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Evaluating the Implementation of Drug Decriminalization in Tijuana Mexico: Police and Public Health.

A dissertatiom submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in
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by
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DEDICATION

To all the senseless victims in this war on drugs, in Mexico and around the world.

I would like to thank and dedicate this dissertation to my family, my mom and dad who have always supported me and gave me the opportunity to travel the world and get the best education possible. To my grandparents who taught me to help other people. Obviously to my sisters, who have always being there for me, on the good and the bad times. Finally, to my cousins (specially Ivan and Miguel, who have been there on the rainy days) and uncles, always supportive and making my life more loving/interesting.

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EPIGRAPH

“Try not. Do or do not, there is no try” – Yoda (the empire strikes back)

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LIST OF ACRONYMS

HCV: Hepatitis C virus

HIV: Human Immunodeficiency Virus

ICAP: Instituto de Capacitación y Adiestramiento Profesional Tijuana

PEP: police education program

PWID: People who inject drugs

SSPM: Tijuana Ministry of Public Safety

TB: Tuberculosis

UCSD: University of California, San Diego

UNODC: United Nations Office on Drugs and Crime

WHO: World Health Organization

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Chapter two and three of this dissertation are currently being prepared for publication, of which professors Leo Beletsky and Steffanie A. Strathdee are co-authors. Chapter 2 also includes professor Tommi L. Gaines as a co-author.

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ABSTRACT OF THE DISSERTATION

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This research seeks to evaluate the impact of drug policy reform in Mexico within the larger Latin American context. Through theoretical and statistical analyses, I use the case study of the municipal Police Department in Tijuana to understand the implementation of Mexico's 2009 "narcomenudeo" drug policy reform that decriminalized drug possession for personal consumption. Using internal unpublished police data, I demonstrate that the policy shift did not appear to impact the policing of

drug arrests over the five years following the implementation of the reform. Police education efforts designed to improve officer understanding of the reform and its street-level implementation found low baseline knowledge of the decriminalization policy, shedding light into the mechanisms impeding its application. Training evaluation suggested that officers increased their legal knowledge, but that training uptake was shaped by level of educational attainment. Ultimately, these findings add to the emerging implementation science literature on the importance of structural interventions to better align public health-oriented drug policy reforms with their intended impact in Latin America and elsewhere.

INTRODUCTION

Background

Around the world, illicit drug use and trafficking continue to be a problem associated with the spread of blood borne infections, violence, and the criminalization of people who use illicit drugs [1]. A 2010 analysis of the Global Burden of Disease estimated that illicit drug dependence accounted for 0.8% of the total global disability adjusted life years (DALYs); opioids and amphetamines were the most common drug use dependence disorders [2]. The risk of infection of HIV and viral hepatitis (i.e., HCV and HBV), is higher among people who inject drugs (PWID) [3]. According to 2007 estimates [4], between 13.1% and 18.75% of the total PWID population is living with HIV worldwide [5]. Aditionally, both HIV and HCV can be concurrent infections among PWID [6], contributing to a larger burden of disease among this population.

To address substance use as a public health issue, we need to recognize that there is a synergic relationship between disease and social problems. Drug use and violence shape each other, and together impact the health and well-being of society in general. The interaction between substance use, violence, and HIV (SAVA syndemic [7]), is particularly salient among street drug users, who are at risk of everyday violence in urban settings and subject to police harassment. All these elements construct a risk environment [8], defined as the space—both at an individual and societal level—where several factors interact to increase the harm of drug use, influencing the attitudes and risk-taking behaviors of drug users and affecting the transmission of infectious diseases [9]. These types of environments, both at a macro and micro level, can be classified as

physical, social, economic or policy factors that act as structural dimensions for increasing harm among drug users (e.g. trade routes, lack of health services, and availability of sterile needles). These factors must be taken into account when stakeholders seek to design evidence-based interventions to improve public health [10].

Among the environmental factors that increase the risk of blood borne infections such as HIV and HCV, a legal framework that criminalizes heroin [11] and other injected drugs plays a negative role in creating barriers for syringe access, HIV testing, and evidence-based treatment, such as opioid substitution therapy [12]. Not only do laws influence the risk behaviors of PWID, but their enforcement has also been shown to lead to an elevated disease risk [9].

Even in view of policies that may facilitate public health interventions, there is often an implementation gap between the “law on the books” and the “law on the streets”: laws can change but street level management can continue to operate as it did before [13]. For example, even in contexts where syringe possession is legal, police can drive PWID risk through formal or informal practices [14]. Police syringe confiscation can lead PWIDs to rent or loan someone else’s injection equipment, or discourage users from carrying clean needles for fear of being arrested [15]. Also, police “crackdowns” can affect the migration patterns of PWID, creating risks by the displacement of the disease to new locales, and hindering the capacity of public health officials to provide support services and HIV testing and treatment [16].

Although there is evidence that drug law enforcement interventions rarely reduce drug market violence [17], many countries around the world, such as the

Philippines [18], Russia [19] or Thailand [20], continue to address substance use with a punitive approach. This is exemplified by mass incarceration, compulsory drug detention, and even capital punishment, raising concerns about human rights abuses [21]. However, there is a set of evidence-driven tertiary prevention strategies, known as the harm reduction approach [22], aimed at reducing the negative effects of problematic substance use, both to drug users and society [23]. This approach can help reduce crime and public disorder [24], while at the same time reducing drug-related harms. Some structural interventions to facilitate such change may include decriminalization of illegal drugs and the establishment of addiction treatment as an alternative to incarceration [25].

Globally, more than 30 countries have modified their drug policies to include public health goals and harm reduction recommendations [26]. On the international level, the World Health Organization (WHO), the United Nations Office of Drugs and Crime (UNODC), and the Joint United Nations Programme on HIV/AIDS (UNAIDS) have established a set of guidelines to minimize the harm caused by drug use dependence among PWID. These harm reduction services include: needle and syringe provision programs (NSPs); opioid substitution therapy (OST); HIV testing and counseling; Antiretroviral therapy (ART); prevention and treatment of sexually transmitted infections; condom accessibility programs for PWID and their sexual partners; targeted information, education and communication; prevention, vaccination, diagnosis and treatment for viral hepatitis; and prevention, diagnosis and treatment of tuberculosis [27]. All these strategies are evidence-based practices that have showed

their cost-effectiveness in achieving health-related outcomes, and whose impact is enhanced if they are employed in combination [28].

Drug policy throughout the Latin American region has mirrored the US approach of addressing the negative consequences of drug use and trafficking through the criminal justice system. The region plays a major role in the world supply and trafficking of illicit drugs. Not only is it the sole producer of coca leaves in the world and a place of rising consumption, but it has also become a main producer of opium for the North American market [29]. The war on drugs promoted by former president Richard Nixon (1969-1974) led to a militarization of the drug problem, designed to suppress drug production [30] in the countries of origin, along with the conceptualization of the drug problem as a national security issue. In Mexico, for example, the government of former president Felipe Calderón (2006-2012) launched a war against drugs, using the army to fight the activities of drug cartels [31]. This policy is believed to have led to an increase in violence [32], doubling the rate of homicides at the national level, from 10 per 100 thousand in 2006 to nearly 24 per 100 thousand in 2010 [33]. In particular, violence was higher in those municipalities with a military intervention [34], for example, Ciudad Juarez, Nogales and Tijuana (49 homicides per 100 thousand in 2008). The Mexican prison system also experienced a high number of incarcerations [35] due to drug crimes, with close to 140,000 additional inmates accused of drug use and possession violations from 2009 to 2012 [36].

In Latin America, the ‘war on drugs’ approach has proven an abject failure in the realms of public health and public security [37], with high levels of violence [38],

and no observed reductions in drug production and consumption [39]. In response, several countries in the region such as Brazil and Mexico have begun shifting strategies and are now focusing their efforts on minimizing the harm caused by illegal drug use. Both countries recently attempted to transition from a firm prohibitionist approach, which emphasizes the prosecution of drug possession and consumption, toward a legal framework that could promote prevention and decriminalization [40]. They modified their legal statutes to decriminalize small-scale possession of drugs for personal consumption, and have established NSP in some of their cities. The comparison between Mexico and Brazil that is described in Chapter 1 can help us understand the complexity of balancing criminalized approaches to drug reform with public health policy.

While focusing on reducing illegal drug production, in 2009 the Mexican government modified several laws in an effort to shift the prosecution of small-scale drug possession to the state (rather than the federal) level [41]. These reforms were also devised to divert appropriate resources towards the arrest and criminal prosecution of drug traffickers. The new reform, called the “narcomenudeo” specified allowable levels for drug possession for immediate personal consumption without being considered a felony [42]. Seeking to also reduce incarceration rates, the new reform denoted that those individuals possessing less than a specific legal threshold should be released; however, upon the third drug-related infraction individuals were supposed to be referred to mandatory treatment [43]. Although the reforms removed all criminal sanctions for personal consumption from the penal code, the reform still required drug users to be processed through the public safety system [44], perpetuating their criminalization [45].

The “narcomenudeo” drug reform also acknowledged the need to foster academic research to evaluate its results, encouraging partnership between universities and government institutions [46].

In 2010, the “narcomenudeo” reform became effective in Mexico’s northwestern most state of Baja California, with the mandate to complete its funding and implementation by 2012. Tijuana, the biggest city in the state, is a major route for drug trafficking and the busiest land border crossing of the world [47]. Its drug consumption patterns are shaped by its proximity to the US border, with higher levels of methamphetamine and heroin consumption compared to the national average [48]. The city forms an urban border region with elevated concentrations of high-risk populations such as sex workers, PWIDs, and deportees from the US. Compared with the national average in Mexico (0.2%) [50], Tijuana also has one of the highest rates of injection drug use in the country, resulting in highly-elevated prevalence among PWID of HCV (95%), latent TB infection (57%) [51] and HIV (3.5% among male PWID and 10% among female PWID) [52,53]. Many PWID in Tijuana inhabit the area that physically divides US from Mexico, referred to as the Tijuana River Canal. Of the nearly one thousand people that inhabited this liminal space in 2013, almost 90% deportees from the United States, 69% of the total population reported frequent drug use, and 20% reported initiating drug use while living in the area [49].

Desipite considerable potential benefit to this population, prior research among PWID in Tijuana indicated that the implementation of the “narcomenudeo” reform has been limited. Virtually none of the drug users participating in a cohort study [54] in the

city experienced any of the operational components of the reform, underscoring the lack of implementation on the street [55]. As part of a Memorandum of understanding (MoU) between UCSD and the SSPM Tijuana, the police department provided an internal precinct-level database of incidence reports, including drug possession, homicides and robbery arrests, among others. Chapter 2 examines these statistics to measure policing toward drug users in the city, shedding light on the existence of an implementation gap of the "narcomenudeo" reform through the use of official arrest data.

Several studies have documented the need to incorporate police training programs that promote the prevention of occuaptional risks, in particular those related to the risk of HIV transmission [56], to align public safety and health objectives [57]. In order to improve street-level uptake of the reform, the Tijuana Ministry of Public Safety (SSPM Tijuana) began implementing a police education program (PEP) – ESCUDO [58], in collaboration with the Division of Global Public Health at the University of California San Diego (UCSD). The impact of the PEP was assessed in Chapter 3 through matched paired nominal data. Predictors of improved legal knowledge, pre vs. post-PEP, were identified using logistic regression.

This research offers an opportunity to study not only the potential impact of an public health-oriented drug policy reform but also a police intervention program that can contribute to better aligning public health with public safety objectives. Focusing on Tijuana provides an opportunity to take advantage of a unique research environment to evaluate the implementation of the "narcomenudeo" reform on the ground. The use of unpublished detailed internal police statistics provides a detailed account of

enforcement dynamics following the implementation of the reform in a case study setting. Additionally, this research can inform future trainings in harm reduction strategies and occupational safety, as well as other structural interventions involving the police. This research represents a novel approach for data sharing and analytical collaboration between public safety practitioners and public health researchers, which had previously proven elusive. Finally, this dissertation adds to a growing body of literature that seeks to understand the challenges to problematic drug use as a public health issue rather than a security concern, both in Mexico and Latin America overall.

Aims and hypothesis

The specific aims for this dissertation proposal are:

Chapter 1. To understand the rationale, strategies, and implications of drug policy reform in the Latin American region, through a comparative analysis between Brazil and Mexico—two early adopters who shifted strategies to focus on minimizing the harm caused by illegal drug use.

Anticipated result: While these countries have shifted towards harm reduction strategies that address drug use, an analysis of the laws seems to indicate that criminal justice is still the primary focus of the reforms. Drug possession continues to be understood as a public safety issue, as other factors such as the legal system, local law enforcement agencies, and political circumstances have shaped the drug policy to focus primarily on criminalization.

Chapter 2. To examine changes in the monthly number of drug possession arrests, compared to violent and non-violent arrests, before and after the "narcomenudeo" reform enactment in Tijuana, Mexico.

H_1: The "Narcomenudeo" reform significantly modified the policing of drug possession in the city of Tijuana, compared to other crimes, after implementation of the reform in the city.

Chapter 3. To establish if there are significant changes in Tijuana police officers' knowledge of Mexico's laws on drug possession, using pre and post self-reported training surveys following the implementation of a PEP. Identify individual police officer characteristics associated with improved legal knowledge.

H_1: There will be a statistically significant increase in the knowledge of the law regarding decriminalized quantities of drugs among police officers after participation in the PEP.

$H_{1.1}$: Changes in the knowledge of the law, among officers unaware of decriminalization limits, are predicted by sociodemographic factors (e.g. gender, age, education).

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CHAPTER 1. A PUBLIC HEALTH APPROACH TO DRUG DECRIMINALIZATION IN BRAZIL AND MEXICO

ABSTRACT

This paper describes the recent efforts of decriminalization of illegal drugs in Brazil and Mexico to understand the challenges, strategies, and implications of drug policy reform in the Latin American region. Decriminalization has not been fully implemented to account for public health concerns in both countries, as other factors such as the legal system, local law enforcement agencies, and political circumstances have shaped the drug policy to focus primarily on criminalization. Failing to consider the potential and ongoing health impacts of drug policy overlooks alternatives to the current characteristics of the adopted reforms, which have produced discouraging results. The chapter points to the need to promote evidence-based harm reduction strategies, including new training and education programs for government agencies and drug users. In addition, the production of academic research to evaluate the results of policy reforms is needed in order to develop a more comprehensive and successful drug policy.

Introduction

Around the world, illicit drug use and trafficking continue to be a problem associated with violence, spread of human immunodeficiency virus (HIV) and other blood borne infections, as well as fuelling the mass incarceration of illicit drug users and street dealers [1]. A 2010 analysis of the Global Burden of Disease estimated that illicit drug dependence accounted for 0.8% of the total global disability of adjusted life years (DALYs); opioids and amphetamines were the most common drug use dependence disorders [2].

Despite nearly 100 years of global efforts for drug control and the creation of multilateral regulations that penalized the production, manufacture, trade, and consumption of illegal drugs, the results continue to be discouraging [3]. The suppression of drug production in one region was often followed by its emergence in others. This has led to unintended health and social consequences that failed to minimize the harm caused by illegal drug use disorders [4], such as HIV and Hepatitis C virus (HCV) transmission due to injection drug use, intra-personal violence due to conflict between rival drug trafficking organizations, and the negative effects on the physical and mental health of the users [5]. In some cases, harm reductions strategies have shifted drug policy towards a public health approach in an effort to reduce the negative effects of illegal substance abuse, both on users and society [6]. These programs might include the decriminalization of small amounts of drugs considered for personal consumption and the establishment of addiction treatment as an alternative to incarceration [7].

Important in understanding the implications of drug policy is a distinction between legalization that considers the removal of any prohibition against the production and use of illegal drugs, and decriminalization that still maintains penalties for the production and trafficking, but eliminates criminal penalties for their use [8]. For example, the Netherlands transitioned in the mid-1960s from an active prohibitionist policy toward a system that emphasized rehabilitation and prevention, including the regulation of commercial sale of cannabis or heroin maintenance as a drug treatment, which lead to a stabilization on the number of users [6]. This model has since expanded in other European countries. In 2001, Portugal moved towards the decriminalization of illegal drugs, and introduced harm reduction strategies such as needle exchange programs and commissions for the dissuasion of drug addiction [9].

In the Latin American region, the policy of a “war on drugs” promoted by the United States government, has shaped the ways in which drug policy has been understood and implemented in recent decades. In 1971, former President Richard Nixon (1969-1974) addressed the congress on “drug abuse prevention and control” and declared a war on heroin addiction, both domestically and abroad, emphasizing the need to disrupt opium production internationally and increase the punishment for drug crimes locally [10]. It was during the Reagan Administration (1980-1988) that drug policy took a decisive punitive turn, which defunded rehabilitation programs and emphasized a law enforcement approach [6]. This led to the militarization of the drug problem in Latin America and around the world, which emphasizes the use of the armed forces for the

suppression of drug production [2], and the criminal prosecution of all drug activities, including possession for personal consumption of illegal drugs [5].

This chapter seeks to shed some light on the challenges of drug policy in Latin America by comparing and contrasting recent reforms in two countries: Mexico and Brazil. Both countries offer insights into the complexity of balancing criminalized approaches to drug reform with public health policy. The geographic location of these countries, the most populous in Latin America, position them as key players for the trafficking of illegal substances to the largest retail markets in dollar value (e.g. USA, Canada, and Europe) [11]. Policy change in both cases has been driven by an increase in drug-related violence, pressure on overcrowded local jail systems, and an international shift towards evidence-based practices that emphasize the necessity to see drug use as a public health problem rather than a criminal issue.

These two nations have tried recently to transition from a firm prohibitionist approach, which emphasized the prosecution of drug possession and consumption, toward a legal framework that should promote prevention and decriminalization. Brazil has pioneered in the region a series of reforms that include harm reduction services, such as needle exchange programs and opioid substitution therapy [12,13]. More recently, Mexico adopted similar approaches that are still pending the application of new legislation [14,15]. Different organizations such as the Global Commission on Drug Policy, which includes the former presidents of both Brazil (Fernando Henrique Cardoso, 1995-2003) and Mexico (Ernesto Zedillo, 1994-2000), have advocated for an

end to the “war on drugs,” setting concrete recommendations to move away from the current status quo of drug policy toward a public health perspective [16].

Although both reforms in Brazil and Mexico have removed all penal sanctions for personal consumption from their drug laws, in practice, the encounters with the public safety system continue to make criminalization a de facto experience for drug users [15,17]. Despite shifts towards prevention and decriminalization, these same legal reforms also have increased the penalties for those considered to be drug traffickers, and the application of the law in both countries is subject to different interpretations due to a lack of knowledge and systematic corruption among police officers and judges in charge of their application [5]. By continuing to approach the drug problem as a criminal issue, policy makers in both Mexico and Brazil risk ignoring important health impacts that have implications at the local, national, and even global level [15,18]. As this paper will address, failing to consider the potential and ongoing health impacts of drug policy overlooks potential alternatives in contexts that are marked by growing public health concerns.

Examination of the underlying contexts that have shaped the successes and failures of implementing harm reduction strategies in Mexico and Brazil offers potential to learn from these emerging models as well as contribute to the policy debate within the international debate on drugs. An analysis of the implementation of more recent models of decriminalization in Mexico and Brazil highlights the need to shape public policy toward a shift on adequate alternative approaches to the problem of illegal drug use disorders.

Harm Reduction Strategies

The transmission of infectious diseases such as HIV and HCV remains a global public health problem. In particular the risk of infection of HIV, and Viral Hepatitis, both C and B, is higher among people who inject drugs (PWID) and it can change according to factors such as frequency of needle sharing [4], unprotected sex, and personal and societal elements such as gender inequities or the local policing practices [19]. According to some estimates, 13.1% of the total PWID population is living with HIV worldwide [3]. In addition, HIV prevalence is higher among incarcerated populations, and in some cases PWID represent almost half the inmates, as in Slovakia, Vietnam and some regions of Russia and Ukraine [20]. Lack of access to injection equipment, condoms, and antiretroviral treatment increases the risk of transmission of HIV and other blood-borne and sexually transmitted infections [21].

In order to address this problem, the World Health Organization (WHO) and the United Nations Office of Drugs and Crime (UNODC) have established a set of guidelines that include several harm reduction interventions such as needle and syringe provision programs (NSPs), opioid substitution therapy (OST), condom accessibility programs for PWID and their sexual partners, and targeted information, education and communication [22]. The provision of sterile injecting equipment reduces the number of injections with used needles and syringes, and they can be provided at fixed sites or through mobile services; these NSP also represent an opportunity for direct contact between health officials and PWID, allowing for the promotion of services such as HIV testing and treatment. These strategies also emphasize the need to safely dispose of used

equipment to prevent further spread of disease. In addition to the NSP, the use of OST can reduce the likelihood of initiation into drug injection, increase adherence to anti-retroviral therapy, and should be considered as part of the HIV prevention strategy among PWID [22]. Recently UNODC has developed training manuals designed for law enforcement officials and their interaction with PWID [23].

While most public health strategies to minimize harm due to drug use are centered on the HIV epidemic, there is also a call to address the Hepatitis C problem, sometimes referred to as a hidden epidemic [24]. This can be further complicated by what is referred to as a "syndemic problem," referring to the presence of two or more mutually-reinforcing epidemics, for example HIV and HCV among PWID, that contribute to a greater burden of disease on the population [25]. It is estimated that worldwide there are 10 million PWID infected with HCV— a common co-infection with those living with HIV, which can lead to liver disease and higher mortality [24]. The risk of contracting HCV when using a contaminated syringe is five to twenty times higher than HIV transmission, since the virus survives for a significant period outside the body, affecting the ability of harm reduction strategies to contain the epidemic [26].

Several factors such as genetics, peer influence, cost and the route of transmission also contribute to substance use disorders [8]. This often combines with other socio-economic variables (e.g. trade routes, lack of health services, availability of clean needles) that shape the environment in which drug users experience their risk of infection [19]. These factors influence the attitudes and risk-taking behaviors of drug users, affecting the transmission of infectious diseases [27]. This risk environment can

be defined as the space—both at an individual and societal level— where several factors interact to increase the harm of drug use [28]. This implies that any solution to minimize the harm caused by substance use must recognize these structural problems as part of a synergic interaction between disease and social problems [29].

To address these challenges through drug reform, researchers and policy experts have highlighted the importance of harm reduction strategies. These strategies emerged in Europe the 1980s as “new” public health approaches to reduce heroin injection harms, and were scaled up around the continent one decade later, gaining high levels of political acceptance among the member states in the last decade [30]. The increase on NSP and OST in Europe shows the need to promote harm reductions strategies from the margins of public policy, as is currently seen in Latin American countries, to the mainstream role of public health as a driver of drug policy.

The barriers to successful addiction treatment, such as stigmatization and criminalization, combined with a high HIV prevalence among PWID in Europe, led the government of Portugal to address the public health crisis and treat addiction as a disease rather than as a criminal act[31]. The legal reforms were preceded by a public debate regarding the harmful consequences of public drug use, in particular of injected heroin use and the infection with HIV, hepatitis, and tuberculosis [8]. The parliament recognized that zero drug use was unachievable, allowing for a decriminalization of drug use as long as the amount possessed of any illegal drug did not exceeded the average consumption for a period of ten days [18]. The police cannot make arrests related to drug offenses and should only refer the user to the commissions for the

dissuasion of addition composed of three experts belonging to the ministry of justice and the ministry of health, which could render a judgment on drug addiction related topics.

The 2001 reform in Portugal is often considered a successful case study for harm reduction implementation, which offers insights into the successes and shortcomings in the Brazilian and Mexican approaches [9,18]. Although there is little empirical data to assess the consequences of the reform, the positive results include: a decrease in prevalence of injection drug use with a reduction in HIV and HCV infections; increase of drug users in treatment; and no significant drug use increases when compared to other countries in the region [31]. Closer consideration of the factors driving criminalization policy—and its implications in furthering public health concerns—is thus necessary to move towards more viable options.

The Failure of the War on Drugs

To understand the complexities of the drug use challenge we need to draw the relationships between the drug market and its interaction with individuals and society. In 2012, it was estimated that around 5% of the total world population between the ages of 15-64 had used at least once an illicit drug [1]. The trend in drug use varies from region to region, with 45% of total cocaine users and an estimated 3 million of PWID in the Americas [1]. South America has experienced an increase in consumption of cocaine, including smokeable forms, between 2005 and 2011 [11].

In the retail drug market, UNODC estimates the illicit market value in the Americas was close to $151 billion USD in 2003, with North America representing more than 44% of the total value [11]. Although estimations may vary between agencies, the consistency of UN data on production and consumption could provide the most reliable estimation available. The added value profits are to be found in the end-markets, and not on the origin places of production. In the case of heroin, the retail value is 170 times more than at the producing place [11].

The Latin American region plays a major role in the world supply and trafficking of illicit drugs, and is the sole producer of coca leaves in the world, with Colombia, Peru, and Bolivia—all of them countries neighboring Brazil—producing more than 130,000 ha in the year 2012 [1]. In the 1970s, the production of opium in Mexico and the Golden Triangle (Myanmar, Laos and Thailand) increased. At the same time, the Turkish government engaged in a process to regulate their opium production with the United States, conceding the implementation of a licensing scheme for medical purposes that acknowledged that total eradication of poppy cultivation was impracticable [32]. Currently, Mexican production has replaced Colombia as the main producer in the continent in just a decade [11]. Similarly, the eradication campaigns of coca leaf in Colombia have shifted its production to other Andean neighboring countries, reflecting underlying market dynamics that affect the way we should understand the supply for drug consumption [3].

The drug policy of Latin American countries has been strongly influenced by the position of the United States' Government. Since the emergence of prohibition

policies in the early 20th century, the region has experienced an increase in drug production and trafficking, as the illegal market continues to produce large profits [33]. This impact is particularly evident in Mexico, where the cultivation of opium became a lucrative business since the 1920s, followed by an expansion of the trafficking routes and the emergence of distribution networks after World War II [34]. Former President Richard Nixon particularly expressed concern in his 1971 special message to Congress, referring in particular to increased heroin use among returning Vietnam Veterans [10]. By 1974, Mexican cartels controlled at least 75% of the heroin market in the United States of America [34].

The rise of cocaine in the US market in the 1980s, and its trafficking helped create trafficking routes through Mexico, the Caribbean, and finally Central America from the Andean countries in the south. More than one decade later, the Mexican DTOs experienced an increase in power as tighter border security in the US-Mexico border helped them to dominate the trafficking of cocaine, to the detriment of other traditional routes such as the Caribbean [35]. This domination of trafficking routes by Mexican DTO permitted them to significantly increase their budget to corrupt Mexican officials and led to violent competition among rival Mexican DTOs. These elements contributed to the conceptualization of the drug problem as a national security issue, provoking the involvement of the army into an anti-drug strategy focused on crop eradication that was followed by the creation of Federal institutions to tackle organized crime [36].

Challenges of Harm Reduction while keeping drugs illegal

A legal framework that criminalizes heroin and other illegal drugs plays a significant role in creating barriers for syringe access, HIV testing, and the availability of opioid substitution programs [28]. Previous research found that PWID are a highly mobile population, particularly along drug distribution routes [37]. In addition, aggressive policing activities also affect the migration patterns of PWID, creating risks by the displacement of the disease within the city limits, and hindering the capacity of public health officials to provide community services and HIV testing and treatment [38]. Previous research has also focused on police enforcement (formal or informal practices) as a factor that drives riskier injection practices, as the PWID are afraid of being arrested while carrying syringes [39].

The incarceration of drug users increases their risk of HIV and HCV infection. Prisoners are subject to sexual abuse and extortion, and illegal drug use continues to be a problem while in prison [40], as the incarcerated population continues to have access to illegal substances, but without the needed harm reduction strategies; clean injection equipment becomes scarce and the chances for blood borne infections increases [21]. In Mexico, for example, eestimates are that between 2% and 3% of the prison population is infected with HIV [41].

Drug policy throughout the Latin American region has contributed to negative consequences of drug trafficking through the legal systems. Along with militarized approaches, local police forces and courts are used to prosecute offenders, both traffickers and consumers, the majority of which are men; recently, there has been a rise

in the prosecution of women who act as “mules,” or traffickers that smuggle drugs into the demand market [42]. This approach has direct implications on how harm reduction is implemented, and co-exists with the prohibition policies toward drugs that remain illegal.

This emphasis on enforcement has led to an increase in the prison population, particularly in Brazil and Mexico, which have the fourth and seventh largest prison populations in the world [43]. It has also reinforced the stigmatization of drug users, which exacerbates drug problems, and produces direct negative implications for treatment access and public health outcomes [5]. In Brazil the total number of prisoners accused of trafficking increased from 32,880 in 2005 to 91,037 in 2009, representing 19.22% of total prison population [5]. In 2012, a survey on federal penitentiaries in Mexico documented that 60% of the population incarcerated was accused of drug crimes, with women reporting a higher number of 80% [44].

A general increase in drug-related violence is also a matter of pressing public health concern, as the transit of drugs and their consumption generates crime and violence within the countries involved. For example, studies in Colombia have shown that larger illicit drug markets leads to higher levels of violence; a 10% increase in market value lead to a 1.2% – 2% increase in the drug-related homicide rate [45].

Following the increase in violence, and after a failed reduction in drug production and consumption [35], both Mexico and Brazil started implementing legal reforms directed toward the introduction of a public health approach to the drug problem, decriminalizing the possession of minimum amounts of drug for personal

consumption and the installment of harm reduction strategies within the guidelines set by the Ministries of Public Health. These strategies have been informed by increasing awareness of public health concerns worldwide and the global pressure to curtail violence and corruption.

Case Studies in Addressing the Challenges of Harm Reduction

The social exclusion of many drug users, largely due to poverty and lack of education, seems to enhance the negative impact of the criminal approach to illegal drug use. In Brazil, an assessment of the current drug laws in the city of Sao Paulo [46] found that most of the detained were men (87%), between 18-29 years old, black (59%), with only elementary education (60%), and were frequent drug users (50%). This same study revealed that in the majority of the cases (84%) a lawyer was not present during their stay at the police precinct, producing a high conviction rate (88%) with almost a third receiving a minimum sentence of one year and eight months. In Mexico, these numbers are similar, with close to 40% of people in jails accused of petty crime and drug retail sales crimes, mostly poor and marginalized population. In both countries, nearly 40% of the prison population are still waiting for a trial [5].

In the case of Brazil, the country saw its drug trafficking incarceration numbers increase by more than 100% between 2007 and 2012 [5]; these offenders were mostly first time arrests and had small quantities of illegal drugs in their possession [46]. All of this occurred despite the fact that in 2006 changes in the law made a clear distinction between consumers who should not be sent to prison, and the persecution of traffickers.

Evidence suggests that local judges continue to exercise a punitive approach toward drug possession, undermining the efforts to introduce effective decriminalization [5].

In Mexico, the lack of consolidated data on prison population and their crimes makes it harder to evaluate the impact of the recent drug policy changes. A recent analysis on the states of Chihuahua, Jalisco, and Mexico City has shown that marihuana possession is the main cause of drug sentencing, followed by cocaine with the intent of distribution. In 2008, the total number of people sentenced for drug-related crimes was 12,228 around the country, representing an increase of more than 40% from 1998 [11]. Between 2009 and 2012, 140,860 people were detained around the country for drug consumption [15]. Decriminalization of drug use in both Mexico and Brazil are not only hindered by an excessive incarceration, but essentially by the failure of keeping drug users outside the judicial and public safety system [14,15].

Brazilian studies have documented the harassment and intimidation of drug users by the police, and reported it was common to have injection equipment confiscated and broken [47]. In Mexico, arrest for possession of used/sterile syringes was associated independently with receptive syringe sharing [39]. The contrast in the two countries between the experiences reported by the drug users and the incident reports of police may be reflecting that the “law on the books” is not properly implemented on the street [39], as drug users are not informed of their rights and proper legal process. Arbitrary policing tactics continue to target high-risk populations increasing the risks for HIV infection and adverse health outcomes [48].

Finally, the gradual implementation of the harm reduction programs in both countries has been possible due to an alliance of local and international non-governmental organizations, as well as dissimilar government support, that provide the required funds to expand harm reduction [13]. In Mexico 77% of the NSP have been funded by the Global Fund to fight AIDS, Tuberculosis and Malaria (Global Fund) whose financing ended in 2014. In stark contrast, Brazilian harm reduction projects are financed mainly by the National STDs/AIDS program depending on the Ministry of Health, and to a smaller degree, on income from local NGOs [49]. Closer consideration of the specific context in each case provides a clearer picture of the factors shaping the strengths and weaknesses of implementing harm reduction strategies in the context of ongoing criminalization policies. The history of this transition from a prohibitionist approach to a harm reduction strategy could help understand the shortcomings to decriminalization in both countries.

Brazil

In Brazil, the latest survey on youth population has showed a prevalence of lifetime drug use of 24.2% in 2010, reflecting an increase from 22.6% in 2004 [50,51]. In particular, Brazil has experienced an increase in lifetime cocaine consumption among High School students from 2% in 2004 to 2.8% in 2010, due to its large urban population and its convenient geographical position for drug smuggling to Europe, with an estimated prevalence of crack cocaine use of 0.7% for both years [13, 51]. Among the 27 state capitals, only 5 reported a decrease in lifetime prevalence, mainly in the North,

while the rest experience an increase. As for heroin use, the reported lifetime national prevalence was 0.3%, with the highest number of 0.8% in the city of Cuiba, state of Mato Grosso [51].

Brazil is a strategic area for exporting drugs to the European market, and, consequently, the large profits generated by drug trafficking has helped to establish a local network of big retailers in the metropolitan areas of the country [12]. This pattern is correlated with public health issues. In Brazil, the HIV epidemic among PWID followed the main highways that connect the Center West area of the country where the drugs are smuggled into Brazil, with the South west where most of the exporting occurs [52].

During the military regime (1964-1985), the harsh prosecution of drug crimes coincided with the establishment of the international prohibition policies. The beginning of the DTOs in the country has its origins in the military dictatorship, as common criminals and political dissidents shared common areas in the Federal prison system, which led to a shared knowledge of tactics and organizational skills used against the State [53]. It was not until the 1980s that organized crime became a security concern, largely due to the fact that Brazil has a long border with the main Andean producers of coca bush in the world, acting as a natural bridge to the export of cocaine to Europe [54]. The access to cheap cocaine lead to the creation of markets in the slums of the Brazilian cities or “favelas.” For example, in the city of Rio de Janeiro the control of DTOs such as “Comando Vermelho” or “Amigos dos Amigos” created a relationship of patronage with the community that exists until today [53].

The origin of Brazil's most recent drug policy stems from the government of former President Fernando Henrique Cardoso (1995-2003), with the creation of the Antidrug National Ministry (Secretaria Nacional Antidrogas – SENAD), headed by an army General [55]. In addition, the army and air force assumed the control of the border areas of the country to stop drug and arms being smuggled through the Amazonian region. Under the government of President Lula da Silva (2003-2011), the army was used for policing activities and to fight drug trafficking directly in the favelas, following a series of highly publicized violent actions by the DTOs in the urban areas of Brazil in 2010. The favela known as "Complexo do Alemão" in Rio de Janeiro, is one of many taken over by the army and the navy, with the objective of reducing the violence by the DTOs in the area, as well as the implementation of a new security strategy called "Unidades de Policía Pacificadora – UPP" (pacifying police units) all around the city [56]. Even though Brazil has not received direct financial aid from the United States to fight the DTOs, its militarized strategy follows a similar pattern throughout the region, especially that of the one undertaken by Mexico during the last decade.

Despite a historical emphasis on criminalization, recent drug policies have shifted towards decriminalization and harm reduction strategies. The first attempts to decriminalize drug possession with alternative jail sentences, such as mandatory treatment, date from former President Fernando Henrique Cardoso and the passage of the law 10,409 in 2002 [57]. This was the beginning of a lengthy congressional process that culminated with the approval of Law 11,343 of 2006, under former President Lula da Silva [58]. This law, still in effect, shapes a new national drug policy under the

guidance of a federal institution, the National System of Drug Policy (Sistema Nacional de Políticas Públicas sobre Drogas – SISNAD). The law decriminalizes personal drug possession, even in cases where the growth of a plant is considered to be for personal use; it recognizes drug abuse as a disease that hinders the quality of life, and recognizes harm reduction as a prevention strategy, as well as community service as a penalty [59].

Under this reform, any drug crime (production, trafficking, possession and consumption) is still processed within the criminal justice system, and the law does not distinguish clearly between the categories of user and drug trafficker. However, for those users who fall under the category of trafficking, the minimum jail term was increased to five years. Each sentence is based on a case-by-case basis, giving place to a high discretionarily within the application of the law [59].

In Latin America, Brazil has lead the way to the introduction of harm reduction strategies in the continent [60], enacting a series of programs to prevent the spread of the HIV infection among the drug user population, including PWID and crack users [61]. The first attempts date from 1989 in the city of Santos; however, is not until 1994 in the city of Bahia that the first NSP is implemented in South America [49]. Some estimations calculate around 100 NSPs around the country, among different municipalities and States, including the creation of local organizations such as the Brazilian Harm Reduction Association (ABORDA) and the Brazilian Harm Reduction Network (REDUC) [12]. These efforts have also benefited from a free access to anti-retroviral therapy for HIV infected persons and the government campaigns that have made condoms and it’s use widely available throughout the country [62].

Mexico

Distinct from Brazil, patterns of consumption and trafficking in Mexico are shaped by is proximity to the US border. The national lifetime consumption of illegal drugs in Mexico has increased from 4.1% to 7.2% between 2002 to 2011, and the age of initiation has decreased from 23.6 years to 20.1 during the same period [63]. The latest 2011 addiction survey in Mexico reported a prevalence of heroin use of 0.1% among the general population. However, high levels of consumption are found in the northern states of Mexico of around 3.8%, according to figures extracted from people seeking rehabilitation services [63]. It has been previously documented that the lower price for black tar heroin and increased security at the border following September 11 of 2001, contributed to high level of heroin injection in Mexican border cities, where needle sharing, and shooting gallery attendance are factors that increase the risk of blood borne infections among PWID [34].

In 2012, more than 95% of the cocaine seized by the United States came from Mexico, with local drug trafficking organizations fighting over the routes to smuggle it, including through Central American countries [1]. The production of opium poppy is concentrated in five states of Mexico (Durango, Chihuahua, Sinaloa, Guerrero and Michoacán); although reported seizures by the Mexican government have decreased, the US has reported the opposite, with an increase to 5.5 tons in 2012 compared to 4.8 tons in 2011 [1]. Mexico has also reported the largest seizures of methamphetamines in

the world, with 44 tons in the year 2012, and it continues to export large quantities of marihuana to the American market [1].

Drug trafficking became a national security issue in the early 1990s, with the Federal government creating a series of institutions such as the National Intelligence Center (Centro de Investigacion y Seguridad Nacional - CISEN) and the National Institute against Drugs (Instituto Nacional de Combate a las Drogas). President Vicente Fox continued with the capture and extradition to the United States of DTOs leaders, such as Osiel Cardenaz and Benjamin Arellano Felix [44].[44] At the same time, it created two new federal agencies to fight crime, the Ministry of Public Safety (Secretaria de Seguridad Publica) and the Federal Investigation Agency (Agencia Federal de Investigaciones – AFI) [64].

Recently, under President Felipe Calderón (2006-2012), the Federal government undertook an aggressive strategy to combat drug trafficking. The most important element in the strategy was the extensive use of the military for its use in policing activities around the country, in detriment of the traditional crop eradication campaigns [65]. The Federal government used the Army and Navy forces to set up checkpoints, conduct raids, patrol streets in rural and urban areas, with mixed results in reducing the violence and with high numbers of human rights violations [66].

In 2007, to finance its strategy to fight against the DTOs in the country, the Administration of President Calderón signed an agreement with the United States called the “Merida Initiative.” Divided into four pillars1 the program has helped finance the training of navy Special Forces, police and prosecutors, the acquisition of helicopters

and special inspection equipment, worth approximately $1 billion USD [67]. However, the results have been disappointing, as the DTOs have expanded their control of territory, violence has spread to other parts of the country, and the flow of drugs has not been altered significantly [68]. Such factors have increased a militarized emphasis on drug control over consideration of its impact on public health.

Despite the emphasis on a drug war strategy, some decriminalization efforts emerged alongside criminalization policies. In 1994 the Mexican Government removed federal penalties for drug possession crimes if it was considered as personal consumption; article 199 of the Federal penal code set that if a person was deemed as an addict by the health authorities the person should be sent to treatment with no additional penalty [69]. Reform of the penal code also increased the minimal penalties for drug production and trafficking. However, in practice the possession of illegal drugs continued to be processed by the federal justice system, as suspects had to be presented by local authorities in front of the Federal Prosecutors Office (Ministerio Publico Federal), which had authority to decide whether to press charges or not.

In 2004, former President Vicente Fox (2000-2006) sent congress a modification of the General Health Law that set the framework for the federal Penal Code, to create the new crime of "*narcomenudeo*" or retail drug sale, which would be prosecuted at the state level. The reform justified the need for prosecuting retail sale as a part of a new problem—posed as a concern for the public safety of the country. Within these changes there was also a clear definition for immediate personal consumption, and the reforms provide the possibility of avoiding any sanction if the user is defined as an addict [70].

The Mexican Congress approved the legal reforms in 2006, with the addition of a specific table within the General Health Law to determine the amount considered as of immediate personal consumption of several illegal substances. However, President Fox decided to veto the law and send it back to congress for modifications. Some would argue that this was due to the public pressure by then President George Bush in the United States [18]. Since his departure from government, Vicente Fox has promoted the legalization of all drugs, with particular emphasis on marihuana [72].

In 2009, under a new administration, the Mexican government passed the law that decriminalized a maximum amount of drug possession in an effort to shift the legal prosecution of small-scale drug possession to the state (rather than the federal) level [73], so that appropriate resources could be diverted towards the arrest and criminal prosecution of drug traffickers [15]. The new reform set maximum amounts of a drug that a person can have for immediate personal consumption without being considered a felony. Similar to the Portuguese reform, a new crime of "*narcomenudeo*" could be prosecuted by state authorities under a certain threshold; beyond that quantity, the crime is considered a federal case of trafficking. It is important to mention that both "*narcomenudeo*" and trafficking saw their punishment increased in comparison to the previous law. This is an important difference with the Brazilian case, since the judges and prosecutors must measure the quantities to render a judgment.

In contrast to Brazil, the introduction of harm reduction reform in Mexico has been slow, in part due to the US government pressure, fixated on policies that facilitate its eradication campaign [74]. However, the modifications in Mexico's General Health

Law did signify a change in strategies to fight drug addiction by mandating states to create rehabilitation systems and to avoid prosecuting individuals identified as drug dependent [71]. The law included the creation of a national plan to fight addiction through campaigns that emphasize public health-based approaches to drug use, also aiming to develop more efficient public policies by bolstering scientific research [71]. In an effort to reduce incarceration rates and improve outcomes, the new law denotes that those individuals possessing less than a specific legal threshold should be released; however, upon the third drug-related infraction, individuals may be referred to mandatory treatment [75].

It is also important to note that Mexico has conducted harm reduction strategies as part of the recommendations from the Joint United Nations Programme on HIV/AIDS (UNAIDS) strategy for attending and preventing HIV among PWID, and in parallel to the drug reforms. The National Center to Prevent and Control HIV developed in 2008 a targeted information, education and communication manual for harm reduction strategies among PWID [76], and in 2009 generated guidelines to prison population with HIV [77]. The are private and public clinics (Centros de Integracion Juvenil A.C. – CIJ) that provide OST and some publicly and internationally funded NSP on the northern states of the country (Baja California, Chihuahua, Sonora).

Shortcomings of Decriminalization and Harm Reduction Strategies

Although the prevalence of illegal drug use in Mexico and Brazil continue to be low in comparison the United States or Europe, the unintended consequences of the

"war on drugs" has led to high levels of violence in rural and urban areas in both countries, as well as focalized addiction areas, with increased risks for the spread of infectious diseases [47,78]. The involvement in the market of illicit drugs has prolonged structural impacts in both Brazil and Mexico. The money generated by the illegal drug trafficking leads to corruption schemes, both in individuals and institutions, which helps to protect the operations and money laundering from this illegal market. According to UNODC estimations, the global value of the cocaine market is estimated in a range between US$75 and US$100 billion, while the heroin market is valued in US$55 billion [11].

The corruption of the legal system has led to the establishment of parallel power structures that compete against the state for the provision of public and private services. In Brazil, local mafias control not only the drug market but also illegal gambling, TV services, taxation and transport services [53]. In Mexico, where approximately more than 85% of the crimes are not registered [79], the lack of trust in state institutions, combined with the corruption and power of drug trade organizations (DTOs) in the local sphere, has led to a rise in autonomous and self-organized armed civilian groups, known as "autodefensas" in southern Mexico during the first months of 2013 [80]. In both Mexico and Brazil, violence associated with drug trafficking has increased, with some estimates indicating a rate of 19 per 100,000 drug-related homicides in Mexico during 2009, in part due to the militarization strategy [81], and in Brazil the concentrated drug related violence has been documented since the1990s, with a rate of 26 per 100,000 in 2009 [82].

In both countries, distrust of the police forces ranges from 60% to 85% during the last decade, according to surveys by the Latinobarometro, with Mexico systematically showing higher numbers. Both countries share a similar structure of police and justice system, with a combination of National, State, and Municipal forces, as well as a division between the investigative (Ministerio Publico) and preventive police (Policia de Proximidad) [83]. Their current legal framework produces a high rate of direct interaction between corrupt police forces and drug users, in a stark contrast with the Portuguese experience.

Finally, several of the harm reduction programs are also limited by political opposition than hinders funding for alternative programs. In Brazil, for example, the first attempts to establish NSP in the State of Sao Paulo included threats of imprisonment for the public health personal working in the project [62]. The lack of funding can lead also to their cancelation and the HIV epidemic can change quickly when the programs, services and interventions are scaled down [3].

Evaluation and Policy Recommendations

For more than 40 years, the focus on a “war on drugs” has emphasized a reduction of the supply of drugs in the countries of origin, while severely punishing the possession and distribution of drugs at any scale. The army and navy have been used in both countries not only to eradicate and seize trafficking, but also more recently to conduct the role of policing in urban areas that are occupied by the DTOs. The creation

of national drug strategies continue to follow a national security concern, yet its consequences can, and should, be linked to pressing public health concerns.

Both countries play an important role in the political economy of illicit drugs in Latin America, in particular their proximity to the high value drug retail markets expands their role as trafficking routes, which elevates the accessibility of drugs to certain populations of dependent drug users. The money generated by the DTOs has allowed for the weakening of the local rule of law, reflected in high levels of violence and extortion as the organizations operate as local mafias that extend their business to other areas of the economy. Transparency and external controls on all the elements of the justice system could help to improve the rule of law in these cases, as well as control interactions between law enforcement and drug users on the street.

Mexico and Brazil have populations that are at higher risk of blood borne infections, such as users of heroin in Mexico or crack cocaine in Brazil. A full prohibitionist policy that focuses mainly on the reduction of illicit drug production and distribution has led to unintended consequences such as increased violence, spread of infectious diseases, and mass incarceration. Drug policy that emphasizes a contact with the justice system could adversely affect public health by increasing the risk environment of PWID, creating barriers for effective prevention, diagnosis, and treatment of HIV and HCV, among other infectious diseases. Importantly, the synergic interaction between substance abuse, violence, and HIV must be recognized (SAVA syndemic) [29].

While both countries have shifted towards harm reduction strategies that address drug abuse, a detailed analysis of the creation of the laws seems to indicate that criminal justice is still the primary objective of the reforms [18], as drug possession continues to be understood as primarily a public safety issue, resulting in an increase of incarceration due to small drug possession. Preliminary data indicates that in the Brazilian case there has been a failure to reduce the incarceration of drug users [5]. In the case of Mexico, a recent analysis of the Narcomenudeo Law has shown that since the implementation of the reform, the federal system has generated close to 90,000 reports of mandatory treatment, despite the fact that, in theory, these cases should be generated by the local authorities [15].

The Portuguese experience demonstrates that it is necessary for the general public to recognize the drug issue as a public health concern, rather than view drug users primarily through the lens of criminal justice. This alternative conceptualization of the drug phenomenon allows lawmakers to shape policy in a more progressive way [18]. A new framing of the drug use challenge could lead local legislators to introduce legislation independently from the federal changes and focused more on their local constituency; for example, the leftist governing party in Mexico city has introduced legislation to increase the quantities considered for personal consumption, the regulation of medical marihuana, and the establishment of a wide harm reduction network [84]. Unfortunately, this discussion remains absent in Brazil, where local politicians are more interested in “cleaning” the public spaces from drug users, particularly in Sao Paulo with an estimated population of 1000 users of crack in the city center [85].

A change in public perception could provide additional support for evidence-based successful interventions, such as safe injection facilities, OST or NSP, increasing public financing from federal and local governments. The city of Vancouver, Canada, for example, currently funds safer injection facilities that have effectively reduced the risks behaviors associated with law enforcement encounters, by reducing rushed and public injection, syringe sharing and overdose [86]. Also, the Netherlands has experimented with providing prescriptions of heroin for PWID; in two randomized control trials Van den Brink showed higher adherence and more effectiveness in reducing physical, mental, and social problems related to heroin addiction [87].

Parallel to the introduction of these new policies, proper evaluation techniques that inform policy makers and society in general about the consequences of drug reform in our countries must be developed. The availability of frequent and good quality data on substance use desorders trends must be one of the main goals for the federal governments. In this sense the case of Mexico could provide a good example for Brazil. Mexico has promoted regular national surveys on drug addiction since the 1970s, allowing for an improved assessment of the evolution of drug use in different segments of the population, including high-risk population such as PWID [63]. Brazil, however, has only conducted two national addiction surveys since 2001 [51], and is currently assessing the possibility of a third one. Unfortunately, there is also a lack of continuous monitoring for information regarding drug treatment access. In both countries, this remains a pending issue that has yet to be fully addressed by the federal authorities.

These instruments are necessary in order to fully assess and compare evidence-based policies implemented in each of the countries.

Research has also demonstrated that the intensive use of law enforcement and supply reduction likely does little to significantly alter the dynamics of illegal drug markets in the long run [88]. However, this evidence has not influenced Mexican or Brazilian policy. The replacement of drug retail networks can also lead to an escalation of violence, since the new sellers will have to compete for the local market [89]. As the discussion of Brazil and Mexico has illustrated, drug policy reforms including harm reduction components can have unintended consequences that fuel the political economy of illicit drugs, making it difficult for legal institutions to focus on harm reduction strategies. Police have tended to dedicate resources to the prevention of drug crimes, which overlooks health-related challenges and could be better redirected to the prosecution of violent crimes that affect the society [90].

Traditionally, security and public health sectors have operated independently, advancing differing visions of how to mitigate the harms of drug addiction. However, both share an emphasis on the importance of local-level approaches that might address the relationship between drug abuse, violence, and community health and safety. A crucial factor in this context has been the capacity to provide police officers – often the first point of contact with vulnerable populations such as PWID – the necessary training and tools to address the complex interplay of health, social, economic, and other issues that are the root causes of drug abuse [91]. As demonstrated by previous police reform programs, the lack of institutionalization of the reforms is a key element contributing to

the failure to have a sustained long-term public policy beyond any political changes [92,93].

Several studies in other countries have documented the need to incorporate police training programs that promote the prevention of job related risks, in particular those related to the risk of HIV transmission [94.95]. Preliminary data has shown that a shift in police officers attitudes toward NSP could in turn lead to a reduction in needle confiscation, and improve the occupational safety of the officers [96]. Currently, the city of Tijuana, Mexico, has decided to implement a Police Education Program in association with the University of California, San Diego, to provide information on health risks of special concern to performance of police duties with high-risk populations. Police officers must be incorporated in the design of the reforms, so the collaboration with external actors can lead to a change in the day to day activities [93].[93] Accountability measures need to be set in place to allow for a public measure of the common goals and objectives of the strategies.

An additional element that emerges from the literature on drug policy highlights the lack of awareness of legal reforms, particularly among high-risk populations. Current studies have documented the lack of knowledge of the law in Mexico, with only one in ten users in the city of Tijuana reported being aware of the reform, and virtually none experienced its operational components [94]. The combination of institutional goals together with research results can help steer the public debate from a purely security focus towards a public health oriented focus, emphasizing the positive effects on the reduction of the negative public health consequence of drug use.

Moving forward, we should set common strategies toward a global solution to drug related issues: Firstly, active training and educational programs on the public health aspects of the law needs to be promoted for both government officials and for illegal drug users, as it has showed before that it helps modify their attitudes and knowledge. Importantly, police and judges should receive tailored material emphasizing the positive benefits for their occupational health and the respect of human rights, particularly among high-risk populations. These initial steps should be followed by a public debate on the procedures of the law (i.e. the maximum quantities of personal possession of illegal drugs) and the promotion of financing of public treatment and prevention programs.

Additional resources should also be generated through a reorientation of current public safety budgets, supported by a framework that acknowledges the health impacts of drug policy, rather than solely focusing on criminalization and security. Both Mexico and Brazil have a National Fund for Public Safety9F that finances police reform initiatives, they could finance local harm reduction projects designed in common agreement with local police forces and the health sector. This would require additional guidelines to evaluate and design public safety budgets, combining traditional indicators (e.g. crimes reported, prison population, convictions) with health related goals (e.g. reduction in HIV prevalence among PWID, total number of needles-syringes distributed, availability of treatment).

Well-informed strategies and multi-institutional collaboration can increase awareness of the health-related consequences of drug reform, as well as contribute to a global discussion on alternative models.

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CHAPTER 2. THE LAW ON THE STREETS: EVALUATING THE IMPACT OF MEXICO'S DRUG DECRIMINALIZATION REFORM ON DRUG POSSESSION ARRESTS IN TIJUANA, MEXICO.

ABSTRACT

Background: In 2009, the Mexican Federal Government enacted a new policy known as the "narcomenudeo" reform that decriminalized the possession of small amounts of illegal drugs, delegated prosecution of retail drug sales to the state courts, and mandated treatment diversion for habitual drug users. There has been little effort to formally assess street-level impact of the reform despite mounting interest in drug decriminalization.

Methods: A municipal police dataset of monthly incidence reports between January 2009 and December 2014 was used to examine changes in the number of drug possession, violent and non-violent total arrests before and after reform enactment in Tijuana, Mexico. A hierarchical panel data analysis with random effects was conducted.

Results: The "narcomenudeo" reform appeared to have no significant impact on the number of drug possession arrests or other violent and non-violent crimes after controlling for other variables (e.g. time trends, electoral cycles and precinct-level socioeconomic factors). Time periods directly preceding local elections were observed to be statistically associated with arrest increases.

Conclusions: Mexico's reform decriminalizing small amounts of drugs does not appear to have significantly shifted drug law enforcement in Tijuana. More research is required to fully understand the policy transformation process for policing interventions in Mexico and similar regional and international efforts. Observed relationship between policing and political cycles echo other data indicating increases in law-and-order activities during mayoral electoral campaigns.

Introduction

Over the recent decades, countries in Latin America have reacted to changes in drug trafficking and consumption patterns by adapting new policy and enforcement responses [1]. Some countries have reacted by mounting heavily-militarized campaigns, focused on suppressing drug production [2]. Others have recently embarked on a transition from a punitive, prohibitionist approach toward a legal framework that promotes harm reduction and decriminalization [3]. There is however, little research evaluating early adopters of such decriminalization reforms and its consequences on public health and policing [4].

In 2009, the federal Mexican congress promulgated a set of changes, known as the "narcomenudeo" reforms, shifting the legal prosecution of small-scale drug possession to the state (rather than the federal) level [5]. The overarching goal of the reforms was to reserve federal resources for high level drug traffickers, while state and local governments would focus on small-scale dealers or "narcomenudistas." Additionally, the reforms promoted treatment and harm reduction rather than

incarceration by decriminalizing the possession of specific drug thresholds. However, drug users found in possession of illegal drugs were to be processed and referred through the justice system [6]. These modifications set allowable amounts of drug possession (e.g. 50mg for heroin, 5g for marijuana) for immediate personal consumption without being considered a felony, and mandated states to create free substance use rehabilitation systems to which habitual users would be diverted [7]. On the local level, the state Baja California set the deadline of August 2012 for full implementation and funding of the reforms [8].

At the time of passage, there was ample speculation about the impact of these new policy shifts. The reforms strengthened coordination between police and health officials in order to minimize the negative effects of illegal drug use, possibly benefitting both the users as well as the broader community [9]. New responsibilities for local police could possibly increase their interactions with street drug users, as local (state and municipal, rather than federal) police officers would now be mandated to present all individuals detained with drugs to the "Ministerio Publico" (Public Prosecutor) for assessing whether the possession of drugs fall within the established legal threshold. These encounters can also become more frequent when there is an increased presence of police in street-based drug markets, increasing the possibility of corruption (i.e. extorting drug users for police quotas). Another potential consequence of focusing on drug possession crimes is that policing efforts would be diverted from other high impact crimes, such as homicides or armed robbery [5,6]. Conversely, the reforms may substantially decrease drug possession arrests and other encounters. As has

occurred in other decriminalization contexts, police managers or street-level officers could respond to decriminalization by discretionarily shifting their enforcement away from small-scale drug crimes [10].

Tijuana is an international metropolitan area situated in the northern border region in the State of Baja California, Mexico. The city is a major route for drug trafficking of heroin, cocaine, marijuana and methamphetamines with local drug consumption patterns influenced by its geographic proximity to the US [11,12,13]. As such, Tijuana has a high concentration of drug users, particularly people who inject drugs (PWID), who in many cases inhabit an area that physically divides the US and Mexico (locally referred to as “El Bordo”). Many of these users are migrants and deportees who lack access to formal health, housing and other government services [14]. This area exhibits higher rates of drug possession arrests, as it includes several open air drug markets [15] and has been a common place for police raids to “clean” public space, increasing the number of detentions for loitering or vagrancy among PWID. The experience of Tijuana as a locale with elevated levels of drug-related harms presents a unique opportunity to analyze the application of the “narcomenudeo” reforms in a case study setting where its benefits are especially vital.

The local dynamics of law enforcement deployment and systems provide a unique setting for such an assessment. During 2008, Tijuana experienced an increase in violence, from 14 homicides per 100,000 in 2007 to 49 per 100,000 in 2008, [16] that led the federal government to implement a series of police reforms. The municipality was a recipient of a federal subsidy for public safety (SUBSEMUN) that required a

standardization of basic protocols (i.e. frisking, patrolling), police identity (i.e. uniforms), higher salaries and better equipment (i.e. surveillance cameras, computers) [17,18]. The Tijuana Police Department is among the largest in the country, with approximately 2,100 officers. They work on shifts of eight hours per day and rotate among the 11 policing sectors of the city (i.e., precincts). Police capacity-building reforms in Tijuana also included improvements in police data collection systems. In March 2013, a Memorandum of understanding (MoU) was signed between the University of California San Diego (UCSD) and the Tijuana Ministry of Public Safety (Secretaria de Seguridad Publica Municipal de Tijuana - SSPM Tijuana) facilitating access to these police databases for academic research purposes.

Using this unique data source, this study seeks to assess the impact of the "narcomenudeo" reforms on police enforcement patterns by analyzing Tijuana Municipal Police's monthly crime incidence reports. We measured changes in drug possession arrests in comparison to arrests for other violent and non-violent crimes before and after the mandated implementation of the narcomenudeo reform. Although the reform could be expected to directly modify drug-related arrests, our study also examined its potential impact on a wider range of criminal offenses [19,20]. We hypothesize that the reforms increased monthly drug possession arrests after they were fully implemented in August 2012 as a result of the contemplated shift of drug law enforcement to local police.

Methods

Data sources

The current study used an institutional panel dataset maintained by the SSPM Tijuana. This dataset summarizes monthly arrests for drug possession and other violent (e.g. robbery, homicides, injuries) and non-violent (e.g. car theft, theft) crimes. This information draws on mandated officer daily incident reports, collected across all 11 police precincts of the city and is utilized to inform police management and deployment decisions. This secondary data analysis was approved by the Institutional Review Boards of UCSD School of Medicine, USA.

Measures

The primary outcome under investigation is the monthly number of drug possession arrests recorded at the precinct level over a 72-month period (January 2009-December 2014). Secondary outcomes include a subset of violent (injuries, robbery, homicides) and non-violent (theft, possession of stolen car) arrests during the same time period. The primary independent variable is implementation of the "narcomenudeo" reforms defined as a binary indicator (yes/no), with the value of 1 from the time it was slated to be fully implemented (August 2012 – December 2014), and 0 otherwise (January 2009 – July 2012).

To account for changes in arrests patterns over time that are unrelated to the implementation of "narcomenudeo" reforms [21], we adjusted for both seasonal and

annual time trends [22]. Ignoring these underlying time trends might lead us to falsely assume that the drug reform change is modifying the patterns over time, or that changes in the outcome variables are caused by any other of the independent variables. Annual time trends are coded with dummy variables for each year, using 2009 as the reference point. Following a visual analysis of the arrests in the city, which seemed to show a cyclic pattern in the crime trends, it was decided to model seasonality in a quarterly format [23]. The months were coded as 1=January, …, March=3, April=3, …, June=1, July=1, …, September=3, …, October=3, …December=1.

Furthermore, other studies have documented increases in police activity and hiring during mayoral elections years, a "tough on crime" strategy, given that public safety and security are among the main concerns for the local electorate [24,25]. These electoral cycles are also associated with higher rates of prosecution and sentencing of crimes than in other conditions might be dismissed [26,27]. We controlled for the effect of electoral cycles on arrest patterns according to electoral law: candidates are allowed approximately 3-4 months of political campaigning before Election Day. Thus, we created a binary indicator defined as 1 reflecting the months covering legal primaries and mayoral campaigns (elections held July 2010 and 2013), and 0 otherwise.

Additional confounding factors adjusted for in the models include unique police precinct environments, such as demographic and socioeconomic conditions, as arrests can be differently distributed in accordance to the socio-demographics of neighborhoods [22,28,29,30,31,32]. The following control variables used in other crime related studies were applied to this analysis: (1) Number of men per 100 women,

(2) percentage of population 15 years or older with incomplete basic education, (3) percentage of population with no health insurance coverage, (4) percentage of private houses with dirt floor, (5) percentage of female headed households, (6) percentage of general unemployment. All of the socio-demographic variables were obtained from the 2010 Mexican Census [33] and precinct-level summaries were computed [34,35,36] using ArcGIS-ESRI version 10 software.

Data Analysis

A hierarchical panel data analysis with random and fixed effects [22,37,38,39] was used to examine changes in the number of drug possession, violent and non-violent total arrests over a 72 monthly period. The outcome variables were log transformed to fulfill the assumptions of general linear modeling regression (i.e., normality, linearity and constant variance), while also allowing the regression coefficients to be interpreted as percentage change of the outcome [40].

Under the hierarchical model, the number of arrests were nested within precincts, which allowed us to control for unobservable characteristics and unmeasured heterogeneity that are inherent to the lower unit of analysis: that is, changes to the drug market structure such as drug availability on the street or the price of drugs. We compared results generated under a random effects model to a fixed effect model. A random effects model uses both the cross-sectional and temporal variations of the data, so it can include time invariant variables to reduce the unmeasured heterogeneity. In contrast, the fixed effect model automatically removes any time-constant variables

(census data per precinct) during the estimation process, thus, the fixed effect model uses only within-precinct changes, while ignoring between-precinct variation. A Hausman test [21] indicated that a random effects model provided the best fit to the data (compared to a fixed effects model). These models also provide an Intraclass Correlation Coefficient (ICC) that explains the proportion of variance that is attributable to the clustering by units, in this case, police precincts [38, 39] . All statistical analysis was conducted using STATA 14 (StataCorp, LP, College Station, TX, USA). All the estimations were obtained using robust standard errors clustered on precinct level [22].

Results

A visual analysis of the city wide drug possession arrests showed a moderate decrease in the immediate months, (August – December 2012) after the full schedule of the reforms (figure 1). However, the city saw an overall increase in the total arrests for drug possession in the first quarter of 2013 (January – March), and reached almost the same number than the first quarter of 2010 (around 450 per month). Relative to violent and non-violent arrests, drug possession arrests fluctuated more over the 72-month period displaying a noticeable increase in the number of arrests during local election months (March-May) in 2010 and 2013. In contrast, violent and non-violent arrests were relatively stable and often overlapped each other, with the “narcomenudeo” reforms appearing to have no effect.

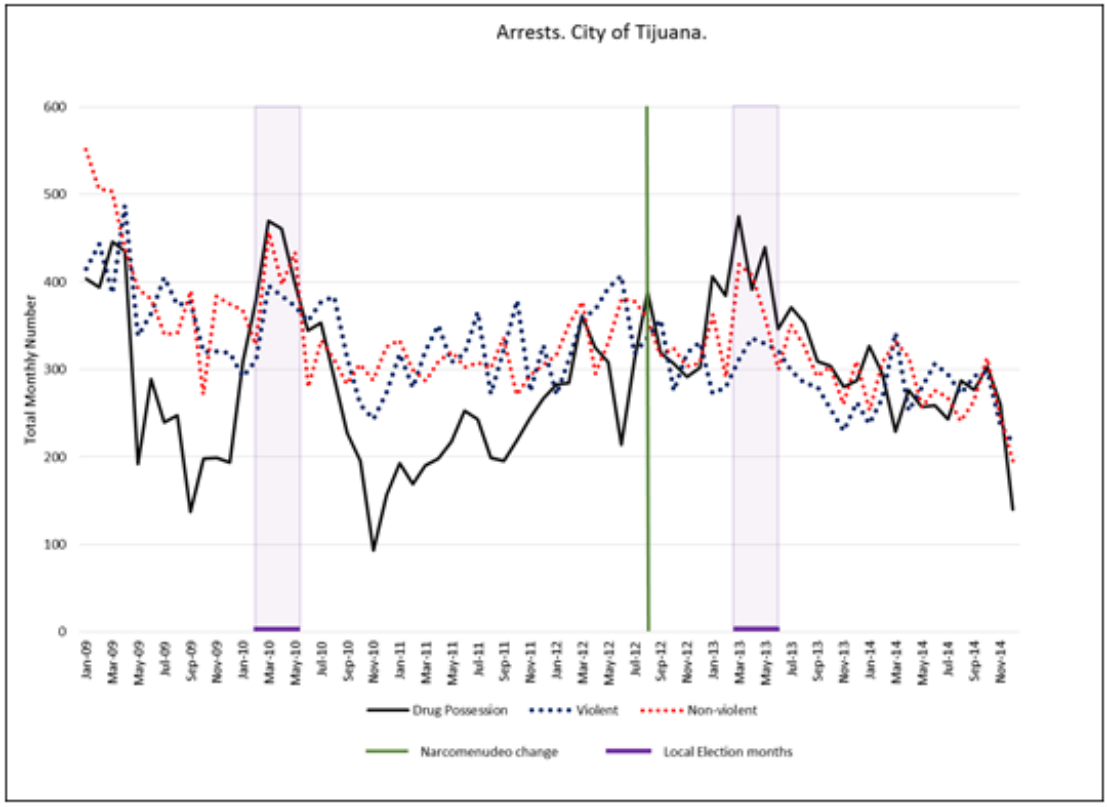

Figure 1. Tijuana-wide trends for drug possession, violent and non-violent arrests, January 2009- December 2014. All information was taken from the internal COMPSTAT systems.

Arrests for drug possession, violent, and non-violent crimes are not evenly distributed across the precincts (see Table 1). The precinct “Centro” (Downtown), has the highest average arrest rates across the three categories, and is the only area with 1 standard deviation values above the city wide statistics. Socio-demographically, Centro is not drastically different from the overall city profile. A correlation analysis was conducted for all the city wide crimes (see Table 2). The relationship between violent

and non-violent arrests was strong and statistically significant ($r = 0.724$, $p < 0.01$), while the correlation of drug possession with violent and non-violent crimes was lower and still statistically significant ($r = 0.5$, $p < 0.01$). These results suggest that the policing of drug possession crimes follows a different pattern from policing of other violent and non-violent crime in the city.

Table 1. Table of descriptive statistics for monthly average number of arrests, and 2010 census values by the existing 11 police precincts used by the Tijuana Ministry of Public Safety.

	Monthly # of Arrests						Socio-Economic controls (census 2010)					
	Drug Possession		Violent		Non Violent		# of Men per 100 Women	% Pop >15 with incomplete basic education	% Pop with no social security coverage	% of Private houses with dirt floor	% Female headed households	% General Unemployment
	Mean	S.D.	Mean	S.D.	Mean	S.D.						
Tijuana - city wide	26.31	18.88	29.23	21.22	30.23	16.09	103.21	32.52	35.82	2.34	29.38	4.36
By Police Precinct												
Centenario	24.12	10.90	21.45	8.35	23.95	8.47	103.07	32.38	34.21	3.15	27.53	3.54
Centro	57.47	21.79	81.19	23.32	59.61	15.88	104.83	25.80	40.94	0.66	33.21	3.57
Cerro Colorado	15.55	11.09	19.11	7.93	21.70	9.63	101.38	29.39	34.14	0.94	29.98	4.09
Los Pinos	19.72	11.06	23.77	8.74	31.08	9.39	102.00	35.49	30.63	3.28	30.14	3.78
La Mesa	13.06	8.21	26.02	11.37	30.09	11.57	99.25	22.64	37.46	1.15	32.46	2.03
La Presa	31.73	17.30	44.37	11.33	44.95	13.46	104.67	33.60	33.70	2.85	24.59	5.35
Mesa de Otay	29.65	22.12	17.48	9.05	18.55	9.08	103.69	33.14	43.36	1.59	31.62	5.15
Playas de Tijuana	20.70	17.58	17.55	8.09	21.62	8.85	101.85	29.61	37.58	1.23	29.61	4.76
Presa Rural	22.61	11.96	18.97	7.24	24.29	9.69	106.28	42.48	30.49	5.65	25.32	5.17
San Antonio de los Buenos	29.59	15.74	31.15	10.33	35.98	13.24	105.03	34.86	35.51	1.32	27.87	5.27
Sanchez Taboada	25.23	12.19	21.47	7.26	20.73	7.26	103.31	38.32	36.05	3.92	30.85	5.27

Table 2. Table of pearson's correlations coefficients between crimes and statistical significance level.

Variables	Drug Possession	Violent (Homicides + Injuries + Robbery)	Non Violent (theft + car theft)
Drug Possession	1		
Violent	0.522***	1	
Non Violent	0.503***	0.724***	1
*** p<0.01, ** p<0.05, * p<0.1			

The results in Table 3 display the results of the hierarchical panel data analysis. They indicate that the "narcomenudeo" reform, after its full implementation in August 2012, had no significant statistical effect on arrests for drug possession or other violent, and non-violent crimes at the $p>0.05$ level. In contrast, local elections were significantly and positively associated with arrests across all models ($p<0.01$). Drug possession arrests had the strongest association with local elections ($b=0.546$, $p<0.01$) followed by arrests for violent ($b=0.204$, $p<0.01$) and non-violent ($b=0.196$, $p<0.01$) crimes. Specifically, drug possession arrests are associated with an increase of more than 50% during the electoral cycles, while adjusting and controlling for time trends and socio-demographic conditions. According to the ICC in our models, only 16% of drug possession arrests can be explained to local factors, while 40% for violent crimes and 36% for non-violent events of the variance is due to differences between precincts (i.e. socio-economic controls).

Table 3. Panel analysis of Drug possession, violent and non-violent logged arrests per 11 police precincts for the city of Tijuana.

Model	**1**	**2**	**3**
Outcome	ln (DrugPoss)	ln (violent)	ln (nonviolent)
Stop and Arrests	Drug Possession	Homicides + Injuries + Robbery	theft + car theft
Time Controls (Quarter Seasonality, Year Dummies)	YES	YES	YES
Variables of Interest			
Narcomenudeo Law (August 2012)	0.187	0.001	-0.043
	(0.151)	(0.090)	(0.071)
Local Election months	0.546***	0.204***	0.196***
	(0.088)	(0.044)	(0.049)
Socio-Economic controls (census 2010) (Demographics, Schooling, Social Security Coverage, Housing Conditions, Female-Headed Households, Economic Structure)			
# of Men per 100 Women	0.274***	0.332***	0.245***
	(0.026)	(0.033)	(0.024)
% Pop >15 with incomplete basic education	-0.071**	-0.200***	-0.131***
	(0.033)	-0.053	-0.043
% Pop with no social security coverage	-0.012	-0.116***	-0.099***
	(0.024)	(0.025)	(0.026)
% of Private houses with dirt floor	0.087	0.206	0.084
	(0.073)	(0.131)	(0.106)
% Female headed households	0.075*	0.136***	0.080***
	(0.039)	(0.033)	(0.028)
% Female Unemployment	0.097	0.317*	0.156
	(0.154)	(0.192)	(0.150)
Constant	-25.49***	-26.10***	-17.27***
	(2.684)	(3.651)	(2.766)
R-sq:			
overall	0.348	0.487	0.421
Intraclas correlation coefficient (ICC)	0.163	0.405	0.369
Observations	791	792	792
Number of police precincts	11	11	11
Robust standard errors in parentheses			
***** p<0.01, ** p<0.05, * p<0.1**			

Discussion

The results from the analysis indicate that the “narcomenudeo” reforms showed no significant association on drug possession arrests after they went into force in Tijuana. While the decriminalization of a small amount of illegal drugs is theoretically expected to impact police enforcement patterns, we have previously identified gaps in the stret-level implementation of the laws, as preliminary research has found a nearly universal absence of drug user knowledge or experiences of this reform, including diversion to drug treatment or weighting of personal possession of drugs [4]. Additional qualitative data also indicated a lack of preparation and coordination between key institutional stakeholders from public security, drug treatment, judicial, and public health sectors [41]. To our understanding, no other study in Mexico has used longitudinal precinct-level local police data to assess the effects of the recent “narcomenudeo” drug reforms.

While it was not initially considered one of the main questions of our study, it is important to highlight the relationship between elections, particularly local mayoral races, on policing patterns. We found a 54% spike in monthly drug possession arrests, while only close to 20% increase for violent and non-violent crime arrests during electoral cycles. This seems to confirm previous results on incentives for mayors to increase policing in advance of elections to secure positive electoral results, as they are mainly responsible for providing public security and hence are blamed for poor performance [23]. While the results showed an increase in arrests for all kinds of crimes, it is important to point out that drug possession arrests more than doubled during this

period. This might be a reflection of police targeting the “low-hanging fruit” such as street drug users and the homeless [42], undermining the secondary objectives of the decriminalization reforms and making it more difficult for people to access rehabilitation services [43]. Although the reforms have removed all penal sanctions for personal consumption from the drug laws, in practice, these encounters with the public safety system continue to make criminalization a de facto experience for drug users [44].

The differences of Intraclass Correlation Coefficients among models emphasize the importance of the local covariates to understand variability of crime, as our model for drug possession arrests could only account for 16% of variation between precincts, emphasizing that there are other unmeasured factors that may do a better job of explaining drug-related arrests patterns (i.e. number of drug selling points or shooting galleries). Such factors could further elucidate the relationship between policy reform and its impact on the policing of drug related crimes. Further statistical models that include time lag of crime could help to deal with the simultaneity of police arrests and crimes, allowing us to control for historical factors that might affect current crime levels [20].

Also, while crime is not randomly distributed, we can identify clusters of criminal activity, either at a neighborhood or even with more detailed information, at a street level. These “hot-spots” of criminal activity are generally used to design more effective crime prevention programs [45]. In this study, we found that the precinct, “Centro”, had higher number of arrests across all three categories of crime, and this area had been identified as a hotspot of drug possession arrests over a three-year period [15].

Thus, it is important to study if these hotspots are stable across time or the result of temporary changes in the city [46,47]. A stable crime area can present an opportunity for structural interventions that maximize resource allocation to promote public health goals. Under the framework of the "narcomenudeo" reforms, this could include the establishment of opioid substitution therapy (OST), Safe Consumption Rooms (SCR), needle exchange programs or HIV treatment and testing in hot-spots, and thus helping reduce barriers for basic health care among street drug users.

Although we hypothesized an increase in arrests, one could also hypothesize that the law's impact would decrease the prevalence of drug arrests. Such an outcome could result if police discretionarily shifted their enforcement away from small-scale drug crimes in view of decriminalization. Several jurisdictions have implemented low-priority policing of small drug possession, resulting in a decrease of drug users' arrests, with no effect, either positive or negative on the general crime trends [48]. However, even under this alternative hypothesis, our analysis indicates that there is no significant change (increase or decrease) linked to the implementation of the decriminalization reforms in Tijuana.

Our study should be considered in light of several limitations. First, as previous research has documented, there could be gaps in police data due to factors such as incomplete reporting, error checking, or the size of the agency that reports them [49,50]. In addition, police data might not reflect true trends in crime [51], as the vast majority of crimes, close to 94% according to national numbers [52], go unreported. There is also a possibility that municipal police data does not fully represent drug-related events since

instances of police corruption, such as monetary brides to avoid arrest, may lead to fewer incident reports [53]. Secondly, although electoral cycles are significantly statistically associated with an increase in the number of arrests, policing enforcement could also be driven by external factors that were not measured in the current study, such as the influx of deportees from the US, isolated federal or state police interventions in one neighborhood that might accidentally affect nearby areas [54], or the aggressive activities of Drug Trafficking Organizations (DTO) to take over the territory of an opposite gang [55].

Finally, we cannot conclusively confirm or refute a causal relationship between drug-related arrests, or other crimes, and the changes in the law, as there are many additional ecological factors that might erode the validity of our results [56,57]. These factors include changes in local police deployments and administration, local drug market structure, or the annual influx of deportees from the US. Third, generalizability is limited as the results of this study only reflects one municipality, and it would be erroneous to assume that the reforms are uniformly implemented across Mexico.

Conclusion

There is an ample body of evidence that criminal law reforms exhibit a major policy implementation gap, whereby policing practices may systematically differ from newly-enacted drug policies, including ones intended to closer align policing practices with public health objectives [58, 59,60]. Traditionally, public health and public safety have had different approaches in addressing drug-related harms, but both sectors have

emphasized the need to promote health and security at the community level. Legal frameworks play a significant role in creating barriers for effective prevention services, access to harm reduction strategies, such as OST, SCR and clean syringe access, as well as increasing arrests by police officers [1,61,62,63]. Law reforms may be vital, but not in-and-of-themselves sufficient to accomplish the intended impact of drug decriminalization reforms.

In the same manner, the "narcomenudeo" reforms implied the potential to increase cross-sectoral cooperation between police and health. But the lack of a proper implementation has undermined this goal. We must reduce the implementation gap between the "law on the books" and the "law on the streets" [60] through evidence-based interventions that align public health and security goals [64,65]. Additionaly, we need to modify the way that street-level officers and police management deal with vulnerable populations, such as street drug users. These changes should contribute towards a new policing strategy that promotes harm minimization of drug use and can lead to access for drug treatment, lower infections of blood borne diseases, and respect for human rights [66,67]. As a strategy to harmonize the objectives of public safety and health areas, several studies have documented the need to incorporate police education programs (PEP) that promote the prevention of job related risks [61,68,69].

Considering the results of our analysis, the current collaboration between the UCSD and the SSPM Tijuana offers a unique opportunity to use institutional data to evaluate policy impact on policing practice. In turn, such collaboration also creates a platform to design and implement trainings and other interventions within the police

department [70]. Such collaborations are rare in Mexico and can help bring accountability and transparency to a realm that is usually resistant to outside input.

The current chapter is currently being prepared for submission for publication, of which professors Leo Beletsky, Steffanie A. Strathdee and Tommi L. Gaines are co-authors.

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CHAPTER 3. MEASURING IMPROVEMENT IN KNOWLEDGE OF DRUG POLICY REFORMS FOLLOWING A POLICE EDUCATION PROGRAM IN TIJUANA, MEXICO

ABSTRACT

Background: Mexico's 2009 "narcomenudeo" reform decriminalized small amounts of drugs, shifting some drug law enforcement to the states, and mandating drug treatment diversion instead of incarceration. Data from Tijuana suggested limited implementation of this harm reduction-oriented policy. We studied whether a police education program (PEP) improved officers' legal knowledge, and aimed to identify participant characteristics associated with uptake of drug policy knowledge.

Methods: Pre- and post-training surveys were self-administered by municipal police officers to measure legal knowledge, decriminalization attitudes, and perceptions of harm reduction policies. Training impact was assessed through matched paired nominal data using McNemar's tests. Logistic regression was used to identify predictors of improved legal knowledge pre vs. post-PEP, as measured by officers' ability to identify conceptual legal knowledge provisions related to thresholds of drugs covered under the reform.

Results: Of 1751 respondents, 85.9% (n=1,504) were male, mean age was 38.5 years and mean time working as a police officer was 11 years. Comparing pre vs. post-training, officers reported significant improvement (p<0.001) in their technical understanding of the drug amounts decriminalized under the "narcomenudeo", including marijuana (from 9% to 52%), heroin (8% to 71%), and methamphetamine (7% to 70%). The training was associated with even greater success in improving conceptual legal knowledge, as trainee recall of decriminalization improved dramatically for all three drugs (p<0.001), marijuana (from 16.5% to 91.5%), heroin (11.5% to 91.5%), and methamphetamine (11.7% to 89%). In univariate modeling, those with at least a high school education were more likely to report improvement of conceptual legal knowledge of decriminalization, for heroin (Odds Ratio [OR] 2.8, 95% CI: 1.8 – 4.5), methamphetamine (OR 2.1, 95% CI: 1.4 – 3.2), and marijuana (OR 2.8, 95% CI: 1.8 – 4.5).

Conclusions: Drug policy reform is often necessary, but not sufficient to achieve public health goals because of gaps in translating formal laws to policing practice. To close such gaps, PEP initiatives bundling occupational safety information with relevant legal content demonstrate clear promise. Our findings underscore additional efforts needed to raise technical knowledge of the law among personnel tasked with its enforcement. Police professionalization, including minimum educational standards appear critical for aligning policing and harm reduction goals.

Background

The predominant framework for drug policies around the world focuses on criminalization and punishment [1]. Meanwhile, this legal framework has also led to unintended collateral harm, including street violence, occupational risks to police, police corruption, spread of infectious diseases, and various social and economic detriments [2]. Mexico's drug war has claimed the lives of more than 1,000 police officers [3] and its toll on civilians is in the hundreds of thousands [4,5]. In the realm of infectious disease, arbitrary policing tactics such as syringe confiscation have been associated with higher risks of Human Immunodeficiency Virus (HIV) transmission [6]. Incarceration of drug users increases their risk for blood borne infections, due to high levels of drug use, scarce access to injection equipment and condoms, exposure to sexual abuse and extortion [7,8]. Amidst regional efforts to reduce harms emanating from this punitive framework, police enforcement, either through formal or informal practices, should be included as factors shaping public health outcomes [9,10].

In Mexico, drug production and trafficking intended for the US has expanded to a domestic market, where "narcomenudeo" (retail drug sale) functions as an additional source of revenue for the drug cartels [11]. To meet these challenges, the federal government moved to involve local authorities in the prosecution of minor drug crimes. In the context of drug policy reforms elsewhere in North America, Mexico's agenda was similarly driven by an increase in drug-related violence [12], overcrowded local jail systems [13], and an international shift towards evidence-based practices that emphasize the necessity to treat drug use as a public health problem rather than as a criminal issue [14].

The 2009 “narcomenudeo” legislation served as the centerpiece of Mexico’s drug policy reform. This law decriminalized [15,16] possession of a minimum amount of specific drugs and delegated criminal prosecution of local retail drug sales to the state level [17]. The reform mandated that, when apprehended by police, individuals possessing small quantities of drugs for personal consumption below a specified volume would not be charged with a crime. Instead, these users must be referred to the health authorities and then released, avoiding jail time altogether. On the third report of small-scale possession of illegal drugs, the “narcomenudeo” reform mandated that individuals must enter drug treatment provided by the state.

These reforms were also supported by broader efforts to professionalize law enforcement and the judicial system in Mexico to improve the administration of justice, including the creation of federal guidelines for minimum education standards for municipal police [18]. Despite the significance and controversy surrounding these professionalization efforts, their impact on drug policy reform efforts has never been formally evaluated.

The city of Tijuana is a singularly salient setting for evaluating the implementation of the “narcomenudeo” drug reform as it experiences a disproportionate burden of drug-related harms. Located in Baja California on the northwest Mexican border with the United States, the city forms an urban border region and is the busiest land border crossing of the world. As a result of active north- and south-bound migration, the city is home to large numbers of high-risk individuals such as sex workers, people who inject drugs (PWID) and deportees from the US [19,20]. The city

is a major route for drug trafficking and consumption of heroin, cocaine, and methamphetamine [21].

Compared with the national average in Mexico (0.2%) [22], Tijuana also has one of the highest rates of per capita of injection drug use [21], resulting in high prevalence among PWID of hepatitis (95%) C Virus (HCV), latent TB infection (57%) [23] and HIV (3.5% among male PWID and 10% among female PWID) [24,25]. Of concern is the possibility that HIV and other sexual transmitted diseases are likely to spread to other vulnerable populations in close proximity in the city [26]. Access to evidence-based drug treatment and other harm reduction services prior to the implementation of "narcomenudeo" reform were low [27,28]. Drug decriminalization and scale-up in access to substance use treatment in Tijuana has the potential to reduce both local and regional harms related to drug use.

Our prior research among PWID in Tijuana indicated that the implementation of the "narcomenudeo" reform has been limited. Drug user experiences suggested apparent gaps in police knowledge of drug possession laws and related policies [29,30,31], echoing a growing evidence base of gaps in police knowledge of drug policies [32,33]. To improve street-level implementation of the law, we designed a police education program (PEP). The PEP follows an occupational safety framework, covering drug possession and other formal laws, enforcement procedure, rationale for public health initiatives targeting drug users, and basic occupational knowledge (Project ESCUDO - [SHIELD]) [34]. Providing street level officers with this information, along with content regarding the rationale for, and potential benefits of the reforms could shift police

practices towards harm reduction goals contemplated by the “narcomenudeo” reform [35].

The objectives of this study were to determine if the PEP implemented under project ESCUDO was associated with improvements in police officers’ self-reported knowledge of Mexico’s drug possession laws. In order to inform future training and other structural interventions, we also sought to identify officer characteristics associated with improved knowledge of drug policy content under the PEP.

Methods

Study Setting

The Tijuana municipal police force is among the largest in Mexico, with an estimated 2,000 officers, divided among eleven policing precincts. Candidates for the police force are required to meet a minimum set of requirements, which include three years of residency in the state, at least a high school education, being aged 18 or older, and passing a set of toxicological and polygraph examinations. This educational requirement was instituted in 2008, but about 20% of existing officers who did not have a high school diploma were “grandfathered” in [36]. Since 2007, the average annual turnover is relatively low, at 6.2%, and the police salary is among the highest in the country [36]. The average age of police officers in the force is 38 years old, with 80% men and the rest women [36]. Due to federal support designed to incentivize police

professionalization, annual refresher training consisting of various modules is required [37].

Instructional Design

The design and conceptual framework of Proyecto ESCUDO have been described elsewhere [34]. Briefly, we established a Memorandum of Understanding with Tijuana Ministry of Public Safety (SSPM) to collaborate on police training and assessment activities. The PEP was integrated to the Department's annual training effort and lasted approximately three hours in one sitting. To improve the implementation of the "narcomenudeo" reform, the training featured a module on relevant drug policies. This module contained legal information about the drug quantities decriminalized for personal possession, reinforced through visual aids resembling threshold volumes of specific drugs to help in knowledge acquisition.

Data for this analysis were limited to those who completed pre and post self-administered paper surveys. The questionnaire was adapted from instruments used in previous PEP evaluations in US and elsewhere [38]. Bilingual staff translated and back-translated the survey from English to Spanish; trained interviewers piloted the instrument for cultural appropriateness, clarity, and other elements with six officers from the Tijuana police academy – ICAP (*Instituto de Capacitacion y Adiestramiento Profesional*). The survey included socio-demographics (age, gender, education, marital status, rank, years of service), basic infectious disease knowledge, legal knowledge including provisions of "narcomenudeo" reform (e.g. decriminalized personal

consumption quantities), other relevant policies like the legal status of syringes, and attitudes toward harm reduction programs.

Data Collection

Police officers who provided written consent to participate in the evaluation of Proyecto ESCUDO were given self-administered paper surveys (15-20 minutes to complete) immediately before and after the training. Unique identifiers were generated for each participating officer, which we used to match pre- and post-training data. Officers received compensation (movie tickets worth approximately 20 USD) for the completion of both surveys. All information was confidential and participants were informed that there were no consequences of their decision to participate on their current or future employment within the SSPM Tijuana.

Outcomes

Respondent technical Legal knowledge was measured by correct recall of the exact quantity for decriminalization under the "narcomenudeo" reform for three most commonly-misused drugs [39,40], heroin (≤50 mg), methamphetamine (≤40 mg), and marijuana (≤5 gr). For each of the three outcomes, we dichotomized the responses by correct or incorrect quantities under the law.

Police officers might have difficulty identifying precise weight limits (e.g. grams vs. milligrams), especially since substances sold on the black market are variously packaged as balloons, rocks or joints. Nevertheless, these officers may grasp the general

concept of drug decriminalization and act on the “spirit” of the law, even if they do not recall the law’s particular technical elements. To measure this important phenomenon, we created a second set of outcomes that captured the understanding of the legal concept of “decriminalization” [15,16] for the three substances of interest.

We designated a respondent to have conceptual legal knowledge if, in response to the question about allowable drug volumes, he/she chose any of the listed quantities. Those choosing options “none” or “do not know,” were defined as not having conceptual legal knowledge for each of the three substances of interest. To understand the measurement of change in this outcome, we excluded those participants who demonstrated conceptual legal knowledge at baseline: Heroin (N=197), methamphetamine (N=201), and marijuana (N=283). Within this sub-sample, we defined as “learners” those participants who demonstrated improvement in conceptual legal knowledge as the result of the training, while those who did not were defined as “non-learners” (i.e. answered options “none” or “do not know” in post-PEP survey).

Statistical Analysis

We used McNemar's test for paired nominal data to evaluate the impact of the training by comparing the percentage of correct answers on legal amounts of the three substances (for both the exact quantities and the concept of decriminalization), before and after the PEP.

We used logistic regression to identify correlates of conceptual legal knowledge acquisition ("learners" versus "non-learners") after receipt of the training. In univariate analyses, only age and education were found to be significantly associated with the outcome ($p<=0.05$) after considering the following independent variables: socio-demographics (gender, age, years of service, district, education), occupational safety measures (e.g. needle stick injury history, frequency of syringe contact), and pre-PEP attitudes toward harm reduction and decriminalization laws. Thus, further multivariable analyses were not warranted [41].

Results

Overall, 1,806 officers were trained by ESCUDO and 1,788 (over 99%) agreed to participate in the evaluation, in total 18 police officers refused to participate in the study. For 37 officers, either a pre- or a post-survey was submitted, but not both, so they were excluded from the analysis. Our final sample was comprised of the 1,751 officers for whom we had matched pre- and post-training surveys completed. Respondents had approximately equal representation from 11 police precincts (see Table 4). While the training included officers from all ranks, the majority were street level officers (81%). The sample represents mostly men (85.9%), with a median age of 38.5 years (IQR 32-44) and an average of 11 years of work experience (SD 3.47 years). Even though the police requirements mandate a minimum level of high school, almost 20% of officers (N=283) did not meet this standard.

Table 4. Socio demographic variables for officers participating in ESCUDO.

Variable	Total Quantitative (n= 1,750)	
	N	% (IQR)
Sociodemographics		
Gender Male	1499	85.90%
Age, Median (IQR)	38.5	(32-44)
Married (N= 1,226)	947	77.24%
Education (N= 1,473)		
Less than High School	283	19.21%
High School completed	882	59.88%
more than High School	308	20.91%
total years in law enforcement	11	(8-18)
Rank (N= 1,749)		
District Chief	17	1%
Deputy	73	4.20%
Supervisor	115	6.60%
Officer	1473	84.20%
current assignment (patrol)	1410	81%

Pre- and post-PEP knowledge outcomes for each of the three substances are presented in Table 5. In the realm of precise technical knowledge, we found statistically significant increases (p<0.001) for all substances associated to their participation in the

training. At baseline, only 9% of police officers could correctly identify the technical quantities of marijuana, 7.2% for methamphetamine, and 8.3% for heroin decriminalized under the current law. After the training, technical legal knowledge of threshold amounts increased to 70% for heroin and methamphetamine and 52% for marijuana.

Table 5. Change in knowledge of the law, by substance. Exact and Decriminalization concept. Including McNemar's chi2.

Variable	Before training		After training		P-value
	No.	%	No.	%	McNemar's chi2
Exact Knowledge of the law - what a suspect can currently possess under the law of Baja California					
Heroin (50 mg)	142	8.33	1211	70.69	<0.001
Methamphetamine (40 mg)	125	7.28	1158	69.04	<0.001
Marijuana (5 gr)	156	9.08	900	52.66	<0.001
Decriminalization concept - what a suspect can currently possess (Any quantity)					
Heroin	197	11.48	1566	91.42	<0.001
Methamphetamine	201	11.71	1519	89.25	<0.001
Marijuana	283	16.46	1564	91.52	<0.001

Regarding conceptual legal knowledge, respondents showed even more dramatic improvement (p<.001). At baseline, between 11.5% and 16.5% of police

officers conceptually grasped the fact that some amount of heroin, methamphetamine and marijuana had been decriminalized under the current law, regardless of whether they could identify the precise threshold. Post training, almost 90% of the officers selected some decriminalized amount of all three listed drugs. For marijuana possession, there was a major (40%) difference between technical legal knowledge and conceptual legal knowledge, whereas those gaps were smaller for heroin (20.5%) and methamphetamine (20.2%). Notably, a minority of police officers (approximately less than 10%) responded that there were no decriminalized quantities of drugs under the current law even after receiving the training.

Unadjusted odds ratios (OR) and 95% confidence intervals from univariate logistic regression models examining predictors for improvement of conceptual legal knowledge acquisition between “learners” and “non-learners” after receipt of the PEP are found in Table 6. Only level of education was significantly associated with conceptual legal knowledge uptake for all of the analyzed substances. Individuals with high school education were at least twice as likely to be learners compared to those with lower education, for heroin (OR 2.8, 95% CI: 1.8 – 4.5), methamphetamine (OR 2.1, 95% CI: 1.4 – 3.2), and marijuana (OR 2.8, 95% CI: 1.8 – 4.5).

Table 6. Multivariable logistic regression analysis to identify correlates of conceptual legal knowledge acquisition ("learners" versus "non-learners") after receipt of the ESCUDO training.

Predictor	Heroin Odds ratio	Methamphetamine Odds ratio	Marijuana Odds ratio
Age	0.996	1.007	0.993
(Lower 95% CI - Upper 95% CI)	(0.973 - 1.019)	(0.986 - 1.028)	(0.971 - 1.016)
Education (no HS refence group)			
Highschool	2.749***	2.207***	2.751***
(Lower 95% CI - Upper 95% CI)	(1.664 - 4.542)	(1.430 - 3.406)	(1.682 - 4.498)
More than Highschool	2.500***	2.668***	2.700***
(Lower 95% CI - Upper 95% CI)	(1.296 - 4.821)	(1.479 - 4.814)	(1.385 - 5.264)
Observations	1,106	1,119	1,059
*** p<0.01, ** p<0.05, * p<0.1			

Discussion

Despite several years since the narcomenudeo's full implementation in Baja California, we found low levels of legal knowledge of decriminalization limits among police officers in Tijuana. These results underscore the failure of an effective roll out of the "narcomenudeo" reforms in the Tijuana police department. International literature reflects growing recognition of the importance of PEPs to inform police practices targeting vulnerable groups [42,43]. The PEP evaluated here was associated with improvement of the participants' conceptual legal knowledge related to decriminalization for marijuana, heroin, and methamphetamine. However, officers were less successful in correctly recalling the law's technical provisions, suggesting that

additional training may be needed. Our findings suggest that the effort to maintain minimum educational requirements [44] (i.e. high school diploma) may improve the uptake of trainings such as the PEP described here. In evaluating the legal knowledge element of the PEP, this study adds to this emerging evidence base and highlights the successes, challenges and opportunities of harm reduction-focused police instruction [45].

While many policy changes regarding drug policy and public safety in Mexico lack a theory-driven approach, the “narcomenudeo” case underscores the need for better empirical understanding of the targeted objectives, operational resources, and a more effective evaluation framework that includes public health goals. Drug policy reform is often necessary, but not sufficient to achieve public health goals because of gaps in translating formal laws to policing practice [46]. To close such gaps, PEP initiatives bundling occupational safety information with relevant legal content demonstrate clear promise. Since the ESCUDO project seeks to diminish the gap in the implementation of a harm reduction-oriented policy [34,46], educational requirements and continuous trainings could be seen as beneficial to public health. This reframes police professionalization efforts such as mandatory employment standards [47] as instrumental for harm reduction actions. Identifying this residual knowledge gap also raises an opportunity for innovation. The Tijuana police department has made efforts to incorporate technology into patrol practice, including equipping officers with tablets for use on the street. The development of a mobile reference application (i.e. implemented

on a smart phone) that can provide technical information on “narcomenudeo” limits could help bridge the knowledge gap.

Evaluation of past police education initiatives, including those focused on harm reduction content have noted discrepancies in uptake and receptiveness of trainings based on a number of characteristics. These studies have included demographic factors like age, education level, and number of years working as a police officer, as well as attitudes on harm reduction and other occupational safety factors [10]. Our analysis found that only educational level was significantly associated with legal knowledge improvement after adjusting for other socio-demographic factors. So far, we have found only one previously published study examining predictors of legal knowledge acquisition among officers, which identified years of police service as a significant predictor for follow-up knowledge intake [48]. Our study, with its large sample size and high participation rate, substantially expands the evidence base, with implications for instructional design and tailoring.

Prior police reform in Mexico has shown that local police forces lack the education, resources, and proper accountability controls to do their jobs effectively [49]. In addition, policing strategies might change from administration to administration, in part due to the lack of a strong civil public sector career system which relies more on informal rules or patronage appointments [37]. Efforts to standardize and professionalize policing have taken the form of federal guidelines and subsidies, among others [18]. Street level officers and management should be involved in planning the reforms, so collaboration with external actors and the police can be successful by

combining a rigorous evaluation of the results and adapting them to the realities of policing on a daily basis [49].

The correct implementation of the “narcomenudeo” reform has great potential to shift Mexico’s response to substance use to one rooted in public health rather than in a counterproductively punitive approach. The differentiation of drug possession levels between users and traffickers could theoretically help the criminal justice system to optimize its resources by transitioning from an aggressive police enforcement model to a more harm reduction-oriented approach contemplated by the “narcomenudeo” reform. However, our findings indicate that such policies require additional efforts to assure police compliance with the letter and spirit of the laws.

The foundation of this project was a unique collaboration between an academic institution and a police department, including its training academy. The partnership between UCSD and the SSPM Tijuana, the first study of its kind in Latin America, offers valuable lessons that could shape police training, practices and drug policy implementation in Mexico and elsewhere across the region and globally. Sustainable collaborations between academic institutions and local governments are critical to long-term strategies for police reform and institutionalizing a synergy between two areas that have traditionally operated in isolation from one another, police and public health.

Limitations

Our study is subject to several limitations. First, a threat to internal validity might be present if the questions on the survey do not measure the constructs as expected. Although a self-administered survey helped reduced social desirability [50], an interviewer-administered survey would have helped determine if the officers properly understood the questions. However, the costs and logistical difficulties to evaluate a large classroom simultaneously made it unfeasible. Previous studies have documented high level of concordance between these two modes of survey administration [51]. There is also a risk of having a non-response bias, where police officers that refuse to take part in the study might express systematically different answers from those included in the evaluation [52]. In total 37 (0.72%) officers were excluded due to the inability to match pre and post surveys and were. unable to compare these missing data to the rest of the sample used for the analysis. Further, 18 (0.99%) refused to participate due to concerns with privacy and the impact on their job. Thus, due to the low refusal rate/missing data, we expect the effect of this bias to be negligible. Lastly, the experience of police officers in Tijuana is probably markedly different than other cities in Mexico, making it difficult to generalize our findings to other police departments in the country [53].

Conclusion

Efforts to improve police legal knowledge are critical to any drug decriminalization or other harm reduction-focused police intervention. Our findings

have special relevance for the regional evolution of harm reduction as federal, state/provincial and local governments embark on drug policy and other reforms. Such reforms are not self-implementing and must be supported by other interventions designed to improve their street-level impact. Broader police reform and professionalization is an under-recognized structural factor that has the potential of improving the state of harm reduction in North America and beyond.

The current chapter is currently being prepared for submission for publication, of which professors Leo Beletsky and Steffanie A. Strathdee are co-authors.

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CONCLUSION

Overview

This dissertation sheds light on the challenges of drug policy reform, particularly the implementation of drug decriminalization in a Mexican setting. Using a case study of one Municipal Police Department in the city of Tijuana, I address three aims: (1) understand the rationale, strategies, and implications of drug policy reform in the Latin American region through a comparative analysis between Brazil and Mexico—two early adopters who shifted strategies to focus on minimizing the harm caused by illegal drug use; (2) examine changes in the monthly number of drug possession arrests compared to violent and non-violent arrests, before and after the "narcomenudeo" reform enactment in Tijuana, Mexico; (3) establish if there were significant changes in Tijuana police officers' knowledge of Mexico's laws on drug possession, using pre and post self-reported training surveys following the implementation of a PEP, while identifying individual police officer characteristics associated with those changes.

Broadly, this research suggests that drug policy reform is not self-implementing and requires additional efforts to assure full compliance with the letter and spirit of the law. Despite several years since the enactment of the "narcomenudeo" reform in Mexico, the policing of drug possession in Tijuana does not appear to have changed. The finding of low levels of legal knowledge of decriminalization among police officers helps explain this implementation gap. These elements underscore the failure of an effective roll-out of the drug policy reform in the Tijuana police department. Results of the PEP imply a promising structural intervention to partially close that gap.

The discussion in Chapter 1 allows us to understand the unintended consequences of the "war on drugs", which has been associated with high levels of violence in Brazil and Mexico, with focalized addition areas and increased risks for the spread of infectious diseases [1,2]. While both countries have shifted towards harm reduction strategies, their penal laws indicate that drug possession continues to be understood primarily as a criminal justice issue [3]. In addition, several of their harm reduction programs are limited by political opposition [4] and lack of funding that can lead to their elimination [5].

In Chapter 2, results from a hierarchical panel data analysis [6] indicate that the "narcomenudeo" reform appeared to have no statistically significant effects ($p>0.05$) on arrests for drug possession or other violent and non-violent crimes. However, time periods directly preceding local elections were observed to be significantly associated ($p>0.01$) with an increase of more than 50% of drug possession arrests, while controlling for time trends and socio-demographic precinct-level conditions. Also, we found that the downtown precinct in Tijuana had consistently higher numbers of arrests across all three categories of crime.

The results in Chapter 3 underscore the need for increasing awareness of legal reforms among police officers, often the first point of contact for vulnerable populations such as PWID. Pre-PEP survey data found that less than 10% of police officers could correctly identify the specified quantities of marijuana, methamphetamine, and heroin that were decriminalized under the current law. After the training, technical legal knowledge of threshold amounts increased to 70% for heroin and methamphetamine,

and 52% for marijuana. In univariate logistic regression modeling, those with at least a high school education were more likely to report improvement of conceptual legal knowledge of decriminalization.

Implications

Research has demonstrated that the intensive use of law enforcement and supply reduction does little to significantly alter the dynamics of illegal drug markets in the long run [7], and is also associated with increased drug-related harms, including violence and higher risks of acquiring blood-borne infections related to injection drug use [8,9]. However, it is necessary that the general public and policymakers recognize addiction as a public health concern, rather than solely through the lens of criminal justice. Above and beyond national and provincial responses, the reframing of problematic drug use should motivate local decision-makers to introduce social programs independently from the federal or state strategies, focusing more on their local constituency. Unfortunately, currently local representatives are more interested in "cleansing" the public spaces from drug users, for example in Sao Paulo, Brazil [10] or in Tijuana, Mexico [11].

While the drug-related arrests we analyzed are not randomly distributed, we identified clusters of drug use activity, either at a neighborhood or even with more detailed information, at a street level. These "hot-spots" are generally used to design more effective crime prevention programs [12]. If these areas are stable, government strategies could be modified to maximize resource allocation for supportive services.

Government agencies and non-governmental organizations could target these high-density areas with harm reduction services, such as NSP, Safe Consumption Rooms, HIV testing, or public health information campaigns. Public safety institutions could also reorient their current policing strategies by promoting a harm reduction approach through avoiding extralegal needle and ART confiscation and eradicating abuses, while instituting mechanisms to respect the human rights of drug users.

The “narcomenudeo” reform in Mexico creates a unique opportunity for collaborative efforts between the public health and security sectors, and produces several potential benefits. For example, by re-directing drug users to rehabilitation programs instead of incarceration, police departments can focus their resources on violent and property crimes. It creates both a symbolic and practical platform from which these two sectors can work together to minimize the negative effects of illegal drug use, not only for the user, but also for the community as a whole. Appropriate implementation of the reform could potentially shift Mexico’s response to substance use to one rooted in public health rather than in a counterproductively punitive approach.

Under the “narcomenudeo” reform, the tasks of police have been expanded and now include a key role as promoters of public health. The potential for increased interactions between police and drug users necessitates police training to help reduce the unnecessary confiscation of needles and promote uptake of social programs offered by the city [13]. The collaboration between UCSD and the SSMP Tijuana exemplifies the kinds of positive synergy that can flow from such projects. As demonstrated by previous police reform efforts, the lack of institutionalization and operationalization is a

key element contributing to the failure to have a sustained long-term public policy impact that is resilient to changes in political leadership [14,15]. In this sense, a cost-effectiveness analysis of PEP and other police-side interventions could ensure that it is institutionalized in Mexico and possibly in other cities throughout Latin America. Officers and police cadets education, and other policy implementation efforts, should be part of a continuous national strategy to align policy with street-level practice.

Drug policy reform is often necessary, but not sufficient to achieve public health goals because of gaps in translating formal laws to policing practice [16]. The PEP implemented in Tijuana offers a promising solution for increasing the capacity to train police officers in implementing laws that potentiate harm reduction. By building bridges between policing and public health—two areas that have traditionally operated in isolation from one another—this research also marks a number of innovations. To our knowledge, this dissertation represents the first analysis of internal longitudinal arrest data in Mexico to evaluate an implementation of a drug policy, and the first evaluation of the "narcomenudeo" reform using official municipal police statistics. The PEP with the Tijuana police is by far the largest such intervention ever attempted globally, and the analysis of predictors of knowledge uptake is similarly unique within this emerging literature. This research constitutes a solid platform for further assessment of police-side interventions and other structural efforts to shift criminal justice policies and practices in the advancement of public health goals.

Limitations

Substance use and criminal justice datasets consulted in this research have several shortcomings [17,18]. First, drug use surveys in Brazil and Mexico are often conducted several years apart from each other, and usually explore only national trends, rarely including city level statistics [19]. Also, their use of household population sampling with face-to-face interviewing [20] might lead to an underestimation of drug use among key populations, such as homeless and minorities [21,22]. The lack of regular drug use surveys makes it difficult to evaluate and inform policy makers and society in general, about the consequences of drug reform. Furthermore, both in Brazil and Mexico, the vast majority of crimes go unreported [23]. Victimization surveys have shown that this phenomenon is accentuated in poorer neighborhoods, due at least in part to a degree of mistrust between police and citizens [24]. Additionally, police data might not fully represent drug-related events, since these are generally 'victimless' crimes and monetary bribes to avoid arrest might may lead to fewer incident reports [25].

We must also take into account that we cannot conclusively confirm or refute a causal relationship [26] between drug-related arrests and changes in decriminalization policies. There are many additional ecological factors [27] that might erode the validity of our results [28]. For example, policing enforcement could be driven by external factors that were not measured in the current study, such as the influx of deportees and migrants, local drug market dynamics, and state or federal police interventions in specific neighborhoods that might inadvertently affect nearby areas [29]. Also there is a generalizability problem [30], as the results of the statistical analysis of this study only

reflect one municipality, and it would be erroneous to assume that the reforms studied herein are uniformly implemented across Mexico or Latin America.

Finally, additional threats to internal validity might be present from the elements surrounding the administration and design of the surveys [31]. We could have encountered a social desirability bias, where individuals have a tendency to present themselves more favorable to the researcher, appearing more sensible or free of prejudice [32]. Although a self-administered survey likely reduced social desirability among police respondents, an interviewer-administered survey would have allowed for probes to ensure that officers properly understood the questions. However, the costs and logistical difficulties to evaluate a large classroom simultaneously made this mode of survey administration unfeasible [33]. There was also a risk of non-response bias, where police officers that refuse to take part in the study might systematically express different answers from those included in the evaluation. However, almost 85% of the Tijuana Police department received the PEP, and only 1% refused to participate in the research study. Thus, due to the low refusal rate/missing data, we expect the effect of this bias was negligible. Lastly, since the sampling of the officers participating in the study was non-probabilistic, this convenience sampling makes it difficult to generalize our findings to other police departments in the country.

Future Directions

Our findings demonstrated clear promise in the application of the PEP among the Tijuana police officers. These encouraging results could be applied by several Latin

American countries that are modifying their laws to address decriminalization [34]. However, it is likely that the police trainings, taken alone, will not be sufficient to shift police practices in the face of formidable barriers such as financial constrains, police culture, and clear policy directives from police managers and politicians. Observed changes in knowledge might not lead to sustained behavior changes, emphasizing the need to measure behaviors prospectively through follow-up studies [35]. An additional factor that needs to be addressed is the lack of knowledge of the law among marginalized groups, such as PWIDs, FSWs and migrants [36]. The ability to accurately understand the scope of decriminalization measures could empower drug users to demand their rights to treatment, in addition to reduce stigma related to drug use [37]. We must tailor and expand culturally-appropriate education programs, as well as implement other policy re-alignment efforts, in institutions and actors across Mexico and other Latin American contexts. For example, In 2012 the Colombian Supreme court ruled that “the constitution does not allow penalizing consumers” and mandated municipal governments to appropriate funds for the implementation of harm reduction strategies [38]. Presently, several Colombian NGOs conduct harm reduction programs directed to drug users in the cities of Bogota and Pereira [39,40]. These outreach programs could benefit from formal collaborations with police officers, including police trainings that take the occupational safety and harm reduction perspective. As showed in the present study, there can be implementation gaps between police and the mandate from the courts, emphasizing the need for additional interventions.

While this research focuses on the role of police officers in policy implementation, we need to recognize that police play only one small part within a larger policy implementation ecosystem. There are additional institutions within the criminal justice and public health sectors that must be involved to assure that the provisions of the “narcomenudeo” reform are implemented as intended. In the Mexican justice system both the public prosecutor’s office (state level) and city judges (city level) are involved in the processing of drug possession arrests. We must expand training programs of the “narcomenudeo” reforms to these additional actors, using materials emphasizing the positive benefits of the decriminalization reform. On the public health side, drug treatment is provided mainly by non-governmental service providers, as well as governmental oversight bodies on the local, state, and federal levels. Research suggests that these professionals and institutions have failed to respond to the decriminalization and diversion provisions of the reform, so interventions focusing solely on gaps in police activities will be inadequate to fully potentiate the public health benefits of the reform [41].

There also an opportunity to build on the “narcomenudeo” reform to advance other progressive policies. As exemplified by the Swiss experience with the implementation of harm reduction programs, the existence of a federalized political system can help foster innovative interventions on a state by state basis [42]. Under the federalized system in Mexico, some states such as Baja California could engage in more progressive interventions [43] like safe injection facilities or low-threshold OST provision [44]. These programs have proven to effectively reduce PWIDs’ risk

behaviors associated with law enforcement, by diminishing rushed and public injection, syringe sharing and overdose [45] in places like Vancouver, Canada. It could also lead to the implementation of heroin-assisted and other maintenance treatment programs [46] that have proven to be effective and safe as a therapy intervention in other settings [47].

This research has illustrated flaws in the implementation of the "narcomenudeo" reform in a particular case study setting, but some of these flaws resulted from the legislation's inadequate initial design [48]. A lack of designated funding, inadequate training and operationalization highlight the opportunities for further steps in improving the reform. For example, a public and expert-driven debate on the procedures mandated by the laws (i.e. Judicialization [49] of possession cases, mandated treatment), maximum quantities allowed for personal possession, and the financing of public treatment and prevention programs could help improve the impact of the reform at the national and regional levels. A careful re-examination of the experience in one state like Baja California may help inform future policy design elsewhere.

Conclusion

This research offered the opportunity to study not only an enacted national drug policy reform but also a police intervention program that aimed to better align public safety and public health. The statistical analysis conducted in this dissertation are among the first studies of their kind in Mexico and Latin America, and adds to emerging evidence-based literature on the implementation of harm reductions strategies. In addition, this research helped foster sustainable collaborations between academic

institutions and local governments while also providing policy makers with long-term strategies for police reform. The appropriate implementation of drug law reform in Tijuana offers a unique opportunity for binational partnership between two sectors with great potential to effectively address the many harms of drug dependence that continue to burden Mexico's northern border region and beyond.

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APENDIX A

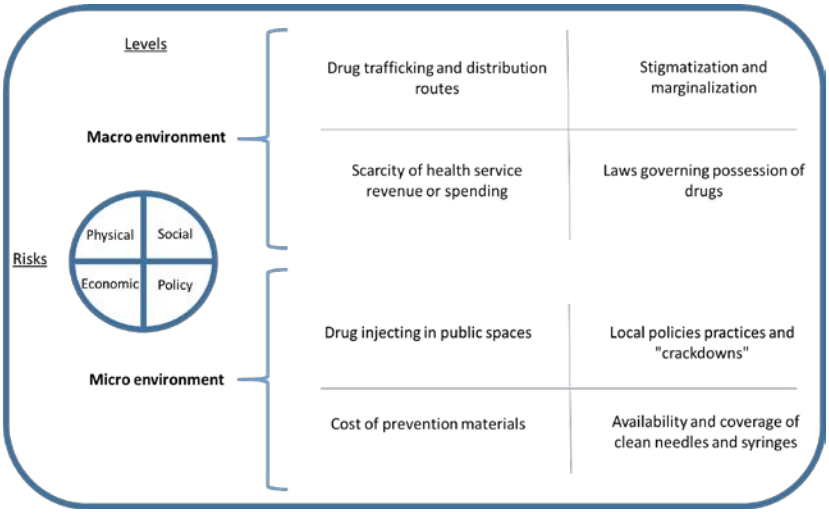

Figure 2. Theoretical Framework: Risk Environment Adapted from Strathdee et al. Lancet 2010.

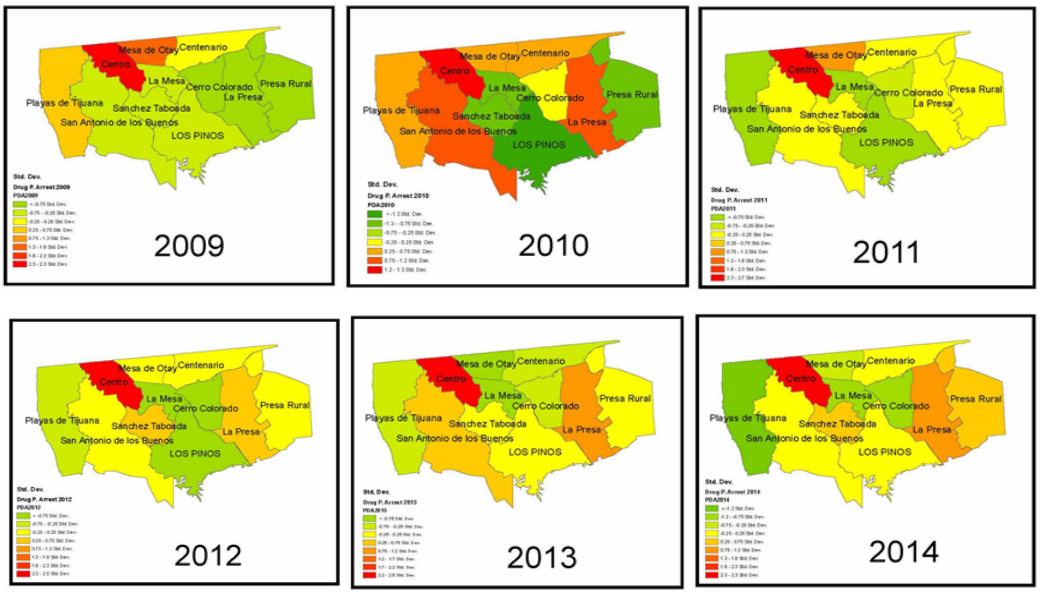

Figure 3. Drug Possession Stops and Arrests. Standard Deviations.

Survey Framework

Pre Survey	Post Survey
Study ID	Study ID
Demographics	
Basic Disease knowledge (HIV, HCV)	Basic Disease knowledge (HIV, HCV)
Occupational Safety Knowledge	Occupational Safety Knowledge
Law knowledge	Law knowledge
Harm Reduction Knowledge	Harm Reduction Knowledge
Law Attitudes	Law Attitudes
Harm Reduction Attitudes	Harm Reduction Attitudes
Past Behavior: Occupational Risk (last 6 months)	
Past Behavior: Drug Law enforcement (last 6 months)	
Self-efficacy, support, norms and motivation	Self-efficacy, support, norms and motivation

Figure 4. ESCUDO Pre and Post Survey Framework.

"circle the selection that accurately describes what a suspect can currently possess under the law of Baja California".

Item	Legal under current law in Baja California				
a) Heroin	None	50mg	5gr	500mg	Don't know
b) Methamphetamine	None	40mg	4gr	400mg	Don't know
c) Marijuana	None	50mg	5gr	500mg	Don't know

Figure 5. Main outcome question. ESCUDO pre-post survey.

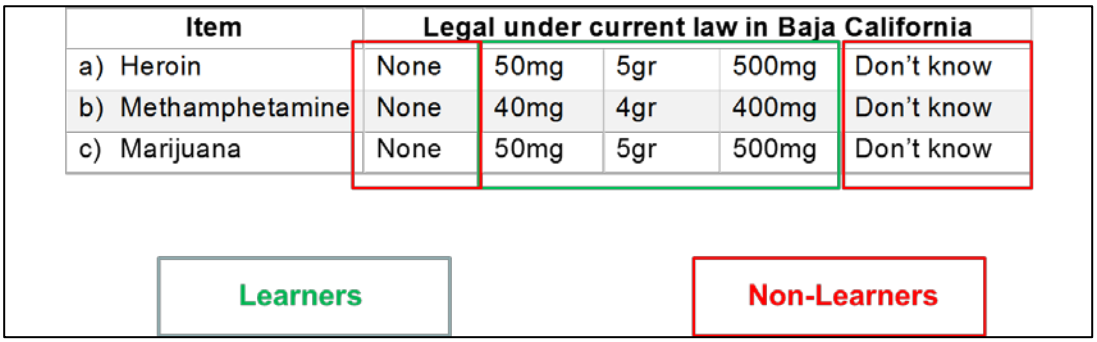

Figure 6. Post-Survey. Disctintion between Learners Vs Non-Learnes in Post-Survey answers – Legal Knoledge of decriminalized quantities.