



## Full length article

## Rural and urban comparisons of polysubstance use profiles and associated injection behaviors among people who inject drugs in Puerto Rico



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## ABSTRACT

**Introduction:** In contrast to urban populations, little is known about polysubstance use among rural people who inject drugs (PWID), particularly in Puerto Rico where injection drug use and related health consequences are prevalent. The aim of the study is to compare injection and non-injection substance use profiles among separate urban and rural samples of Puerto Rican PWID.

**Material and methods:** Data for the urban sample come from 455 PWID who participated in the CDC's National HIV Behavioral Surveillance survey of injection drug use in San Juan. The data for the rural sample come from 315 PWID residing in four rural cities approximately 40-miles from San Juan. Latent class analysis was used to derive separate urban and rural profiles of weekly injection and non-injection substance use. Injection behaviors were examined as possible correlates of latent class membership.

**Results:** Five latent classes were identified in the urban sample, and three latent classes were identified in the rural sample. Classes were similar across samples; however, key differences emerged. Both samples had classes of primary heroin injectors, primary speedball injectors, and cocaine-heroin injectors. The urban sample had one high polysubstance class. Polysubstance use profiles that shared similar characteristics between samples also shared similar injection patterns, with some variation.

**Discussion:** Variations in substance use patterns and associated health risks are likely shaped by social and geographic boundaries.

**Conclusions:** Understanding variations in substance use patterns across rural and urban locales may improve surveillance efforts and tailor desistance and harm reduction efforts at the state and local levels.

## 1. Introduction

Patterns of substance use and related health risks differ considerably across substances and geographic locations (Colon et al., 2001a, 2001b; Deren et al., 2003). This is particularly evident among Puerto Ricans, who despite lower overall rates of lifetime illicit substance use (Canino, 2007), display higher rates of substance use-related health consequences such as HIV and hepatitis C (HCV; Mino et al., 2011). Comparative research in the San Juan metropolitan area and New York City shows that people who inject drugs (PWID) in San Juan use injection drugs more often and engage in riskier injection behaviors compared to Puerto Ricans on the mainland (Colon et al., 2001a, 2001b). Within Puerto Rico, internal differences in use patterns, overdose risk, and service need—especially urban/rural differences—are not well known, while the growth in injection opioid use in rural communities elsewhere in the U.S. suggests a need for research in rural areas (Dombrowski et al., 2016). This study uses latent class analysis (LCA) to examine weekly injection and non-injection polysubstance use

profiles across comparable rural and urban samples of active PWID in Puerto Rico to determine how and when rural and urban substance use and injection risk differ.

Polysubstance use is understood as the consumption of two or more substances during a specified time period, including simultaneous use of multiple substances in a single occasion or concurrent use of multiple substances on separate occasions within a short period of time (Ives and Ghelani, 2006). In general, polysubstance use among PWID has been associated with distinct physical and mental health comorbidities (Betts et al., 2016; Patra et al., 2009), increased injection and sexual risk behaviors (Harrell et al., 2012; Meacham et al., 2015), and poorer treatment outcomes (Dutra et al., 2008). These factors may explain higher risks of overdose and HIV and HCV infection among polysubstance using PWID when compared to PWID who use a limited range of substances (Harrell et al., 2012; Keen et al., 2014).

Simultaneous use of heroin and cocaine (i.e., speedball) is highly prevalent among Puerto Rican PWID (Colon et al., 2001a, 2001b). Compared to U.S. born Hispanics, Puerto Rican born Hispanics are

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