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Research paper

Cross-border injection drug use and HIV and hepatitis C virus seropositivity among people who inject drugs in San Diego, California

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ABSTRACT

Background: The prevalence of HIV and Hepatitis C Virus (HCV) are significantly lower among people who inject drugs (PWID) in San Diego, CA, USA compared with PWID in Tijuana, Mexico, located directly across the border. We investigated associations between cross-border injection drug use (IDU), HIV and HCV seroprevalence and engagement in injecting risk behaviours while on each side of the border.
Methods: Using baseline interviews and serologic testing data from *STAHR II*, a longitudinal cohort study of PWID in San Diego, bivariate and multivariable logistic regression analyses examined associations between recent (past six months) cross-border IDU and HIV and HCV antibody seropositivity, socio-demographics, drug use characteristics, and participants' connections to, and perceptions about Mexico. Chi-squared tests and McNemar tests examined associations between cross-border IDU and injecting risk behaviours.
Results: Of the 567 participants (93% U.S.-born, 73% male, median age 45 years), 86 (15%) reported recent cross-border IDU. Cross-border IDU was not associated with HIV (OR: 0.85, 95% CI: 0.37–1.95) or HCV seropositivity (OR: 1.01, 95% CI: 0.62–1.65). Age, identifying as Hispanic or Latino/a, and being concerned about risk of violence when travelling to Mexico were independently associated with decreased odds of recent cross-border IDU. Injecting cocaine at least weekly, having ever lived in Mexico and knowing PWID who reside in Mexico were associated with increased odds of recent cross-border IDU. PWID who reported cross-border IDU were significantly less likely to engage in receptive needle sharing, equipment sharing, and public injection while in Mexico compared with in San Diego (all $p < 0.001$).
Conclusion: Prevalence of HIV and HCV infection was similar among PWID who had and had not injected in Mexico, possibly due to practising safer injecting while in Mexico. Research is needed to elucidate contextual factors enabling U.S. PWID to inject safely while in Mexico.

Introduction

Population mobility plays an important role in health, particularly in relation to infectious diseases (Hirsch, 2014; Michalopoulos, Aifah, & El-Bassel, 2016; Rachlis et al., 2007; Weine & Kashuba, 2012). Although there is often a concern that mobile populations can introduce infectious diseases to populations in the settings to which they travel (Grove & Zwi, 2006; Kamper-Jorgensen et al., 2012), they may also be exposed to new or increased risks in these settings compared with their place of origin (Goldenberg, Strathdee, Perez-Rosales, & Sued, 2012; Rachlis et al., 2007; Weine & Kashuba, 2012). This vulnerability is particularly important as mobile populations can act as bridge populations when infected travellers transmit infections upon returning home (Kramer et al., 2008; Rachlis et al., 2007; Rai et al., 2014).

The United States (U.S.)–Mexico border region spans 10 states, and is characterised by extensive cross-border mobility for the purposes of employment, trade, visiting family and friends, and tourism (Lee et al., 2013; Murià & Chávez, 2011; Romo & Marquez,

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2010). The border crossing between San Diego, California, and Tijuana, Baja California is the busiest in the world, with an estimated 33 million crossings in each direction in 2015 (San Diego Association of Governments, 2016). Located on a prominent drug trafficking route, Tijuana is experiencing a syndemic of injection drug use (IDU) and HIV (Brouwer et al., 2006; Instituto Nacional de Salud Pública, 2008; Strathdee, Magis-Rodriguez, Mays, Jimenez, & Patterson, 2012).

Cross-border travel for the purposes of buying and injecting drugs has been reported among people who inject drugs (PWID) in the U.S–Mexico border region, as well as international settings including the China–Vietnam and China–Myanmar border regions (Hammett et al., 2005; Li, Assanangkornchai, Duo, McNeil, & Li, 2014; Williams, Liu, & Levy, 2011). In San Diego, approximately one-third of PWID have ever injected drugs in Mexico, with cheaper price, ease of access to drugs and higher quality drugs the most commonly reported reasons for cross-border injection (Volkmann et al., 2011; Wagner et al., 2012). In August 2009, Mexico enacted drug policy reform which decriminalised small amounts of drugs for personal use (Mackey et al., 2014), potentially influencing patterns of cross-border IDU among U.S. PWID, and prompting a need for research to characterise PWID who engage in this behaviour, in order to appropriately target services.

Cross-border IDU in this region may have significant implications for infectious disease transmission. First, there is disparity in disease prevalence, with prevalence of HIV and Hepatitis C Virus (HCV) among PWID in San Diego estimated at 4% and 27–51%, respectively, compared with 4–10% and 96% among PWID in Tijuana, respectively (Garfein et al., 2013; Gunn et al., 2003; Strathdee, Lozada, Ojeda et al., 2008; Strathdee, Lozada, Pollini et al., 2008; White et al., 2007). Second, contextual factors that impact PWIDs' ability to practice safe injecting may also differ. Compared to established residents, newcomers often engage in riskier injecting practices, including sharing injecting equipment and injecting in public spaces (Rachlis et al., 2007), potentially due to a lack of resources and established social networks. Although syringe possession is legal and pharmacies may sell syringes without a prescription in Tijuana, reports from Mexican PWID suggest that access to sterile syringes is limited and drug use commonly occurs in informal settings with poor amenities (e.g. shooting galleries), creating barriers to safe injecting (Davidson et al., 2012; Philbin et al., 2008; Smith et al., 2016). Little is known about whether these conditions extend to U.S. PWID who inject in Mexico.

Although evidence from a binational disease surveillance system has identified cross-border travel as a risk factor for acute viral hepatitis in the U.S.–Mexico border region (Spradling et al., 2013), few studies have examined cross-border IDU specifically. Despite some evidence of receptive syringe sharing while in Mexico (Volkmann et al., 2011), no significant associations between cross-border IDU and HIV or HCV seropositivity were detected in earlier cross-sectional studies (Garfein et al., 2013; Volkmann et al., 2011), however these studies did not examine injecting risk behaviours specific to each setting. Consequently, the objective of this paper was to explore in detail the relationships between cross-border IDU, HIV/HCV prevalence and injecting risk behaviours. Specifically, the primary aim was to measure the prevalence of recent (past six-month) cross border IDU, test for associations between recent cross-border IDU and HIV and HCV seropositivity, and identify independent correlates of recent cross-border IDU in order to identify sub-populations of mobile PWID who may be in need of health information and prevention resources. To help interpret the results of this primary analysis, a secondary analysis was conducted which aimed to: (1) compare self-reported engagement in injecting risk behaviours between PWID who did and did not report recent cross-border IDU, and (2) compare self-reported injecting risk behaviours among those who report cross-border IDU during injection events in each location.

Methods

Study methods

Data were drawn from the *Study of Tuberculosis*, *AIDS*, and *Hepatitis C Risk (STAHR II)*, a mixed methods longitudinal cohort study designed to assess the putative consequences of Mexico's drug policy reform on U.S. PWID. Study methods have been described in detail elsewhere (Robertson et al., 2014). In brief, 574 participants were recruited from sites across San Diego County between 2012 and 2014, using targeted outreach methods. Eligible individuals were those aged 18 years and over who had injected illicit drugs within the past 30 days, spoke English or Spanish, and had no plans to move away from San Diego County in the next two years. The study received ethical approval from the University of California San Diego Human Research Protections Program.

After providing written informed consent, participants completed a structured interviewer-administered questionnaire using computer-assisted personal interviewing technology. The interview assessed socio-demographics, patterns of drug use and associated risk behaviours, health status and health behaviours, and experiences of travel to and drug use in Mexico. Testing for HIV and HCV was performed using the Uni-Gold™ Recombigen (Trinity Biotech PLC, Bray, Ireland), and OraQuick® (OraSure Technologies, Bethlehem, USA) rapid antibody testing kits, respectively. Positive HIV test results were confirmed with a second rapid antibody test (OraQuick ADVANCE®, OraSure Technologies, Bethlehem, USA), and confirmatory testing conducted by the San Diego County Public Health Laboratory (Robertson et al., 2014). Pre- and post-test counselling was provided, and participants with positive test results were referred to health services. Participants completed behavioural and biological testing bi-annually for two years, and were reimbursed $25 for completion of baseline interview and serologic testing, with escalating incentives for follow-up visits.

Measures

The primary measures of interest for this analysis were recent (past six month) cross-border IDU (yes vs. no) and HIV and HCV antibody seropositivity (yes vs. no; assessed using rapid testing as described above). Although an incidence analysis would be a more informative way to assess the relationship between cross-border IDU and infectious diseases transmission, current serostatus was selected as the primary outcome as there was a high baseline prevalence of HCV, some loss to follow-up, and preliminary data analysis suggested a low incidence of both HIV and HCV, limiting power to conduct such analyses.

Recent (past six month) injecting risk behaviours were secondary measures of interest. Four risk behaviours known to be associated with HIV and/or HCV risk, or with reduced likelihood of safe and hygienic injecting practices (Fuller et al., 2003; Marshall, Kerr, Qi, Montaner, & Wood, 2010; Palmateer et al., 2013; Pouget, Hagan, & Des Jarlais, 2012; Rhodes et al., 2006) were examined: (1) receptive syringe sharing; (2) sharing of cotton, cookers or water; (3) injecting in a public place; and (4) injecting in a shooting gallery. Receptive syringe sharing and sharing of cotton/cookers/water in San Diego were derived from participants' responses on a 5-point Likert Scale (Never/Less than half the time/About half the time/More than half the time/Always); however, in relation to drug use in Mexico, these questions were asked with binary (yes vs. no) response categories. As such, responses regarding drug use in San Diego were dichotomised to