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Injection Drug Use Trajectories Among Migrant Populations: A Narrative Review

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Abstract

Background—Dual epidemics of injection drug use and blood-borne disease, characterized as "syndemics," are present in a range of settings. Behaviors that drive such syndemics are particularly prevalent among mobile drug-using populations, for whom cross-border migration may pose additional risks.

Objectives—This narrative review aims to characterize the risk factors for injection drug use initiation associated with migration, employing a risk environment framework and focusing on the San Diego–Tijuana border region as the most dynamic example of these phenomena.

Methods—Based on previous literature, we divide migration streams into three classes: intra-urban, internal, and international. We synthesized existing literature on migration and drug use to characterize how mobility and migration drive the initiation of injection drug use, as well as the transmission of hepatitis and HIV, and to delineate how these might be addressed through public health intervention.

Results—Population mixing between migrants and receiving communities and the consequent transmission of social norms about injection drug use create risk environments for injection drug use initiation. These risk environments have been characterized as a result of local policy environments, injection drug use norms in receiving communities, migration-related stressors, social dislocation, and infringement on the rights of undocumented migrants.

Conclusion—Policies that exacerbate risk environments for migrants may inadvertently contribute to the expansion of epidemics of injection-driven blood-borne disease. Successful

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Declaration of interest

The authors declare that they have no conflict of interest. The authors alone are responsible for the content and writing of the article.

interventions that address emerging syndemics in border regions may therefore need to be tailored to migrant populations and distinguish between the vulnerabilities experienced by different migration classes and border settings.

Keywords

HIV prevention; injection initiation; migration; people who inject drugs; review; syndemic

Introduction

People who inject drugs (PWID) are at high risk for blood-borne infections and account for almost a third of all HIV cases outside of sub-Saharan Africa (UNODC, 2016). Migrant populations have also been shown to be at risk of initiating injection drug use (IDU) (Folch et al., 2016; Horyniak, Melo, Farrell, Ojeda,& Strathdee, 2016a; Ojeda et al., 2011), especially those populations whose migration pathways traverse drug trafficking regions (Beyrer et al., 2000; Rachlis et al., 2007). Relatedly, dual epidemics of IDU and blood-borne disease have been observed across international borders and drug trafficking routes globally (Beyrer et al., 2000; Rachlis et al., 2007; Strathdee, Magis-Rodriguez, Mays, Jimenez, & Patterson, 2012). Such linked epidemics have been characterized as “syndemics”—the interaction of two or more coexistent conditions in a population that exacerbates disease morbidity and mortality—given their patterns of spread and their concentration among specific marginalized populations (Singer & Clair, 2003). Current international migration crises, including the mass deportation of people from the United States to Mexico (Becker & Armendariz, 2012; GSA, 2014; ICE, 2015), and the large-scale, conflict-driven migration from the Middle East and North Africa into Europe (Clayton, 2016; Sunderland, 2015), have the potential to put many more at risk of these syndemics.

Factors associated with injection drug use initiation

Exposure to injecting behaviors is a key risk factor for IDU initiation (Robertson, Lozada, Pollini, Rangel, & Ojeda, 2012; Sherman, Smith, Laney, & Strathdee, 2002; Werb et al., 2016). Experts have therefore described injecting as a socially communicable condition: a condition spread between individuals through social exposure in an enabling environment (Robertson et al., 2012; Sherman, Smith, Laney, & Strathdee, 2002; Small, Fast, Krusi, Wood, & Kerr, 2009). Adherence to the social communicability of this condition is further influenced by individual, social, and structural factors (Horyniak et al., 2014; Horyniak et al., 2015; Sherman et al., 2002). As such, in settings experiencing syndemics of IDU and blood-borne disease, calls have been made to prioritize the prevention of injection initiation to reduce disease incidence and mitigate other drug-related harms (Bluthenthal & Kral, 2015; Vlahov, Fuller, Ompad, Galea, & Des Jarlais, 2004; Werb et al., 2016). Preventing injection initiation is likely to be more effective in curtailing the expansion of epidemics of blood-borne disease compared with efforts to reduce injection-related risk behaviors among individuals after they have begun injecting, given that the risk of HIV and hepatitis C virus (HCV) transmission increases dramatically during the months and years immediately postinitiation (Garfein, Vlahov, Galai, Doherty, & Nelson, 1996; Vlahov et al., 2004).

Importantly, although sharing drug use practices outside one's immigrant network has not been consistently observed, evidence suggests that socialization with drug injecting networks puts migrants at risk of injection initiation and may lead to the dissemination of drug use norms across borders through migrating individuals (Guarino, Marsch, Deren, Straussner, & Teper, 2015; Rachlis et al., 2007; Wagner et al., 2011). Among a sample of recently initiated PWID in Spain, a higher proportion of participants were international migrants than locals (Folch et al., 2016). Along the China–Vietnam and the China–Myanmar borders, mobile drug dealers and migrant PWID populations drive the regional HIV epidemics (Hammett et al., 2012; Rachlis et al., 2007; Williams, Liu, & Levy, 2011). So, although epidemics of blood-borne disease have been identified among PWID over the past three decades, mobility is emerging as a driving factor in syndemics of blood-borne disease and IDU (Beyrer et al., 2000; Folch et al., 2016; Rachlis et al., 2007). Notably, the relationship between migration and IDU may be bidirectional, as studies have observed PWID migrating in order to seek addiction treatment, as well as mixing with local PWID populations upon arrival, as has been observed among Puerto Rican migrants in the Northeastern U.S. (Deren et al., 2014; Michalopoulos, Aifah, & El-Bassel, 2016).

Globally, high-risk behaviors associated with HIV transmission have been observed in migrant populations as maladaptive coping mechanisms for migration-related hardships (Michalopoulos et al., 2016). High-risk sexual behaviors associated with HIV transmission are more prevalent among mobile populations compared with non-migrant populations (Rachlis et al., 2007; Swift, Maher, Sunjic, & Doan, 1997; Williams et al., 2011), a phenomenon that has, in addition to high-risk drug-use behaviors, driven the diffusion of HIV among PWID across border regions (Wagner et al., 2011; Williams et al., 2011). For that reason, one major focus for syndemic research is the northern Mexican border region, as Tijuana and Ciudad Juárez, two Mexican cities bordering the American cities of San Diego and El Paso, respectively, have long been identified as "hot spots" for cross-border heroin injection and HIV transmission (Bucardo et al., 2005; Strathdee et al., 2012). The Tijuana–San Diego border is the world's busiest land border crossing with an estimated 100,000 individuals traversing every day (GSA, 2014). Given the communicable nature of drug injecting, the high degree of mobility and population mixing in the Tijuana–San Diego corridor is likely contributing to the expansion of the well-characterized syndemic of injecting and blood-borne disease among vulnerable populations in this region (Garfein et al., 1996; Sherman et al., 2002; Wagner et al., 2011).

This review seeks to characterize the risk factors for the initiation of IDU and problematic injection practices associated with migration across international borders as well as internally within countries. We have also sought to delineate how the drug use-related risks among migrants might be addressed through public health intervention. We employed Rhodes' risk environment framework to guide this review (Rhodes, 2002). This framework hypothesizes that a set of intersecting environments—policy, economic, social, and geographic—constrains the range of choices available to individuals to avoid risky injection-related behaviors. The risk environment framework has been particularly useful for studies investigating the sociostructural antecedents of health and social harm experienced by PWID (Kennedy et al., 2017; Rhodes, 2002; Small, Rhodes, Wood, & Kerr, 2007), and is therefore well-suited to a consideration of the impact of migration on risks associated with drug

injecting. Using this framework, we hypothesize that migration contributes to risk environments that may expand the risk for injection initiation among migrants and consequent risks for blood-borne disease transmission and the expansion of syndemics of injecting and blood-borne disease.

From March to December 2016, we identified and synthesized existing literature on migration and drug use. Relevant peer-reviewed literature and policy pieces were identified using the following search terms in English and Spanish: cross-border migration; HIV; initiation; injection drug use; internal migration; mobility; migration; and syndemic. Ultimately, 72 scholarly articles informed the conclusions of this review. We draw particular attention to the U.S.–Mexico border region as a case study, given the high level of migration in this region (GSA, 2014), and the fact that it is disproportionately affected by an epidemic of injection-driven HIV and HCV transmission (White et al., 2007).

Migration classes and injection initiation

In this review, in order to understand contrasting migration pathways, their distinctive risk environments, and associated levels of vulnerability to injection-related risk, we consider three classes of migrants: intra-urban migrants, internal migrants, and international migrants. While the distinction between these groups is based on the type of geopolitical border crossed, international borders also represent boundaries between cultures and risk environments, and distinct cultural and social divides exist within national borders as well (Ellis, 2012). For example, intra-national migration may be observed as movement between rural and urban settings, in and out of indigenous communities, and even across local metropolitan borders (Brouwer et al., 2012; King & Skeldon, 2010; Rachlis, Hogg, Wood, Li, & Kerr, 2008; Rachlis, Wood, Li, Hogg, & Kerr, 2008) and, as such, migration across intra-national borders may also carry syndemic risks. Additionally, some have characterized intra-urban mobility as a phenomenon akin to other forms of migration in order to describe health and social outcomes associated with population movement within metropolitan centers (Brouwer et al., 2012).

For the purposes of this review, intra-urban migration refers to people who mobilize within the same metropolitan context, experiencing different risk environments across neighborhoods and local districts (Brouwer et al., 2012; Brouwer et al., 2012). Because of the similarities between the health and social vulnerabilities associated with drug use among populations moving across cities and those experienced by populations moving across national and international borders, we argue that public health researchers should consider intra-urban movement within the context of other forms of migration. The second class, internal migrants, refers to people who may migrate longer distances between noncontiguous communities but do so through within-country migration streams across regional boundaries (Ellis, 2012; King & Skeldon, 2010; Sudhinaraset, Melo, & Diamond-Smith, 2016). Finally, international migrants refer to people who cross international borders and, in this review, are explored in the context of well-established migration routes and interim mass migration events (King & Skeldon, 2010).

Using the risk environment framework as a guide, we developed a matrix that explores how the three typologies of migrants inform the unique socioeconomic and structural risk environments that each migrant class experiences (Table 1). As can be seen, some risk factors are shared across all classes (e.g., exposure to new drug use norms), while others are unique to specific migration pathways (e.g., stressors of undocumented status), exemplifying how intersecting risk environments may constrain individuals' choices.

Intra-urban migration

Literature on intra-urban and internal migration is limited but there have been calls to apply international migration frameworks to internal migration due to the magnitude of this phenomena and current research has begun in that direction (Ellis, 2012; King & Skeldon, 2010; Sudhinaraset et al., 2016). Despite a dearth of scientific literature, risk factors for IDU among intra-urban migrants have been studied in Canada, Australia, and Mexico and have demonstrated similarities in risk environments experienced through other forms of movement of people (Brouwer et al., 2012; Brouwer et al., 2012; Rachlis et al., 2008; Rachlis et al., 2008). For example, studies of PWID in Vancouver, Canada reported that migrating out of the city's urban center was associated with reduced IDU, suggesting that mobile populations experience varying risk environments due to cultural and structural differences within the same metropolitan center (Rachlis et al., 2008; Rachlis et al., 2008). Overall, the evidence to date suggests that intra-urban migrants experience a less constraining risk environment for substance use harms but that they nevertheless experience exposure to new drug use norms and barriers to harm reduction services, as shown in Table 1.

The observed effects of intra-urban migration on IDU risk environments are particularly acute in Tijuana, Mexico, and the adjacent U.S. city of San Diego. In Tijuana, IDU is most prevalent in the city's *Zona Norte* neighborhood, which spans a length of the Mexico–U.S. border and encompasses Tijuana's red light district and a section of the abandoned Tijuana River Canal previously inhabited by encampments of deportees and PWID (Brouwer et al., 2012). This area, in addition to four other hotspots for IDU in the city, is the epicenter of the HIV-injecting syndemic in the city (Brouwer et al., 2012; Kori, Roth, Lozada, Vera, & Brouwer, 2014). While the *Zona Norte* is home to a large proportion of the city's PWID population, many PWID originating from other parts of the city engage in intra-urban migration to injecting hotspots (Brouwer et al., 2012), and thereby experience changes in the risk environment.

Research suggests that PWID migrating within the same urban center may experience heightened injection-related risk because of exposure to changes in social and environmental risk factors in different districts (Brouwer et al., 2012; Brouwer et al., 2012; Kori et al., 2014), a phenomenon of particular concern in cities with highly diverse neighborhoods. Further, research in Tijuana has found the city's population of intra-urban migrating PWID to be more likely to cross the international border and share needles (Brouwer et al., 2012). Contrary to socioeconomic trends common among international migrants, intra-urban migrants in Tijuana were also found to experience more stability and live in neighborhoods with higher socioeconomic status and less drug activity (Brouwer et al., 2012). This may be

due to intra-urban migrating PWID moving to inject in poorer neighborhoods where social norms are more accepting of IDU and where drugs are more readily available, rather than in home communities where such activities are stigmatized. Lack of prevention programs targeting intra-urban risk environments may facilitate the spread of IDU across neighborhood boundaries by intra-urban migrants and may exacerbate the spread of HIV either via high-risk injection behaviors or by the initiation of others into injecting in home communities.

Internal migration

Globally, the largest proportion of migrants engage in internal migration, yet limited data exist on its association with a range of identified risk factors for injection initiation (King & Skeldon, 2010). However, current literature suggests that internal migrants experience a risk environment that constrains their capacity to avoid risky drug-related harms to a greater degree than intra-urban migrants, as presented in Table 1.

For example, studies in China and the U.S. have reported that internal migrants experience isolation, discrimination, disrupted social networks and drug supply, and barriers to preventative healthcare access (Dunlap, Johnson, Kotarba, & Fackler, 2009; He, Wong, Huang, Thompson, & Fu, 2007; Qian, Vermund, & Wang, 2005), all of which have also been shown to be associated with IDU initiation among international migrants in other settings (Durrant, 2003; Hacker et al., 2011; Higgs, Owada, Hellard, Power, & Maher, 2008). In China, where 73% of the country's 121 million migrants are domestic rural-to-urban migrants, experts recognize the potential for internal migration patterns to expand HIV incidence by exacerbating risk environments for drug injecting and sexual transmission (He et al., 2007; Qian et al., 2005).

Additionally, several studies suggest indigenous internal migrants in Canada and Australia may experience unique risk environments in urban centers (i.e., including barriers to healthcare, exposure to public injecting, substandard housing, and disproportionate rates of incarceration) that influence drug use practices. In contrast, evidence suggests that indigenous migrants may also experience a protective effect of return migration to lower-risk home environments (Denner, Organista, Dupree, & Thrush, 2005; Maher, Chant, Jalaludin, & Sargent, 2004; Rachlis et al., 2008). However, there is a potential for the transfer of IDU norms from urban centers to home indigenous communities (Rachlis et al., 2008; Rachlis et al., 2008), though experts noted that such effects may be bidirectional, with migrants moving between these two settings either influenced by social acceptability of IDU in new settings (i.e., urban Vancouver) or, by contrast, potentially disseminating norms protective against IDU from home communities to urban destination communities.

Migration across international borders

International migration may contribute to a highly constraining risk environment for migratory PWID as this phenomenon alters a wide range of socioeconomic and structural factors experienced by individuals and may thereby greatly affect drug-related risks (Table 1). Sociostructural factors such as unemployment, poverty, discrimination, and marginalization are all risk factors for problematic substance use that disproportionately

affect international migrant populations (Durrant & Thakker, 2003; Hacker et al., 2011). Studies in North America, Europe, and Australia have observed that migrants who inject drugs have higher rates of undiagnosed blood-borne infections and lower levels of access to healthcare and preventative services compared with other PWID (Brouwer et al., 2009; Folch et al., 2016; Maher et al., 2004; Swift et al., 1997). Therefore, addressing disparities experienced by migrants may be critical in mitigating risk environments for injection initiation and blood-borne disease.

Housing status within arrival communities (i.e., those to which migrants arrive) has been identified as a critical structural dimension influencing the risk environment for drug injecting, and a large body of evidence has identified housing as a critical factor in determining the expansion of injection-HIV syndemics through migrant populations (Denner, Organista, Dupree, & Thrush, 2005; Deren et al., 2014; Gelpi-Acosta et al., 2016). Specifically, international and internal migrants may experience homelessness or substandard, overcrowded housing, which has been shown to increase risk for injection initiation (Denner, Organista, Dupree, & Thrush, 2005; Roy et al., 2003; Wagner et al., 2011; Zafar, Brahmbhatt, Imam, ul Hassan, & Strathdee, 2003). For instance, among Puerto Rican migrants to New York City, a demographic that includes PWID migrating in search of drug use treatment (Deren et al., 2014), homelessness was associated with higher risk drug use behaviors, including receptive needle sharing (Gelpi-Acosta et al., 2016). Similarly, in Pakistan, Afghani refugees were more likely to experience homelessness and initiate injecting relative to Pakistani drug users (Zafar et al., 2003).

Further, following the disruption of social ties and the consequent stress associated with migration (Michalopoulos, Aifah, & El-Bassel, 2016) (Table 1), arrival communities appear to be strongly determinative risk environments for injection initiation risk among migrants, particularly migrants residing in neighborhoods with above average injecting prevalence resulting from below average socioeconomic indicators (Durrant & Thakker, 2003; Robertson et al., 2012). For example, among Vietnamese women living in a neighborhood in Melbourne, Australia with a disproportionate number of PWID, injection initiation was reported by participants as a way to attain desired social connections following migration (Higgs et al., 2008). Those who migrated at a younger age tend to be especially vulnerable and more likely to use drugs, particularly in communities where public drug use norms were present (Horyniak et al., 2014; Ojeda et al., 2011; Robertson et al., 2012). Research further suggests that geographic proximity to communities with high-risk injection norms intensifies risk environments for blood-borne infections among migrants, potentially driving syndemic expansion (Brouwer et al., 2012).

Interestingly, male PWID residing in Tijuana who were previously deported from the U.S. described initiating injecting with friends or female sexual partners in the U.S. communities to which they had initially migrated (Robertson et al., 2012; Wagner et al., 2011). Also, among migrants returning to Mexico, longer residence periods spent exposed to U.S. arrival communities were associated with an increase in problematic substance use overall and experts suggest this behavior continues after returning to Mexico (Borges et al., 2016; Borges et al., 2009). These appear to contribute to a cross-border syndemic by exposing

migrants to injection-related social norms, which may then be spread across the border to communities via return migration.

Undocumented migration and deportation

Undocumented migrants are a sizable subpopulation of the international migrant population (Hill & Hayes, 2015; Murray, 2015). This mode of migration is associated with highly constraining risk environments for injection-related harms, given a variety of stressors—including fear of deportation, housing instability, compromised basic human rights, and forced return migration—associated with injection-related risks (Apostolopoulos et al., 2006; Hacker et al., 2011). Reviews of substance use and migrant health literature have concluded that forced migrants, including deported migrants, are particularly vulnerable to initiating problematic substance use (Horyniak et al., 2016a), as forced migration disrupts social networks, which in turn heightens the risk of injection initiation as a coping mechanism (Higgs et al., 2008; Ojeda et al., 2011; Wagner et al., 2011).

In the Tijuana–San Diego border region, roughly a quarter of immigrants are undocumented (Hill & Hayes, 2015; Murray, 2015). While drug-related activity may result in deportation for some migrants, deportation itself appears to be critical in heightening injection-related risks, including initiation, and has been observed specifically among Mexican deportees from the U.S. who inject drugs (Robertson et al., 2012). Injection-naïve drug users who were deported to Tijuana reported a higher risk of initiating injecting as a result of greater hardships, including integration challenges, following deportation (Horyniak, Pinedo, Burgos, & Ojeda, 2016b; Ojeda et al., 2011). Further, among samples of PWID in Tijuana, deported migrants had a four times higher odds of being HIV-infected and reported lower rates of receiving medical care, HIV testing, and drug treatment (Brouwer et al., 2009; Strathdee & Magis-Rodriguez, 2008). Additionally, deportation has been found to be associated with relapse into injecting and with high-risk injecting methods including needle sharing and injecting in public places (Becker & Armendariz, 2012; Ojeda et al., 2011; Wagner et al., 2011). For these reasons, as supported by multiyear, mixed-methods research in the Tijuana–San Diego border region, deportation may especially contribute to risk environments for PWID and simultaneously intensify syndemics.

The impact of deportation on injection-HIV/HCV syndemics is heightened by the volume of mobility across the Tijuana–San Diego border region (GSA, 2014; Robertson et al., 2012). A high incidence of deportation has driven this phenomenon, as, on average, in excess of 100 people are deported from the U.S. and sent to Tijuana every day (Becker & Armendariz, 2012; GSA, 2014). U.S. Immigration and Customs Enforcement (ICE) reports that more than 70% of deported migrants in 2015 were apprehended in municipalities near the border (ICE, 2015), indicating that bidirectional migration is concentrated in border regions. Indeed, this suggests a dynamic, mobile border population both vulnerable to and necessary for the diffusion of epidemics of IDU via incarceration and deportation. Effectively responding to this phenomenon requires that interventions distinguish between migrants apprehended while crossing the border and settled migrants being deported. That is because the latter population has likely been exposed to risk environments associated with

international migration for a longer period and has therefore experienced greater cumulative injection-related risks (Robertson et al., 2012; Wagner et al., 2011).

Mass migration events

Recent mass population movements from the Middle East and North Africa (MENA) region to Europe have highlighted the importance of research on mass migration events and their consequent health and social impacts (Sunderland, 2015). People migrating to Europe via the Mediterranean route more than tripled between 2013 and 2014 as a result of major political–economic events in MENA countries, including the war in Syria, and the United Nations High Commissioner for Refugees (UNHCR) reports that more than 300,000 refugees and migrants made this journey in the first nine months of 2016 (Clayton, 2016; Sunderland, 2015). Experts predict this influx to affect the risk environments PWID and migrants experience and consequent patterns of HIV spread (Friedman, Rossi, & Braine, 2009; Paraskevis et al., 2013).

Major geopolitical shifts including the wars, revolutions, and civil unrest occurring in some MENA states have been defined as “big events” in recent epidemiologic literature (Friedman et al., 2009). After Friedman et al., we extend the risk environment framework by considering mass migration as a “big event” with the potential to contribute to risk environments conducive to syndemic expansion (Friedman et al., 2009; Rhodes, 2002). This framework proposes that these events contribute greatly to the socioeconomic context of drug-using risk environments and thereby expand the population vulnerable to participation in high-risk sexual and injection-related behaviors (Friedman et al., 2009). This has been documented, for example, in Pakistan, when the Afghanistan War resulted in a reduction in access to heroin and a concomitant rise in needle sharing among border-dwelling Pakistani PWID (Strathdee, Zafar, Brahmbhatt, Baksh, & ul Hassan, 2003). More recently, initial research on the migration originating in the MENA region crisis as a “big event,” and its impact on HIV outcomes, has taken place in Greece, a major point of entry for MENA migrants; in this setting the genotype of the HIV epidemic has been attributed to strains from Greece as well as Afghanistan and Iran (Nikolopoulos et al., 2015; Paraskevis et al., 2013). Studies in Athens have identified that migrants, particularly undocumented PWID, face increased barriers to prevention and treatment during big events where harm reduction services remain at low levels, putting them at heightened risk for injecting and blood-borne disease transmission (Paraskevis et al., 2013). Further, experts in the region have suggested that the resulting scarcity of drug paraphernalia may cause previously small networks of locals and migrant PWID to mix in larger injecting networks, thereby potentially further disseminating injection practices and blood-borne disease (Nikolopoulos et al., 2015; Paraskevis et al., 2013). In one study, HIV prevalence among migrant PWID originating in the MENA region (specifically from Afghanistan and Iran) was found to be 31%, higher than the 19% prevalence among local PWID (Nikolopoulos et al., 2015), raising concerns about increased serodiscordant injection interactions and expanded syndemics in Europe resulting from the changing risk environment during this “big event.”

The influence of policy environments on injection initiation risks among migrant populations

While migration contributes to socioeconomic and structural factors that affect individuals' drug-using behaviors, the drug policy context that migrants experience further influences the impact of risk environments on risky injection-related behaviors. As presented in Table 1, access to health insurance, basic healthcare services, and drug prevention services may all be impacted by drug policies in place in arrival communities (Arbona et al., 2010; Hacker et al., 2011).

In the 1980s, Switzerland implemented nationwide harm reduction services including opioid substitution therapy (OST) (Dubois-Arber et al., 2008; Dubois-Arber, Jeannin, & Spencer, 1999). Afterward, longitudinal studies in Switzerland demonstrated reduced levels of needle sharing and injection practice overall, with a marked decrease in public injection and IDU in Switzerland during and subsequent to this period of harm reduction scale-up (Dubois-Arber et al., 2008). While additional barriers to accessing services for migrants were not extensively explored in these ecological findings, they seem to suggest that preventative drug policy mitigated the risk environment for injection initiation (Dubois-Arber et al., 2008). Therefore, because migrants exposed to IDU are more likely to initiate injecting, vulnerable migrants that enter regions with scaled-up harm reduction and addiction treatment services likely experience a reduced risk for injection initiation compared to regions that have not implemented such policies and, consequently, constitute risk environments conducive to injection initiation.

By comparison, Russia exemplifies how harmful drug policy approaches can exacerbate syndemics by constraining choices in risk environments already conducive to IDU (Elovich & Drucker, 2008; Kazatchkine, 2014). Despite the well-established effectiveness of OST medicines as a treatment for opiate dependence and in response to the global HIV epidemic (Elovich & Drucker, 2008; WHO, 2005), Russia's health professionals have historically opposed them, OST remains illegal in the country, and the country's IDU-driven epidemic has resulted in an estimated 1.2 million people living with HIV (Kazatchkine, 2014). The devastating cross-border effects of Russian drug policy were effectively exported during the annexation of Crimea from Ukraine: a unique situation where borders have moved but people have not (Kazatchkine, 2014; Kuzmenko, 2015). Before its 2014 annexation, OST was a key component of the Crimea's drug policy (Kazatchkine, 2014; Kuzmenko, 2015). During annexation, however, approximately 800 Crimeans previously enrolled in OST were officially cut off from treatment (Kazatchkine, 2014; Kuzmenko, 2015). While this population of PWID was immobile, the annexation shifted a border resulting in a new political and risk environment—a change in risk dimensions similar to those that migrants often face. Reports from Crimea suggest that approximately 10% of former OST patients have died since programs ended, while re-initiation into injecting and drug overdose was observed (Kazatchkine, 2014; Kuzmenko, 2015). The effects of this policy shift are yet to be fully investigated but denying OST access has been shown to increase injection-related HIV risk behaviors among PWID (Elovich & Drucker, 2008).

Similarly, the changing drug, health, and immigration policy landscapes in both Mexico and the U.S. have the potential to impact cross-border injecting behaviors and regional syndemics by modifying risk environments. Former Mexican President Calderon passed legislation in 2009 ("*Ley de Narcomenudeo*" [petty drug dealing law]) that decriminalized possession of small amounts of drugs for personal use (Atuesta, 2015; Werb et al., 2014), including injectable drugs (Mackey et al., 2014). Concern existed that this policy would attract PWID from the U.S. to Mexico for recreational drug use and increase binational interaction among PWID (Wagner et al., 2011). In recent years, however, these concerns have become less relevant as the Mexican state has been slow to enact the policy reform in Baja California (Werb et al., 2014) and a preliminary analysis in San Diego found that less than a third of PWID had ever travelled to Mexico to inject drugs (Horyniak et al., 2017). Therefore, the potential effects of this policy on IDU risk environments remain unclear.

On the U.S. side of the border, however, Proposition 47 was passed in California in 2014, which changed the legal status of drug possession from a felony to a misdemeanor across the state (Porter, 2014). The implementation of Proposition 47 has resulted in an estimated 10,000 incarcerated persons, including PWID, eligible for re-sentencing in California (Porter, 2014). However, undocumented migrants remain subject to deportation if arrested for drug-related charges and are immediately referred to prosecution by ICE (USCIS, 2013). Therefore, while Proposition 47 is reducing the overall rate of drug-related incarceration, it is unlikely to have an effect on the risk environment dimensions migrants experience because the proportion of undocumented migrants subject to detainment and deported on possession-related charges will not change. This is particularly problematic, given data demonstrating that migrants incarcerated in the U.S. were six times more likely to report initiating injecting and that they were also more likely to engage in interactions with PWID from other countries during incarceration (Robertson et al., 2012; Wagner et al., 2011). Therefore, while incarceration may increase the risk that people initiate injecting (Boys et al., 2002; Robertson et al., 2012; Wagner et al., 2011), the risk appears to be particularly acute among incarcerated migrant populations compared to migrants without a history of incarceration, according to studies in the region reporting increased odds for injection initiation ranging from 2.4 to 11.8 among incarcerated migrants (Horyniak et al., 2016b; Robertson et al., 2012; Wagner et al., 2011), and despite moves toward decriminalization of drug use on both sides of the U.S.–Mexico border.

Further, as discussed in the section "Undocumented migration and deportation," immigration and health policies governing insurance and access to culturally-relevant addiction treatment are structural factors contributing to risk environments that influence drug-related harms among settled migrant populations. One such policy in the U.S. is Deferred Action for Childhood Arrivals (DACA), a federal program providing temporary deportation relief for undocumented youths and access to certain health insurance programs for qualifying participants in some states (e.g., California) (Brindis et al., 2014; United States Citizenship and Immigration Services, 2017). Still, millions of undocumented immigrants in the U.S. do not qualify for DACA or the medical benefits of the program despite research demonstrating that migrants who receive DACA have increased access to healthcare and treatment services since implementation (Brindis et al., 2014; Sudhinaraset, To, Ling, Melo, & Chavarin, 2017). Unfortunately, the Trump Administration has decided to

discontinue this program which could further restrict access to healthcare for recipients (United States Citizenship and Immigration Services, 2017), and consequently exacerbate the contribution of this structural dimension to drug use behavior risk among migrants in the U.S. This exemplifies how immigration policies, in addition to drug policies, impact risk environments for migrant populations.

Discussion

The risk of HIV and HCV incidence among PWID is highest in the months immediately after initiation into injecting, and migrant PWID are an especially vulnerable population who may experience barriers to harm reduction services that aim to prevent injection-driven blood-borne disease transmission (Garfein et al., 1996; Guarino et al., 2015; Paraskevis et al., 2013; Vlahov et al., 2004). Preventing initiation is therefore an effective way of curtailing the spread of injection-driven disease transmission among vulnerable migrant populations. However, experts have identified a lack of scientific literature on preventing injection initiation and have yet to identify specialized strategies for migrants (Werb et al., 2013). Migrants experience unique risk environments for drug-related harms (and IDU in particular) and interventions must therefore consider how documentation status, social networks, and housing status contribute to these risk environments. Successful strategies must be adaptable to border regions and other high-risk settings where migrants reside, while also addressing the needs of multiple classes of migrants. However, beyond these basic requirements, policymakers and other professionals seeking to alter the risk environments for IDU experienced by migrant populations must contend with a range of other considerations.

First, prevention efforts must consider the dynamic, binational structure of PWID networks in border regions in order to effectively address the social determinants of injection initiation (Wagner et al., 2011). As outlined above, geopolitical boundaries are unlikely to inhibit diffusion of injecting norms between states and successful interventions will therefore address the often bidirectional social impact of cycles of migration across these boundaries (Wagner et al., 2011).

Second, public health programming for migrants must address the stressors associated with undocumented and deported migration status before resultant feelings of powerlessness and distress in choice-restraining risk environments progress to drug use and high-risk behaviors (Apostolopoulos et al., 2006; Durrant & Thakker, 2003; Hacker et al., 2011; Ojeda et al., 2011; Wagner et al., 2011). As such, preventing injection initiation likely requires addressing the broader public health and social needs of migrant populations—including developing social support and healthy coping mechanisms—immediately following arrival in receiving communities in order to mitigate the drug use risks in these environments (Arbona et al., 2010; Robertson et al., 2012). This has been found to be critical among migrant youths who are especially vulnerable to social norms that increase the social acceptability of injecting in new communities (Horyniak et al., 2014; Robertson et al., 2012). Specifically, experts have noted the success of family-based interventions in order to prevent problematic substance use and incarceration among migrant youths (Ojeda et al., 2011). Further, interventions should adapt the successful methods of social network HIV interventions among PWID—

including education of community leaders and peer-driven information dissemination—to interventions seeking to prevent injection initiation among migrant populations (Latkin, 1998; Small et al., 2009).

Third, undocumented migrants who are detained experience a particularly acute risk environment for injection initiation while in prison and following deportation (Boys et al., 2002; Ojeda et al., 2011; Robertson et al., 2012; Wagner et al., 2011), and the depenalization of drug use in California through Proposition 47 is unlikely to reduce the number of migrants detained by ICE or deported to Tijuana (USCIS, 2013). Because U.S. president Donald Trump promises to dramatically increase deportations in the near future (Long, 2016), further policy interventions to reduce injection initiation among imprisoned migrants specifically, in addition to the general incarcerated population, are likely needed in order to prevent syndemics of injecting and blood-borne disease across both sides of the U.S.–Mexico border.

Finally, while well-studied issues such as deportation may only be relevant in the context of international migration, clear parallels exist with respect to the risk environments for injection initiation risk experienced by intra-urban, internal, and international migrants. Specifically, shared risk factors between these migrant classes include housing status, social networks, drug use norms, and migration-related stressors (Dunlap, Johnson, Kotarba, & Fackler, 2009; He et al., 2007; Higgs et al., 2008; Rachlis et al., 2008). Further, disparities in social, structural, and economic factors between neighborhoods inhabited by intra-urban migrants have been found to impact HIV transmission risk similarly to disparities experienced by intra-national and international migrants across regional or national borders (Brouwer et al., 2012). Therefore, policies and interventions to prevent syndemics of injecting and HIV found to be effective among international migrants (i.e., education of community leaders, family-based interventions, and peer-driven information dissemination) may effectively be applied to internal migrant communities and vice versa.

Although, considering that the UN reports that over three quarters of the world's migrant population are internal migrants (Solomon, 2014), experts should further define the unique dimensions of risk environments for injection initiation associated with internal migration in order to develop tailored interventions for this larger class of migrants. Additionally, the recent influx of migrants and refugees to Europe suggests that a large migrant population may be exposed to social norms for IDU within receiving communities (Nikolopoulos et al., 2015; Paraskevis et al., 2013). Literature on this recent phenomenon is limited, however, and further research must explore this population's vulnerability to initiating IDU.

In sum, different classes of mass migration the arrival communities' migrants find themselves residing in, and the stressors they face before, during, and after migration episodes, intersect to create risk environments that may constrain migrants' risk to avoid injection initiation and related behaviors that drive epidemics of blood-borne disease. Like PWID, migrant populations—and especially undocumented migrants—are often marginalized and have a higher risk of engaging in problematic substance use behaviors. Future research should seek to identify the unique legal environments, population mobility patterns, and injection-related social norms experienced by migrants in various geopolitical

border regions. Addressing the vulnerability of migrants and the various dimensions of the risk environments they experience is likely critical to comprehensively controlling syndemics of injecting and blood-borne disease transmission in border regions across the globe.

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Table 1

Geographic typology of migrants by the socioeconomic and sociostructural dimensions that affect drug use behaviors.

	Intra-urban	Internal	International
Socioeconomic dimensions			
Cultural differences in arrival communities	X[a]	X[b c d]	X[e f g h i]
Discrimination and marginalization		X[j k]	X[e l]
Exposure to new drug use norms	X[a c d m]	X[b c d]	X[e f g h i]
Integration challenges			X[n o]
Isolation and disrupted social ties		X[k p]	X[g o q r]
Stressors of undocumented status			X[l s]
Structural dimensions			
Barriers to healthcare access or harm reduction services	X[a]	X[j k]	X[t u v]
Constrained rights			X[w x]
Deportation			X[f w x]
Disrupted drug supply		X[p]	X[y]
Exposure to new drug and immigration policy environments			X[l z]
Incarceration		X[c]	X[f g n]
Poverty and unemployment			X[f l]
Substandard housing and homelessness		X[c aa]	X[b g ab ac ad]

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