

Review

A critical review of social and structural conditions that influence HIV risk among Mexican deportees

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Abstract

Mexican migrants who are deported from the US may be at elevated risk for HIV infection. Deportations of Mexican migrants by the US have reached record numbers. We critically reviewed existing literature to assess how social and structural conditions in post-deportation settings can influence Mexican deported migrants' HIV risk. We also identify critical research gaps and make research recommendations.

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1. Introduction

Mexican migrants in the US are disproportionately at risk for HIV infection [1–3]. Migration has been linked to various risk factors (e.g., poverty, stigma, severed social support networks) that influence HIV risks, including increased susceptibility to risky-sexual practices and drug abuse [1–4]. In 2010, Latino migrants accounted for over one-fifth (21%) of all new HIV infections; ~87% of these cases are among men [5]. A small body of data suggests that Mexican migrants who are expelled from the US and returned to their home countries (i.e., deportees) may be at even greater risk for HIV [6–8]. Post-deportation, individuals face multiple psychological, emotional, and economic stressors that influence their mental and physical health, including HIV vulnerability [7–10]. In the US, deportation of foreigners has increased four-fold since the 1990s; Mexican nationals account for the majority of

deportees (>75%) [11], mainly because they make up the largest undocumented population in the US [12]. Little is known about the health vulnerabilities of deported Mexican migrants [7,9].

In 2012, US deportations reached record numbers with more than 409,000 foreigners being deported [13]. More than 1.9 million migrants have been deported since 2009 [14,15]. In 2003 the US Department of Homeland Security (DHS) was created, which streamlined the process of deportation [16]. In 2008 the DHS shifted its priorities to target migrants with criminal convictions who are considered to be the main threat to society [17,18]. Migrants with convictions for aggravated felonies, drug-related offenses, firearms offenses, domestic violence crimes, and crimes of 'moral turpitude' are now at greater risk for deportation [19]. Deportations of migrants with criminal backgrounds have increased, especially for drug-related offenses. In 2013, 82% of all deported migrants had a prior criminal conviction [20], compared to 31% in 2008 [21]. Additionally, deportation of long-term migrants with strong US and familial ties are also increasing [14]. Mexican deportees may be a high-risk HIV transmission group given

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that they are at elevated risk for HIV in the US and commonly deported with a drug use and criminal history. HIV vulnerability depends upon physical and social contexts.

The Mexican communities to which deportees are relocated may increase their exposure to HIV and related unsafe behaviors. Migrants are often deported to northern US-bordering cities, including Tijuana, that have been plagued with increasing levels of drugs, drug-related violence, and sex work [2,22,23]. Notably, Tijuana receives the highest number of Mexican deportees; ~300 Mexican deportees are displaced to Tijuana *daily*, representing ~40% of all deported Mexican migrants [24]. In 2010, ~135,000 Mexican migrants were deported to Tijuana [24]. Tijuana's estimated HIV prevalence is 3 times as high as Mexico's average (0.9% vs. 0.3%, respectively) [2], and has an established drug and sex culture [2,25]. The local drug use prevalence surpasses the national average, including high rates of heroin, cocaine, and methamphetamine consumption [26,27]. Injection drug use is also pervasive; ~6400 to 10,000 injection drug users (IDUs) reside in Tijuana [25]. Sex work is tolerated and quasi-legal in Tijuana's *Zona Roja* (Red Light District); ~4800 to 9000 sex workers live and work in the city [25,28]. The intermixing of large numbers of vulnerable populations (e.g., drug users, sex workers, migrants) [28] suggests that Tijuana is a high-risk environment and may contribute to HIV transmission among vulnerable persons. Environments such as Tijuana's may thus influence deportees' sexual and drug abuse behaviors.

Rhode's HIV risk environment framework can be used to understand deportees' HIV risk [29–31]. Under this framework, the environment is conceptualized as operating at different domains of influences, including at the physical (e.g., drug availability, homelessness), social (e.g., stigma, discrimination), economic (e.g., employment, poverty), and policy levels (e.g., access to care, drug treatment) [29–31]. Factors within each level of influence constantly interact and shape risk practices and vulnerability to HIV among individuals who co-exist in that environment. Little is known about the post-deportation HIV risk environment. This critical review assesses how social and structural conditions in post-deportation settings can influence deported Mexican migrants' HIV risk, identify critical research gaps, and make future research recommendations.

2. Methods

2.1. Inclusion criteria

Articles that met the following criteria were considered for inclusion: (1) written in English or Spanish, (2) published between 1996 and 2013, (3) the study population was Mexican migrants deported from the US, (4) described HIV prevalence or post-deportation HIV risk factors, and (5) consisted of peer-reviewed research based on original studies. The year 1996 was chosen as the lower boundary for our review since new US immigration control policies that facilitated the mass deportation of migrants were implemented at that time [16,18].

2.2. Search strategy

From October to December 2013, we searched peer-reviewed databases across various disciplines including PubMed, PsycINFO, Sociological Abstracts, and Web of Science for published articles pertaining to topics of deportation and HIV risk. Titles and abstracts were searched by combining the following search terms: “Deportation OR deportee OR deported OR forced migration OR repatriated OR returned migrant” AND “HIV OR HIV risk OR substance use OR drug use OR injection drug use OR sex work OR commercial sex work OR prostitution” AND “Mexico OR Mexican” The above search terms in English and Spanish were also entered into SciELO, a Spanish international database. References within potentially relevant articles were reviewed to identify further potential articles for inclusion.

2.3. Data collection and management

Citations were managed using Endnote X5 software (Thomson Reuters Scientific Inc., New York, NY). Our searched strategy retrieved a total of 147 articles (Fig. 1). After deleting duplicates, 126 unique articles remained. The first author screened retrieved articles to determine eligibility by first examining titles and abstracts; 84 articles were not directly relevant to our review objectives, which narrowed our search to 42 potentially relevant articles. An additional 3 articles were identified via cross-referencing article citations and screened for inclusion. A total of 45 full-texts were reviewed for content surrounding the following topics: (1) HIV prevalence, and (2) post-deportation HIV risk behaviors and factors (e.g., homelessness, stigma, poverty, and barriers to health services). After reviewing full-texts, 26 articles were excluded on the basis that they did not describe original research (e.g., commentaries, review articles, short communications), did not differentiate on deportees as a subsample of migrants, did not focus on deported Mexican migrants, or did not describe post-deportation experiences or HIV risk factors (e.g., examined pre-US migration factors or experiences in the US). A total of 19 articles met our inclusion criteria for this review. Two Microsoft Excel databases were created to organize and group articles into: epidemiological quantitative studies ($n = 12$; Table 1) and qualitative/ethnographic studies ($n = 7$; Table 2). Each database recorded important article information, including: title, authors, year of publication, study location, study design, population sample (i.e., total sample; deportee sample), and important findings relating to HIV risk or infection. Key themes and findings were compared across studies examining consistencies and contradictions.

3. Results

3.1. Epidemiology of HIV and deportation

Studies examining associations between HIV and deportation have been documented along the US–Mexico border (Table 1). Deported males appear to be especially at risk for

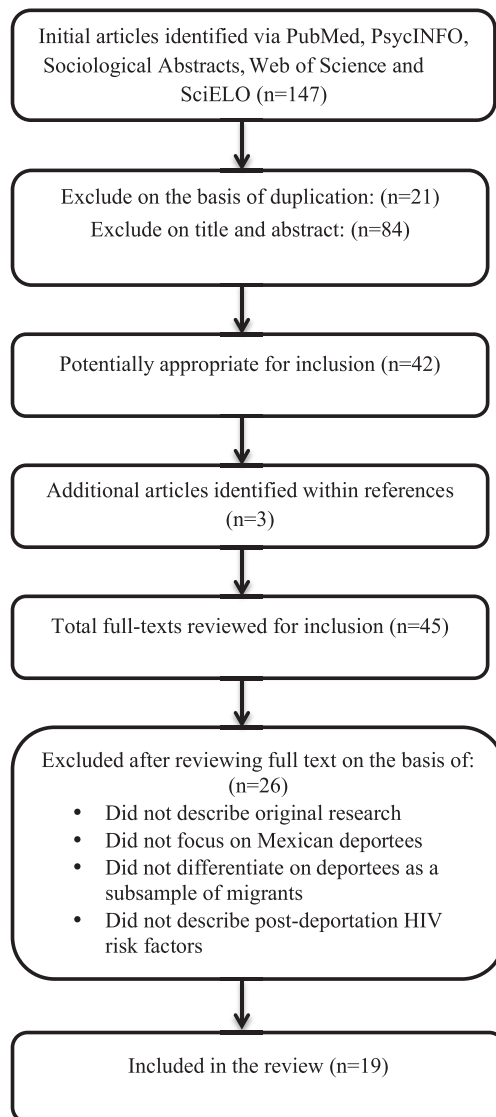


Fig. 1. Flow chart depicting the search strategy for articles between 1996 and 2013 focused on deportation and HIV and HIV risk among Mexican deportees.

HIV. A 2012 cross-sectional study utilizing probability-based sampling among deported Mexican migrants ($n = 693$) in Tijuana found an HIV prevalence of 0.8% in male deportees; the population HIV prevalence among deported migrants was estimated to be at 1.23% [6]. This study did not detect any cases of HIV among female deportees [6]. In a prospective cohort study that employed respondent driven sampling of 1056 IDUs residing in Tijuana, Strathdee et al. (2008) found that among HIV-positive male IDUs ($n = 31$), 71% ($n = 22$) were deportees [8]. Out of 16 female IDUs who tested positive for HIV, only 2 (13%) had a prior deportation. The adjusted odds ratio (AOR) for HIV infection among deported male IDUs was 4 times that of non-deported male IDUs. No statistically significant relationship between deportation and HIV was found among deported female IDUs [8]. A cross-sectional cohort study of 620 female sex workers who inject drugs (FSW-IDUs) in Tijuana and Ciudad Juarez, Mexico also found no association between deportation and HIV positivity [32].

The elevated HIV prevalence documented among male deportees is indicative of an increased HIV risk profile. Importantly, these studies were unable to determine the country where HIV infection was acquired.

3.2. HIV risk behaviors

Deportees often present a higher HIV risk profile than non-deported populations (Table 1). A 2006 study among Mexican migrants ($n = 1429$) returning to Tijuana either voluntarily, as a result of being deported, or arriving to Tijuana from other Mexican regions found a higher prevalence of past 6-month high-risk sexual practices in deported migrants versus other migrants [33]. Males were over represented among deportees in the sample (85%). The population estimated prevalence of having engaged in non-consensual sex, sex with an IDU, transactional sex, or sex with a transvestite man in the past six-months was highest among deportees (6.1%) compared to migrants returning from the US voluntarily (2.2%) and migrants from other Mexican border regions (2.7%). Rangel et al. (2012), documented a higher population prevalence of lifetime history of STIs (22%), last 12-month rates of unprotected sex (63%), sex with multiple partners (18.1%), casual partners (25.7%), and with sex workers (8.6%) among deported migrants in Tijuana than has been found among Mexican migrants in the US and Mexico [6]. The majority of deportees sampled in this study were males (91%). These high-risk behaviors are not limited to sexual practices.

Deportees may engage in harmful drug using practices. Brouwer et al. (2009) found that among IDUs in Tijuana ($n = 219$), deportees were significantly more likely to inject multiple times a day versus non-deported IDUs (OR: 5.52; 95% CI: 1.62–18.8) [34]. Increased frequency of drug injection increases the likelihood acquiring and transmitting HIV, potentially because past 6-month distributive (71%) and receptive needle sharing (76%) was high among IDUs in this study. Deportees' risky drug use practices may also facilitate HIV transmission across borders [35,36]. Wagner et al. (2011) found that deported IDUs in Tijuana were increasingly more likely to have ever injected with someone from the US (53% vs. 27%; $p < 0.0001$), compared to non-deported IDUs [36]. This may be the result of their ongoing relationships with persons from the US post-deportation. Deportation can also impact the behaviors of drug using deportees. Among deported male IDUs in Tijuana ($n = 328$), Robertson et al. (2012) document that 16% of males ($n = 52$) used new drugs or combinations of drugs following their most recent deportation, primarily heroin, methamphetamines, or both drugs combined [7]. Few studies have documented protective factors for HIV among deportees.

Only one study reported an association between protective factors and deportation. Among male clients of female sex workers (FSWs) living in Tijuana ($n = 393$), deportees were more likely to report feelings of higher-efficacy for condom use than non-deportees (41 vs. 27%; $p = 0.01$) [37]. However, this relationship did not retain statistical significance in multivariate analyses. This study was limited by the fact that

Table 1
Epidemiological studies examining associations between deportation and HIV and HIV risk among Mexican deportees, 2006–2013.

Title	Authors	Year	Location	Study design	Population	Sample size	Major findings
<i>HIV prevalence</i>							
A two-way road: rates of HIV infection and behavioral risk factors among deported Mexican labor migrants [6]	Rangel et al.	2012	Tijuana, Mexico	Cross-sectional	Mexican migrants	Total: 693 Deportees: 693 (100%)	An HIV prevalence of 0.8% was found among deported males; no cases of HIV among deported females were detected. The HIV population estimate for deported males was 1.23%. Results also indicate inadequate levels of HIV testing, little knowledge of HIV status, and poor access to HIV and STI treatment.
Social and structural factors associated with HIV infection among female sex workers who inject drugs in the Mexico–US Border Region [32]	Strathdee et al.	2011	Tijuana and Ciudad Juarez, Mexico	Cross-sectional	Female sex workers who are injection drug users	Total: 620 Deportees: 55 (9%)	Among FSW-IDUs who tested positive for HIV ($n = 33$), 9% ($n = 3$) were deportees. No independent association was found between deportation and HIV status.
Differential effects of migration and deportation on HIV infection among male and female injection drug users in Tijuana, Mexico [8]	Strathdee et al.	2008	Tijuana, Mexico	Cross-sectional	Injection drug users	Total: 1056 Male Deportees: 377 (42%) Female deportees: 36 (23%)	Among male IDUs who were HIV-positive ($n = 31$), 71% ($n = 22$) were deportees; among HIV-positive female IDUs ($n = 16$), 13% ($n = 2$) were deportees. The adjusted odds for HIV infection were 4 times higher among male IDUs who were deported than non-deported males IDUs (AOR: 4.00; 95% CI: 1.67–9.44). No statistically significant relationship between HIV and deportation was found among female IDUs.
<i>HIV risk behaviors</i>							
Deportation history among HIV-positive Latinos in two US–Mexico border communities [45]	Muñoz et al.	2013	San Diego, USA and Tijuana, Mexico	Cross-sectional	HIV-positive Latino patients	Total: 283 Deportees: 71 (25%)	Deported HIV-positive patients were more likely to be male (AOR: 2.77; 95% CI: 1.18–6.48) and report lifetime cocaine use (AOR: 2.46; 95% CI: 1.33–4.57). HIV-positive deportee patients were significantly less likely to be adherent to their antiretroviral medication (AOR: 0.35; 95% CI: 0.12–0.96), compared to non-deported HIV-positive patients.
US drug use and migration experiences of Mexican female sex workers who are injection drug users [35]	Ojeda et al.	2012	Tijuana and Ciudad Juarez, Mexico	Cross-sectional	Female sex workers who are injection drug users	Total: 315 Deportees: 39 (12%)	Among US–Mexico migrant FSW-IDUs ($n = 85$), 46% ($n = 39$) were deportees. On average, deported FSW-IDUs experienced nearly 3 lifetime deportation experiences. Independent associations between deportation and ever consuming drugs in the US were not found.
Correlates of self-efficacy for condom use among male clients of female sex workers in Tijuana, Mexico [37]	Volkman et al.	2012	Tijuana, Mexico	Cross-sectional	Male clients of female sex workers	Total: 400 Deportees: 49 (27%)	Deported males were more likely to have higher self-efficacy for condom use (41 vs. 27%; $p = 0.01$) than non-deported males. This relationship did not remain significant in multivariate analyses.
Male injection drug users try new drugs following US deportation to Tijuana, Mexico [7]	Robertson et al.	2011	Tijuana, Mexico	Cross-sectional	Injection drug users (male)	Total: 328 Deportees: 328 (100%)	One in six male deported IDUs ($n = 52$, 16%) tried new drugs following their most recent deportation. New drugs included heroin ($n = 31$), methamphetamine ($N = 5$), or both drugs combined ($n = 17$). Trying new drugs following deportation was independently associated with increasing numbers of US deportations (AOR: 1.11 per deportation; 95% CI: 1.03–1.20) and feeling sad following most recent deportation (AOR: 2.69; 95% CI: 1.41–5.14).

Cross-border drug injection relationships among injection drug users in Tijuana, Mexico [36]	Wagner et al.	2011	Tijuana, Mexico	Cross-sectional	Injection drug users	Total: 1056 Deportees: 413 (39%)	Deported IDUs were more likely to have ever injected with someone from the US (53% vs. 27%; $p < 0.0001$), compared to non-deported IDUs.
The Harm Inside: Injection during incarceration among male injection drug users in Tijuana, Mexico [44]	Pollini et al.	2009	Tijuana, Mexico	Cross-sectional	Injection drug users (male)	Total: 898 Deportees: 377 (42%)	IDU male deportees are more likely to report ever being incarcerated versus male IDUs who have not been deported (AOR: 1.61; 95% CI: 1.12–2.5).
Deportation along the US–Mexico border: its relation to drug use patterns and accessing care [34]	Brouwer et al.	2009	Tijuana, Mexico	Cross-sectional	Injection drug users	Total: 219 Deportees: 34 (16%)	Compared to non-deported IDUs, IDU deportees were more likely to inject multiple times per day (OR: 5.52; 95% CI: 1.62–18.8), and less likely to access (past 6 months) medical care (OR: 0.37; 95% CI: 0.13–1.00; $p = 0.05$), drug treatment (OR: 0.41; 95% CI: 0.19–0.89), and HIV testing (OR: 0.44; 95% CI: 0.19–1.02; $p = 0.05$).
Social and environmental influences shaping risk factors and protective behaviors in two Mexico–US Border Cities [41]	Ramos et al.	2009	Tijuana and Ciudad Juarez, Mexico	Cross-sectional	Injection drug users (male)	Total: 428 Deportees: 37 (9%)	IDUs living in Tijuana were 12 times more likely to have been deported from the US compared to those living in Ciudad Juarez. Authors conclude that the high rates of mobility and deportation observed in Tijuana may help explain why IDUs residing in Tijuana were more likely to be homeless, inject outside or at a shooting gallery, and spend the majority of their time ‘on the street.’
Prevalence of risk factors for HIV infection among Mexican migrants and immigrants: Probability survey in the Northern border of Mexico [33]	Rangel et al.	2006	Tijuana, Mexico	Cross-sectional	Mexican migrants and immigrants	Total, 1429 Deportees: 167 (12%)	The population estimated prevalence of having engaged in non-consensual sex, sex with an IDU, transactional sex, or sex with a transvestite man in the past six-months was highest among deportees (6.1%) compared to migrants returning from the US voluntarily (2.2%) and migrants from other Mexican border regions (2.7%).

Table 2
Qualitative/ethnographic studies describing social and structural conditions of deportation and HIV risk among Mexican deportees, 2009–2013.

Title	Authors	Year	Location	Study design	Population	Sample size	Major findings
“Right here is the gateway”: mobility, sex work entry and HIV risk along the Mexico–US border [40]	Goldenberg et al.	2013	Tijuana, Mexico	Qualitative study	Formerly trafficked sex workers who currently engage in sex work	Total: 31 Deportees: 3 (10%)	Women described their deportation as abrupt and traumatic, arriving to Tijuana with no plans, money, or social ties. Many engaged in sex work for economic survival and drugs. The process of deportation fostered circumstances that increased vulnerability to being coerced into sex work.
Deportation experiences of women who inject drugs in Tijuana, Mexico [10]	Robertson et al.	2012	Tijuana, Mexico	Qualitative study	Deported injection drug users (female)	Deportees: 12 (100%)	Women reported arriving to the US as children (median 6 years) and experienced a median of 2.5 lifetime deportations. Heavy drug use after deportation was common. Post-deportation, women experienced heightened economic vulnerability and physical insecurity, increasing drug dependence, emotional distress, and lack of access to drug treatment and other health services. Economic insecurity facilitated engagement into sex work.
A qualitative view of drug use behaviors of Mexican male injection drug users deported from the United States [9]	Ojeda et al.	2011	Tijuana, Mexico	Qualitative study	Deported injection drug users (male)	Deportees: 24 (100%)	Post-deportation, deportees experienced shame and loss of familial, social and economic support that exacerbated drug use and led to a sense of hopelessness and despair. Deportees perceived the social, drug, and economic climates of their new environments as facilitating their drug use behaviors, including relapse, transition into injection drug use, and injecting new drugs.
“Over here, it’s just drugs, women and all the madness”: The HIV risk environment of clients of female sex workers in Tijuana, Mexico [39]	Goldenberg et al.	2011	Tijuana, Mexico	Qualitative study	Male clients of female sex workers	Total: 30 Deportees: Not specified	Deportation severed important social support networks, including being separated from family and intimate partners. Deportees report searching for intimacy to buffer feelings of social isolation, which resulted in paying for sex with FSWs and drug use simultaneously. The economic strategies employed by deportees in response to social and structural barriers, such as working as middlemen who recruit clients for FSWs, facilitated engagement in high-risk behaviors.
Push back: US deportation policy and the reincorporation of involuntary return migrants in Mexico [42]	Wheatley	2011	Guadalajara, Tepatitlan de Morelos, San Ignacio Cerro Gordo, and San Pedro Itzican, Mexico	Qualitative study	Migrants and non-migrant informants	Total: 41 Deportees: 12 (29%)	Deportees experience greater stigma, report more diminished emotional and psychological well-being, lack social networks, and return with greater financial insecurity than migrants who return voluntarily.
“People here are alone, using drugs, selling their body”: Deportation and HIV vulnerability among clients of female sex workers in Tijuana [38]	Goldenberg et al.	2010	Tijuana, Mexico	Qualitative study	Deported male clients of female sex workers	Deportees: 20 (100%)	Migrants report intense social isolation and economic vulnerability after being deported, which was linked to substance use and unprotected sex with FSWs. Reasons for visiting FSWs included loneliness, lack of a regular partner, being high or drunk, and having a job that results in close contact with FSWs. Paying for sex with FSWs was perceived as being more socially acceptable in Tijuana than in their US communities.

Labor migration, drug trafficking organizations, and drug use: Major challenges for transnational communities in Mexico [43]

Garcia and Gonzalez

2009

Guanajuato, Mexico

Ethnographic

Mexican migrants and deportees

Not specified

Deportees experience social stigma and discrimination after returning to their home communities. Physical (e.g., tattoos, clothing) and cultural (e.g., mannerisms, Spanish language deficiencies) differences associated with being ‘Americanized’ quickly differentiates deportees from ‘locals.’ Deportees are associated with delinquency, gang activity, and drug use and perceived as the cause of social existing problems including increase drug use and crime.

frequency of condom use was not measured. Further studies are needed to determine factors driving preventive behaviors among deportees.

3.3. The post-deportation HIV risk environment

The following section describes social and structural conditions in post-deportation settings that contribute to HIV risk. We describe various levels of environmental influences at the physical, social, economic, and policy levels that may elevate deportees’ HIV risk and report on key features and common themes found in our review of the literature.

3.3.1. Physical influence

3.3.1.1. Social disruption. Deportees often have extensive family and community ties to the US. Many deportees have been long-term residents [6,10]. Some were taken to the US as youths [10,38]. These migrants were raised in the US, attending public schools, speaking English, and adopting American culture and customs. In Tijuana, deportees commonly identify the US as their home, speak English, and report prolonged US residencies (range 9–13 years) [6,7,33]. Deporting established migrants can produce various social conditions that affect their livelihood and health post-deportation.

Deportation disrupts migrant’s lives. Deportees may be inserted to unfamiliar environments. Immediately following deportation, deportees are left to fend for themselves with few belongings or money, a secure place to spend the night, and difficulties communicating with family members [9,10,38]. Many deportees lack cultural familiarity with their native countries, may not speak the language, or may lack local social and family connections in the receiving country [9,22,38]. This can be a traumatic experience for many. Deported Mexican migrants regularly describe intense feelings of fear, social and cultural displacement, isolation, frustration, and disorientation with their new environments [9,10,38]. Such sentiments can influence engagement in risky activities as a form of coping mechanism.

Drug use and unsafe sexual practices have been linked to feelings of isolation, loneliness, and separation from spouses, children, and extended family among deportees [9,10,38]. Qualitative interviews were conducted among deported male ($n = 24$) [9] and female ($n = 12$) [10] IDUs in Tijuana in 2011 and 2012, respectively. Deportees described initiating, relapsing, or increasing drug use in order to deal with the emotional and psychological distress resulting from their deportation. Robertson et al. (2012) found an independent association between increasing numbers of deportations (AOR: 1.11 per deportation; 95% CI: 1.03–1.20) and feelings of sadness after being deported (AOR: 2.69; 95% CI: 1.41–5.14) with trying new drugs or new combinations of drugs among deported male IDUs in the same setting [7]. High-risk sexual practices may also occur. Deportees in Tijuana explain paying for sex with FSWs to buffer feelings of isolation resulting from the dissolution of romantic

relationships with their partners in the US [38]. The emotional and psychological consequences of deportation may render migrants vulnerable to high-risk drug and sexual practices, elevating their risk for acquiring HIV.

3.3.1.2. High-risk environments. Deportees may encounter increased opportunities to engage in high-risk behaviors following their repatriation; these behaviors may be further influenced by their physical, emotional, and socio-demographic vulnerable state [7,9,10]. Mexican migrants are increasingly deported to northern US-bordering cities that have been plagued with increasing levels of drugs, drug-related violence, and sex work [7–9]. Ojeda et al. (2011) found that deported male IDUs residing in Tijuana perceived the social, drug, and economic climates of their new environments as facilitating their drug use behaviors, including relapse and transition into injection drug use [9]. This includes widespread availability and perceived lower cost of drugs, syringes and injecting equipment, shooting galleries, and a large IDU community [9]. Deportees also perceived drug use as carrying fewer consequences in Mexico than in the US. Robertson et al. (2012) found similar themes in the narratives of deported female IDUs in Tijuana [10]. Women described relapsing into drug use, experimenting with new drugs, and initiating drug use as a result of the pervasive presence of drugs in their environments and new social networks that included drug users [10]. Characteristics of receiving communities may influence deportees' drug use and sexual behaviors.

The presence of a prominent sex industry can also impact the sexual behaviors of deportees [38,39]. In a qualitative study of deported male clients of FSWs in Tijuana, Goldenberg et al. (2010) found that deportees perceived paying for sex as more socially acceptable and accessible than in the US [38], a factor that was linked to accounts of unprotected sex with FSWs. Interestingly, these deportees reported never engaging or being exposed to FSWs while in the US [38]. Female deportees residing in Tijuana have also described the ubiquitous local sex industry as influencing their decision to initiate sex work, especially for survival [10,40]. Sex work commonly occurs in contexts that increase susceptibility to HIV. Inserting deportees into high-risk HIV environments can play an important role and shape their risk for acquiring and transmitting HIV.

3.3.1.3. Homelessness. Homelessness is ubiquitously associated with deportation. Access to secure housing is a widespread concern for deportees, as they are inserted into new environments at odd hours or without a guarantee of stable or safe housing [7,41]. Some deportees share the costs of temporary housing (i.e., motels) or rented rooms [10]. Those who are unable to find shelter are forced to sleep on the streets [7]. Securing long-term housing is a great challenge given deportees' low socio-economic profile and lack of economic opportunities [10,35]. Deported women who are homeless may face greater vulnerabilities, and may be more likely to trade sex as a means to secure housing and other resources

[10]. Homeless deportees are at increased risk for HIV given social and structural risk factors associated with lacking secure housing.

3.3.2. Social influence

3.3.2.1. Stigma. Migrants experience social stigma and discrimination following their deportation since receiving communities are aware of US policies that concentrate on the expulsion of deportees with lengthy criminal and incarceration histories [42,43]. Deportees are associated with delinquency, gang activity, and drug use and perceived as the cause of social existing problems including increase drug use and crime [42,43]. Stigmatized populations commonly share a social identity and characteristics that are socially devalued by the larger society. Physical (e.g., tattoos, clothing) and cultural (e.g., mannerisms, Spanish language deficiencies) differences associated with being 'Americanized' can quickly differentiate deportees from 'locals' [42]. Identifying deportees is quite simple, "with their hair cropped short, arms, torso, and neck covered with tattoos and dressed in a distinctive style – Timberland shoes, baggy pants, and oversized, creased tee shirts – these young ex-migrants and immigrants stand out in their communities" [43]. Such characteristics quickly 'brand' deportees into their own separate social group within the community, such as *los deportados* ('the deportees') [43]. Being stigmatized and socially rejected by their receiving community adversely impacts their mental well-being.

Deportees' emotional health is tied to social experiences in receiving communities. Deportees frequently internalize and describe feeling shameful and embarrassed for being branded as a 'failure' or 'criminal' – returning 'empty-handed' to their native country [9,42]. Unable to cope, many deportees experience intense depression and desperation [9,38,39]. Deportees along the US–Mexico border describe a sense of 'giving up' on themselves, having little concern or regard about their physical or emotional health [38]. Feelings of fatalism are perceived as the cause of their high-risk behaviors, including unprotected sex with FSWs and other partners, alcohol and substance abuse, and unsafe drug use [38,39]. Social environments can have strong influences on the behaviors and health of deported individuals.

3.3.2.2. Police targeting and victimization. Local law enforcement officers shape HIV risks via policing practices. In qualitative interviews conducted with male deported IDUs in Tijuana, deportees describe being harassed by police, especially for carrying clean syringes or for having visual indicators of drug injection use (e.g., 'track marks') [9]. Being targeted often led to incarceration. Such experiences resulted in harmful drug use, including sharing injection equipment while incarcerated or bingeing on drugs following their release. Similarly, deported female IDUs describe being fearful of being harassed or detained by police for carrying clean syringes, being a "known drug user", or lacking legal identification documents [10]. Fearing adverse encounters

with police, women took additive risks to remain hidden, such as injecting in high-risk environments (e.g., shooting galleries) and avoided carrying clean syringes – increasing their likelihood of sharing needles. Abuse by criminal justice systems can reduce adoption of preventive behaviors among vulnerable populations, increasing the odds of HIV infection. IDU deportees may also be more likely to be targeted by police, versus non-deported IDUs. Pollini et al. (2009) found that compared to non-deported male IDUs residing in Tijuana, IDU deportees were more likely to have ever been incarcerated (AOR: 1.61; 95% CI: 1.12–2.5) [44]. Abusive and arbitrary policing practices can operate as ‘social–structural’ drivers for HIV risk.

3.3.3. Economic influence

3.3.3.1. Economic vulnerability. Deportees typically arrive with little or no money; finding work is a difficult task [38,42]. Deportees often lack legal identification documents (e.g., government issued identification, birth certificate) that are needed to prove citizenship [7,10]. Lacking these documents excludes deportees from the formal economy and limits economic opportunities post-deportation. Deportees who are excluded from the formal economy may engage in other means of survival. Participating in the informal economy are many times the only options for deportees. For example, in Tijuana, deportees may work as *jaladores*, middlemen who recruit clients for FSWs [38,39]. Given the district’s prominent US-based clientele, deportees’ English knowledge and familiarity with American culture is positively perceived by employers in the sex work industry (e.g., bars, brothels) [38]. Female deportees may also engage in sex work in order to survive economically, which places them at risk for coerced sex and trafficking [10,40]. The economic strategies employed by deportees in response to social and structural barriers places them in situations that increase their risk for HIV.

3.3.4. Policy influence

3.3.4.1. Access to health services. Deportees, especially males, present a high prevalence of HIV risk behaviors and infection [6,8,33]. Yet, post-deportation access and utilization of health services is low. A 2009 study of deported IDUs ($n = 219$) in Tijuana documented low access health service (15 vs. 32%; $p = 0.05$), drug treatment (32 vs. 54%; $p < 0.05$), and HIV testing (24 vs. 41%; $p = 0.05$), when compared to non-deported IDUs [34]. Rangel et al. (2012) found a population estimate of HIV testing at 51% for deportees [6]. Notably, among deportees with an STI diagnosis in the past year, an estimated 39% had received treatment [6]. Lack of familiarity with local resources and economic constraints disconnect deportees from health services [34]. This may also affect the health behaviors of deportees. Muñoz et al. (2013) found that HIV-positive deportee patients were significantly less likely to be adherent to their antiretroviral medication (AOR: 0.35; 95% CI: 0.12–0.96), compared to non-deported

HIV-positive patients [45]. Access to health services and HIV testing is a critical issue for reducing HIV transmission and preventing disease progression.

4. Research gaps and recommendations

4.1. Study design

The relationship between deportation and HIV infection and risks has been primarily examined through cross-sectional studies. Thus, temporality is a critical limitation since extant studies have yet to establish causal pathways between deportation and HIV. Given deportees’ extensive migration trajectories, determining when and in what country HIV infection was acquired is difficult. Temporality of HIV risk behaviors is also problematic. HIV risk behaviors may be acquired prior to migrating to the US, while in the US, or post-deportation [7,9,35,46]. Moreover, many migrants experience more than one deportation experience, adding further complexity to issues of temporality. Sources of vulnerability may differ between the first and subsequent deportation experiences. Thus, longitudinal studies conducted with a broader deportee population can overcome these limitations. Such a study design can also test whether deportation precedes HIV infection and can shed light on interactions between individual, social and environmental factors.

To our knowledge only one small longitudinal feasibility pilot study among deportees has been conducted. Ojeda et al. (2012) recruited 19 newly deported Mexicans in Tijuana with a 1-month follow up period ($n = 6$ visits) to determine the feasibility of a longitudinal study among deportees and retention strategies in health research [47]. Preliminary data suggest that such a study may be feasible if diverse communication methods and settings for conducting interviews are available, and flexibility in study participation (i.e., dates, times) are implemented. Deportees’ mobility within post-deportation communities or attempted or successful returns to the US may result in loss-to-follow up. Research involving a large cohort of newly deported migrants is needed to further develop strategies to retain deportees in longitudinal health research.

Extant data on HIV and deportation are derived primarily from cohort studies that were not designed to study migration [32,48]. These studies also focus on high-risk populations (e.g., IDUs, FSWs) and have primarily been conducted in Tijuana, Mexico. Though Tijuana is the primary receiving community for Mexican deportees, migrants are also deported elsewhere in Mexico [22,24]. Deportations to US-bordering communities in Tamaulipas and Coahuila increased 5-fold between 2009 and 2012 [23]. These communities have experienced widespread drug-related violence and drug use in recent years [23], which can potentially influence HIV risks. Moreover, less is known about the experiences of deportees outside of the US–Mexico context [49–52]. Deportation of migrants from Guatemala, El Salvador, Honduras, and the Dominican Republic are increasing [17]. These deportees can potential influence the HIV epidemics in their respective countries, which are rapidly approaching generalized

epidemics [53,54]. More empirical data is needed for Mexican deportees in border and non-border cities, and with deportees from other countries to better understand the comparative post-deportation experiences of deported migrants in diverse contexts.

4.2. HIV vulnerability among female deportees

Associations between deportation and HIV serostatus among women have not been found [6,8,32], possibly because cohorts of deportees are primarily dominated by males (~89%) [55]. Present studies are likely underpowered to fully investigate the relationship between HIV status and risk among female deportees. Future studies should examine HIV infection and risks among larger samples of female deportees as sources of vulnerability may differ from those experienced by males.

4.3. Post-deportation social networks

Deportees' social networks may change post-deportation yet neither the social networks nor the evolution of networks following deportation have been studied systematically [9,10]. Limited research among deported IDUs suggests that their drug use behaviors evolved following deportation, including experimenting and injecting new drugs [7,9]. This may in part be the result of new social networks, especially with drug users, which influences the drug use behaviors of deportees [10,35]. Social networks with US-based drug users may also be maintained, resulting in cross-border drug use and receptive needle sharing among IDU deportees [36]. Lack of empirical research on deportees' social networks post-deportation represents an important scientific gap in understanding how migrants' drug abuse risk profile may change following deportation.

5. Conclusion

The limited data on deportation and HIV consistently finds that deportees, especially males, return to Mexico with a high HIV risk profile. The increasing number of deportations by the US highlights the need to better understand the link between deportation and HIV. Access to health services, drug treatment, and HIV testing post-deportation are critical factors to consider in relation to HIV prevention and treatment among deportees. Deportees' underutilization of these services may be the result of broader structural factors. Though Mexico provides universal health insurance through *Seguro Popular* (i.e., Population Health Insurance), residents must provide proof of Mexican nationality, which many deportees lack [10,22,56]. Evidence-based drug treatment services in Tijuana are also limited; use of existing services may be discouraged as a result of adverse experiences (e.g., physical or verbal abuse by staff) [57].

Limited measures to decrease deportees' vulnerability have been implemented in Mexico. The Mexican Government established in 2007 the Humane Repatriation Program [58].

This program was first piloted in Tijuana and has been expanded to nine other Mexican border cities, with a planned rollout to 23 cities. Short-term re-integration services are provided to newly deported Mexican nationals (e.g., temporary shelter, food, clothing, transportation, medical attention). In 2009, ~47% of deportees used these services [59]. Additional evaluation is needed to understand whether social re-integration services facilitate deportees' return to Mexico and mitigate the social and structural factors that elevate the risk of HIV. Protecting deportees' can have broader positive community-level health and social impacts. More deportee-focused health research is needed to identify cost-effective interventions and policies that can reduce HIV infection and related social and economic vulnerabilities among deported migrants.

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