	0.7 [0.4-1.5]
Employed in Prison:				
No	1.0	1.0	1.0	1.0
Yes	0.7 [0.4-1.3]	1.1 [0.7-1.6]	1.0 [0.7-1.5]	0.9 [0.4-1.7]
Recreation Team Member:				
No	1.0	1.0	1.0	1.0
Yes	1.4 [0.8-2.5]	1.0 [0.6-1.7]	1.1 [0.7-1.9]	0.8 [0.3-1.7]
Reported Being Physically Attacked in Prison:				
No	1.0	1.0	1.0	1.0
Yes	1.4 [0.8-2.5]	1.1 [0.7-1.7]	1.1 [0.7-1.7]	1.3 [0.7-2.5]
Reported Alcohol Use In Prison:				
No	1.0	1.0	1.0	1.0
Yes	7.1 [0.95-53.1]	*2.4 [1.1-5.1]**	*2.6 [1.2-5.7]**	*4.3 [1.9-8.0]**
Overcrowding				
Number of People Cell Was Built For:				
Less than 3 people	1.0	1.0	1.0	1.0
3-6 people	1.7 [0.6-4.5]	2.2 [0.97-2.4]	*2.4 [1.0-5.5]**	1.1 [0.3-5.2]
6-9 people	1.3 [0.5-3.6]	1.6 [0.7-3.7]	1.7 [0.7-4.1]	2.3 [0.5-10.5]
9 or more people	2.1 [0.4-12.1]	2.4 [0.7-8.4]	2.9 [0.8-10.0]	1.7 [0.2-13.1]
Number of Cellmates:				
Less than 3 people	1.0	1.0	1.0	1.0
3-6 people	1.4 [0.6-3.2]	1.2 [0.6-2.4]	1.4 [0.7-2.8]	1.0 [0.3-4.1]
6-9 people	1.4 [0.5-3.4]	1.0 [0.5-2.1]	1.1 [0.5-2.3]	2.2 [0.6-8.3]
9-12 people	0.9 [0.3-2.4]	1.2 [0.5-2.9]	1.3 [0.5-3.1]	2.0 [0.4-9.7]
12 people or more	2.6 [0.9-7.0]	1.8 [0.9-3.6]	1.9 [0.9-3.9]	2.9 [0.8-10.8]
Cellmates-Cell Capacity Ratio:				
Ratio <1	1.0	1.0	1.0	1.0
Ratio =1	1.4 [0.6-3.4]	0.9 [0.4-1.7]	0.9 [0.4-1.7]	1.3 [0.4-4.1]
1<Ratio≤2	1.1 [0.5-2.1]	0.9 [0.6-1.6]	0.9 [0.5-1.5]	1.7 [0.7-4.4]
Ratio>2	2.2 [0.9-5.3]	1.3 [0.7-2.3]	1.3 [0.7-2.3]	2.2 [0.8-5.6]

* Statistically significant, α=.05

† Omitted from analysis due to too few observations

Figure 5. Adjusted Odds Ratios

Variable	Reported Use of Any Drug	Heavy Users of Any Drug	Heavy Marijuana Users	Heavy Users of Multiple Drugs
Social Demographics and History				
Age:				
18-24 years old	1.0	1.0	1.0	1.0
25-29 years old	0.9 [0.3-2.5]	1.4 [0.7-2.8]	1.4 [0.7-2.7]	3.0 [0.9-10.3]
30-34 years old	1.1 [0.4-3.4]	0.9 [0.4-2.0]	0.9 [0.4-2.0]	1.9 [0.5-7.7]
35-39 years old	0.4 [0.1-1.4]	0.6 [0.2-1.7]	0.5 [0.2-1.4]	0.8 [0.1-8.4]
40-44 years old	0.3 [0.1-1.5]	0.6 [0.2-6.7]	0.6 [0.2-2.6]	1.1 [0.1-15.1]
≥45 years	0.7 [0.1-9.7]	0.7 [0.1-3.6]	0.7 [0.1-3.7]	1.2 [0.1-16.9]
Education:				
None/Primary	1.0	1.0	1.0	1.0
Secondary	*0.3 [0.1-0.8]**	0.7 [0.4-1.2]	0.6 [0.3-1.2]	0.7 [0.3-1.9]
Above Secondary	0.4 [0.1-1.1]	0.7 [0.4-1.4]	0.6 [0.3-1.3]	0.6 [0.3-3.0]
Marital Status:				
Single	1.0	1.0	1.0	1.0
Married/In Committed Relationship	*0.4 [0.1-0.99]**	0.8 [0.4-1.6]	0.9 [0.5-1.8]	1.0 [0.3-3.0]
Divorced/Widowed/Separated	0.4 [0.1-1.1]	0.5 [0.2-1.4]	0.7 [0.3-1.8]	0.9 [0.2-4.4]
Children:				
Doesn't Have Children	1.0	1.0	1.0	1.0
Has Children	1.3 [0.6-3.0]	0.7 [0.3-1.3]	0.7 [0.4-1.4]	0.6 [0.2-1.6]
Prison Experience				
Amount of Detention Served:				
Less than 2 years	1.0	1.0	1.0	1.0
2-4 years	1.0 [0.3-3.0]	2.0 [0.9-4.3]	1.6 [0.7-3.5]	2.4 [0.5-10.4]
4-6 years	1.6 [0.5-5.1]	1.9 [0.8-4.4]	1.7 [0.7-3.9]	3.0 [0.7-13.7]
6 or more years	1.6 [0.5-5.0]	2.1 [0.9-5.0]	2.0 [0.8-4.6]	2.7 [0.6-13.8]
Amount of Detention Left to be Served:				
Yet to be Sentenced	†	1.0	1.0	†
Less than year	†	5.0 [0.4-63.3]	3.7 [0.3-46.2]	†
1-3 years left	†	3.8 [0.3-47.4]	3.4 [0.3-40.8]	†
3-5 years left	†	4.2 [0.3-51.7]	3.7 [0.2-44.2]	†
5 or more years left	†	2.4 [0.2-29.8]	2.1 [0.3-25.9]	†
Has Registered Conjugal Visitors:				
No	1.0	1.0	1.0	1.0
Yes	*0.5 [0.2-0.9]**	*0.5 [0.3-0.9]**	*0.6 [0.3-0.97]**	0.8 [0.3-2.0]
Received Visitors in the Past Week:				
No	1.0	1.0	1.0	1.0
Yes	1.3 [0.6-3.0]	0.7 [0.4-1.3]	0.8 [0.5-1.5]	0.9 [0.3-2.2]
Employed in Prison:				
No	1.0	1.0	1.0	1.0
Yes	*0.4 [0.2-0.9]**	1.0 [0.6-1.7]	0.9 [0.5-1.5]	0.7 [0.3-1.7]
Recreation Team Member:				
No	1.0	1.0	1.0	1.0
Yes	1.5 [0.6-3.9]	0.8 [0.4-1.5]	1.0 [0.5-1.8]	0.6 [0.2-1.5]
Reported Being Physically Attacked in Prison:				
No	1.0	1.0	1.0	1.0
Yes	1.7 [0.8-3.5]	1.2 [0.8-2.0]	1.2 [0.7-1.9]	1.2 [0.5-2.8]
Reported Alcohol Use In Prison:				
No	1.0	1.0	1.0	1.0
Yes	8.5 [0.99-73.2]	*2.8 [1.2-6.6]**	*3.0 [1.3-7.2]**	*5.9 [2.1-16.1]**
Overcrowding				
Number of People Cell Was Built For:				
Less than 3 people	1.0	1.0	1.0	1.0
3-6 people	1.6 [0.4-6.5]	2.4 [0.8-7.4]	2.5 [0.8-7.6]	0.9 [0.1-7.4]
6-9 people	1.1 [0.2-5.1]	1.2 [0.3-4.1]	1.4 [0.4-4.8]	1.8 [0.2-14.6]
9 or more people	1.2 [0.1-20.2]	1.6 [0.2-11.0]	2.2 [0.3-15.6]	0.5 [0.03-8.3]
Number of Cellmates:				
Less than 3 people	1.0	1.0	1.0	1.0
3-6 people	1.5 [0.5-4.8]	1.1 [0.4-2.6]	1.3 [0.5-3.0]	1.1 [0.2-5.9]
6-9 people	2.2 [0.4-11.4]	0.9 [0.3-3.3]	0.9 [0.2-3.2]	5.4 [0.5-53.4]
9-12 people	1.2 [0.2-6.9]	1.5 [0.4-6.1]	1.3 [0.3-5.2]	5.6 [0.5-66.4]
12 people or more	5.9 [0.6-63.3]	3.8 [0.6-22.4]	2.9 [0.5-16.4]	9.9 [0.6-161.6]
Cellmates-Cell Capacity Ratio:				
Ratio <1	1.0	1.0	1.0	1.0
Ratio =1	1.3 [0.4-4.1]	0.8 [0.4-1.9]	0.8 [0.4-1.9]	1.1 [0.2-5.0]
1<Ratio≤2	0.7 [0.2-3.0]	0.9 [0.3-2.7]	0.9 [0.3-2.8]	0.3 [0.1-2.7]
Ratio>2	1.0 [0.1-7.3]	0.8 [0.2-3.3]	1.0 [0.2-4.2]	0.3 [.02-3.0]

* Statistically significant, α=.05

† Omitted from analysis due to too few observations