

Injection Drug Use, Injection Risk and HIV/HCV Status among People Accessing a Syringe Services Program: a Latent Class Analysis

Tyler S. Bartholomew¹, Hansel E. Tookes¹, Corinne Bullock¹, Jason Onugha¹, David Forrest¹, Daniel Feaster¹

UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE

¹University of Miami Miller School of Medicine, Department of Public Health Sciences

IDEA Exchange

Introduction

People who inject drugs (PWID) are at an increased risk for HIV and HCV infection through risky behaviors, such as syringe sharing, backloading, and unprotected sex. While focus on drug use in the US has remained around opiates (heroin and fentanyl), there have been rising trends in non-opioid injection drug use, such as cocaine and methamphetamine. Prior research has demonstrated unique risk behaviors based on the substance being used, suggesting certain subgroups of PWID may need targeted intervention to reduce their risk for HIV and HCV infection. Utilizing Latent Class Analysis (LCA) we aim to understand the latent structures of injection drug use at a syringe services program (SSP) and assess the demographic and injection-related risk behaviors differences between these classes.

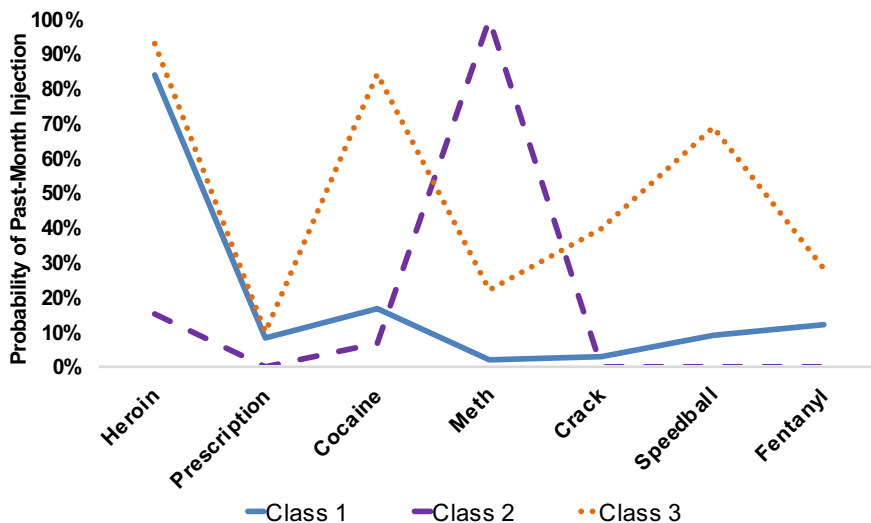
Methods

Baseline behavioral assessments of 837 SSP clients were used for this analysis. Latent Class Analysis (LCA) was used to explore and define the injection drug use profiles of SSP participants. Seven injection drug use indicators (heroin, prescription opioids, cocaine, methamphetamine, crack-cocaine, speedball, and fentanyl) were used to create the latent class structures. The LCA model was first set at one latent class structure and increased the number of classes until the sample size in each latent class was considered to be too small for practical interpretation (<10% of total sample). Model fit statistics for each of the models were used to determine the model that best fit the data (see left). Once the best-fitting class structures were determined, a 3-step approach (using the R3STEP procedure) was used to examine between-class differences among the covariates.

Results

We found a three-class solution: *Heroin-Primary Injectors* (73.6%), *Methamphetamine-Dominant Injectors* (10.4%) and *Polysubstance Injectors* (16.0%). Compared to *Heroin-Primary Injectors*, *Polysubstance Injectors* were more likely to report lower income (OR=1.68, 95% CI: 1.02-2.75), homelessness (OR=2.58, 95% CI: 1.60-4.15), ever overdosing (OR=2.32, 95% CI: 1.39-3.87), injecting more than seven times a day (OR=2.06, 95% CI: 1.22-3.47), sharing works (OR=2.92, 95% CI: 1.81-4.68), and injecting in a public setting (OR=5.49, 95% CI: 3.27-9.21). HIV prevalence and HCV prevalence in the *Methamphetamine-Dominant Injectors* was 54% and 25%, respectively. HIV prevalence and HCV prevalence in the *Heroin-Primary Injectors* was 4% and 48%, respectively. HIV prevalence and HCV prevalence in the *Polysubstance Injectors* was 6% and 52%, respectively.

Three Class Solution



Conclusion

The application of LCA and other advanced research techniques can help shed light on at-risk groups in order to inform potential interventions. In the analysis, all classes presented increased risk for contracting HIV or HCV based on their injection-related risk profiles. However, the risk profiles varied between the classes, presenting a potential need for targeted prevention strategies within higher-risk subgroups. Existing interventions among this population to mitigate infectious disease risk, such as SSPs, can be a used to reduce those risk behaviors. Multi-component, targeted interventions among differing injection drug use typologies of PWID may be needed to further reduce HIV and HCV risk behaviors

Information Criteria	1-Class	2-Class	3-Class	4-Class
N Free Parameters	7	15	23	31
N Classes	1	2	3	4
AIC ^a	4978.569	4776.653	4629.367	4615.214
BIC ^b	5011.678	4847.600	4738.153	4761.838
SABIC ^c	4989.448	4799.965	4665.113	4663.392
Entropy	---	0.741	0.830	0.647
LL ^d	-2482.284	-2373.326	-2291.684	-2276.607
Chi-Square	1357.029	354.369	149.753	112.347
df	120	112	104	96
p value	<0.001	<0.001	0.0022	0.1218
Number in Each Class				
Class 1	837 (100%)	129 (15.4%)	616 (73.4%)	490 (58.5%)
Class 2	---	708 (84.6%)	87 (10.4%)	69 (8.2%)
Class 3	---	---	134 (16.0%)	147 (17.6%)
Class 4	---	---	---	131 (15.7%)

Characteristics	Polysubstance Injectors vs. Heroin-Primary Injectors	Methamphetamine-Dominant Injectors vs. Heroin-Primary Injectors	Polysubstance Injectors vs. Methamphetamine-Dominant Injectors
Age	0.99 (0.97-1.01)	1.01 (0.98-1.03)	0.98 (0.95-1.01)
Sex (male vs. female)	1.00 (0.60-1.68)	15.77 (1.62-153.5)*	0.06 (0.006-0.63)*
Race/Ethnicity			
(Non-Hispanic Black vs. Non-Hispanic White)	1.20 (0.45-3.17)	0.87 (0.26-2.88)	1.38 (0.34-5.63)
(Hispanic vs. Non-Hispanic White)	1.43 (0.90-2.28)	1.64 (0.99-2.71)	0.87 (0.47-1.62)
Education (low vs. high)	1.53 (0.95-2.46)	0.30 (0.16-0.55)*	5.14 (2.50-10.57)*
Income (low vs. high)	1.68 (1.02-2.75)*	0.55 (0.32-0.94)*	3.05 (1.58-5.89)*
Health Insurance			
Medicaid	0.49 (0.20-1.19)	0.70 (0.31-1.60)	0.71 (0.23-2.19)
Medicare	1.73 (0.71-4.22)	1.25 (0.42-3.66)	1.39 (0.41-4.74)
Private	0.50 (0.23-1.08)*	1.94 (1.12-3.37)*	0.26 (0.11-0.62)*
Homeless	2.58 (1.60-4.15)*	0.51 (0.28-0.95)*	5.02 (2.47-10.22)*
Sexual Orientation (gay/bi vs. straight)	1.51 (0.76-3.02)	32.85 (16.58-65.12)*	0.046 (0.02-0.11)*
Overdose	2.32 (1.39-3.87)*	0.21 (0.10-0.41)*	11.22 (5.08-24.78)*
Amount Injecting per day (>7 vs. <7)	2.06 (1.22-3.47)*	0.16 (0.02-1.45)	13.10 (1.40-122.30)*
Reused syringes (any vs. none)	1.37 (0.57-3.33)	0.39 (0.20-0.74)*	3.54 (1.35-9.30)*
Sharing works (any vs. none)	2.92 (1.81-4.68)*	0.62 (0.33-1.15)	4.71 (2.30-9.63)*
Private (in home) injection	0.50 (0.31-0.80)*	3.97 (1.98-7.95)*	0.13 (0.06-0.28)*
Public injection (street, park)	5.49 (3.27-9.21)*	0.30 (0.13-0.70)*	18.45 (7.21-47.31)*
HIV Status	0.89 (0.30-2.61)	20.53 (11.20-37.62)*	0.04 (0.01-0.13)*
HCV Status	1.41 (0.88-2.25)	0.30 (0.16-0.57)*	4.73 (2.26-9.89)*

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