

# Unsafe Places: Syndemic Risk Factors For HCV Seropositivity In Young People Who Inject Drugs, New York City

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## Introduction

- Hepatitis C virus (HCV) infection remains a significant problem in the United States, with people who inject drugs (PWID)
- Over the last decade rates of heroin use have more than doubled, with young persons (18–25 years) demonstrating the largest increase

## Methods

- We conducted a cross-sectional study in New York City from 2005 to 2012 among young people who injected illicit drugs, and were age 18 to 35 or had injected drugs for <5 years
- We examined potentially modifiable factors associated with HCV among young adults who began injecting during the era of syringe services

## Results

- Among 714 participants, the median age was 24 years; the median duration of drug injection was 5 years; 31% were women; 75% identified as white; 69% reported being homeless; and 48% [95% CI 44-52] had HCV antibodies.
- Factors associated with HCV included;
  - older age (adjusted odds ratio [AOR], 1.99 [1.52-2.63]; p<0.001)
  - longer duration of injection drug use (AOR, 1.68 [1.39-2.02]; p<0.001)
  - more frequent injection (AOR, 1.26 [1.09-1.45]; p=0.001)
  - using a used syringe with more individuals (AOR, 1.26 [1.10-1.46]; p=0.001)
  - less confidence in remaining uninfected (AOR, 1.32 [1.07-1.63]; p<0.001)
  - injecting primarily in public or outdoors spaces (AOR, 1.90 [1.33-2.72]; p<0.001)
  - arrest for carrying syringes (AOR, 3.17 [1.95-5.17]; p<0.001).

TABLE 1. HCV seroprevalence by demographics characteristics, young people who inject drugs

Variable	No. (%) of participants	No. (%) HCV Ab (+)	Crude OR	95% CI	p
<b>TOTAL</b>	714 (100%)	343 (48.0%)			
<b>Age, y</b>					<0.001*
18-19	99 (13.9%)	21 (21.2%)	1.00	REF	
20-24	279 (39.1%)	116 (41.6%)	2.64	1.54, 4.52	
25-29	207 (29.0%)	125 (60.4%)	5.66	3.24, 9.88	
30-34	103 (14.4%)	66 (64.1%)	6.63	3.54, 12.41	
≥35 [15-55]	26 (3.6%)	15 (57.7%)	5.06	2.03, 12.65	
<b>Gender</b>					0.209
Male	486 (68.1%)	241 (49.6%)	1.00	REF	
Female	222 (31.1%)	99 (44.6%)	0.82	0.59, 1.13	
<b>Ethnicity</b>					0.137
White	532 (74.6%)	265 (49.8%)	1.00	REF	
Black	25 (3.5%)	7 (28.0%)	0.39	0.16, 0.95	
Latino	108 (15.2%)	108 (48.2%)	0.94	0.62, 1.42	
Asian	7 (1.0%)	1 (14.3%)	0.17	0.02, 1.4	
Mixed	31 (4.4%)	13 (41.9%)	0.73	0.35, 1.52	
Other	10 (1.4%)	5 (50.0%)	1.01	0.29, 3.52	
<b>Currently homeless</b>					0.006
No	223 (31.2%)	90 (40.3%)	1.00	REF	
Yes	491 (68.8%)	253 (51.5%)	1.57	1.14, 2.17	

Abbreviations: OR, odds ratio; CI, confidence interval; \*Mantel-Haenszel chi-square test for trend

Table 2. HCV seroprevalence by injection drug use characteristics, young people who inject drugs

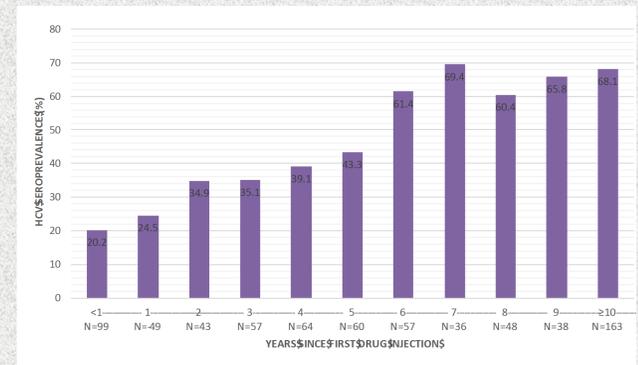
Variable	Overall	HCV Ab (+)	Crude OR	95% CI	p
<b>TOTAL</b>	714 (100%)	343 (48.0%)			
<b>Duration of injection drug use (years)</b>					<0.001*
<1	99 (13.9%)	20 (20.2%)	1.00	REF	
1-4	233 (32.8%)	72 (30.9%)	2.02	1.14, 3.56	
5-9	229 (32.1%)	140 (61.1%)	5.59	3.21, 9.72	
≥10	163 (22.8%)	111 (67.5%)	8.43	4.67, 15.22	
<b>Person who administered first injection</b>					0.58
Self	140 (19.6%)	65 (46.4%)	1.00	REF	
Primary sex partner	96 (13.4%)	48 (50.0%)	1.55	0.89, 2.64	
Other sex partner	14 (2.0%)	7 (50.0%)	1.55	0.38, 6.46	
A relative or close friend	327 (45.9%)	150 (45.9%)	0.98	0.66, 1.45	
Dealer, gallery operator, hit doctor	15 (2.1%)	8 (53.3%)	1.32	0.45, 3.83	
Acquaintance	116 (16.2%)	60 (51.7%)	1.24	0.76, 2.02	
Other	6 (0.8%)	5 (83.3%)	5.77	0.66, 50.66	
<b>Age of person who administered first injection (years)</b>					0.099**
Self	140 (19.6%)	65 (46.4%)	-	-	
<20	194 (27.2%)	87 (44.3%)	1.00	REF	
20-24	174 (24.4%)	78 (44.8%)	1.00	0.66, 1.51	
25-29	101 (14.1%)	50 (49.5%)	1.21	0.74, 1.95	
≥30	96 (13.4%)	58 (60.4%)	1.88	1.14, 3.09	
<b>Before first injection knew HIV could be transmitted by sharing needles</b>					0.2
Did not know	57 (8.0%)	32 (56.1%)	1.00	REF	
Know	657 (92.0%)	311 (47.3%)	0.70	0.41, 1.21	
<b>Before first injection knew hepatitis could be transmitted by sharing needles</b>					<0.001
Did not know	232 (32.5%)	140 (60.3%)	1.00	REF	
Know	482 (67.5%)	203 (42.1%)	0.48	0.35, 0.66	
<b>Before first injection knew hepatitis could be transmitted by sharing cottons, cookers, or rinse water</b>					0.1
Did not know	458 (64.3%)	230 (50.2%)	1.00	REF	
Know	254 (35.7%)	113 (44.7%)	0.77	0.57, 1.05	
<b>Confidence in avoiding hepatitis C virus infection</b>					<0.001†
Extremely confident	180 (25.4%)	45 (25.0%)	1.00	REF	
Somewhat confident	230 (32.4%)	70 (30.4%)	1.31	0.85, 2.04	
A little confident	72 (10.1%)	29 (40.3%)	2.02	1.13, 3.61	
Not confident at all	74 (10.4%)	49 (66.2%)	5.88	3.27, 10.59	
Self-reported HCV-positive	160	165 (101.9%)	-	-	

Abbreviations: OR, odds ratio; CI, confidence interval; \*Mantel-Haenszel chi-square test for trend; \*\*Excludes those self-injected; †Excludes self-reported positive

Table 3. HCV seroprevalence by injection and other experiences, young people who inject drugs

Variable	No. (%) of participants	No. (%) HCV Ab (+)	Crude OR	95% CI	p
<b>TOTAL</b>	714 (100%)	343 (48.0%)			
<b>Ever injected heroin</b>					0.5
No	6 (0.8%)	2 (33.3%)	1.00	-	
Yes	708 (99.2%)	341 (48.2%)	1.85	0.34, 10.21	
<b>Ever injected crack/cocaine</b>					<0.001
No	143 (20.0%)	34 (23.8%)	1.00	-	
Yes	571 (80.0%)	309 (54.1%)	3.78	2.49, 5.75	
<b>Ever injected pharmaceutical pain killers</b>					0.009
No	616 (86.3%)	284 (46.1%)	1.00	-	
Yes	98 (13.7%)	59 (60.2%)	1.77	1.15, 2.73	
<b>Ever injected crystal meth</b>					0.001
No	429 (60.1%)	185 (43.1%)	1.00	-	
Yes	285 (39.9%)	158 (55.4%)	1.64	1.21, 2.22	
<b>Ever injected ketamine</b>					0.047
No	510 (71.4%)	233 (45.7%)	1.00	-	
Yes	204 (28.6%)	110 (53.9%)	1.39	1, 1.93	
<b>Ever overdosed</b>					<0.001
No	304 (42.6%)	104 (34.2%)	1.00	-	
Yes	410 (57.4%)	239 (58.3%)	2.69	1.98, 3.66	
<b>Ever been given money or drugs in exchange for sex?</b>					0.02
No	512 (71.7%)	232 (45.3%)	1.00	-	
Yes	202 (28.3%)	111 (55.0%)	1.47	1.06, 2.04	
<b>Ever arrested solely for drug residue or possession of syringe or needle</b>					<0.001
No	579 (81.1%)	239 (41.3%)	1.00	-	
Yes	135 (18.9%)	104 (77.0%)	4.77	3.09, 7.36	

Fig 1. HCV seroprevalence by duration of injection drug use



## Conclusions

- Despite the availability of harm reduction services, the seroprevalence of HCV in young PWID in New York City remained high and constant during 2005-2012.
- Age and several injection behaviors conferred independent risk.
- Individuals were somewhat aware of their own risk.
- Public and outdoor injection and arrest for possession of a syringe are risk factors for HCV that can be modified through structural interventions.

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## Contact

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TABLE 4. HCV seroprevalence by recent injection practices, young people who inject drugs, New York City, 2005-2012

Variable	Overall	HCV Ab (+)	Crude OR	95% CI	p
<b>TOTAL</b>	714 (100%)	343 (48.0%)			
<b>Injection frequency (injections/month) in last 30 days</b>					<0.001*
None	219 (30.7%)	86 (39.3%)	1.00	-	
1-3	111 (15.6%)	43 (38.7%)	0.58	0.61, 1.56	
4-9	110 (15.4%)	56 (50.9%)	1.60	1.01, 2.55	
≥10	184 (25.9%)	85 (46.2%)	2.09	1.37, 3.19	
≥20	96 (13.4%)	52 (54.2%)	1.81	1.13, 2.87	
≥30	30 (4.2%)	21 (70.0%)	3.61	1.58, 8.28	
<b>Location where injection drug used (last 6 months)</b>					0.02
Home or primary partner's home	187 (26.2%)	72 (38.5%)	1.00	-	
Home of a friend or relative	79 (11.1%)	32 (40.5%)	1.09	0.64, 1.86	
Public or outdoor space	308 (43.1%)	208 (67.5%)	1.84	1.29, 2.62	
Other indoor space	37 (5.2%)	19 (51.4%)	1.88	0.83, 3.42	
Other	20 (2.8%)	14 (70.0%)	1.86	0.62, 4.25	
<b>No. times injected with needle/syringe used previously by someone else† (last 6 months)</b>					<0.001**
Never	321 (45.1%)	131 (40.5%)	1.00	-	
1-3 times	134 (18.8%)	59 (44.0%)	1.16	0.78, 1.75	
4-9 times	80 (11.2%)	41 (51.3%)	1.56	0.95, 2.54	
≥10 times	69 (9.7%)	47 (68.1%)	3.16	1.82, 5.50	
≥20 times	105 (14.7%)	65 (61.9%)	2.41	1.53, 3.79	
<b>No. people who used a needle/syringe used previously by someone else before participant (last 6 months)</b>					<0.001**
None	181 (25.5%)	136 (40.8%)	1.00	-	
1 person	166 (23.2%)	85 (51.2%)	1.48	1.02, 2.15	
2 people	98 (13.7%)	26 (26.5%)	1.14	0.60, 1.99	
3 people	43 (6.0%)	28 (65.1%)	2.7	1.39, 5.25	
4-9 people	65 (9.1%)	41 (63.1%)	2.47	1.43, 4.29	
≥10 people	18 (2.5%)	14 (77.8%)	5.07	1.63, 15.71	
≥20 people	1 (0.1%)	1 (100%)	5.79	0.68, 52.41	
<b>No. times drawing drug by drawing into syringe used on a previous occasion by someone else (last 6 months)</b>					<0.001**
Never	301 (42.2%)	114 (37.9%)	1.00	-	
1-3 times	66 (9.2%)	30 (45.6%)	1.13	0.67, 1.88	
4-9 times	41 (5.7%)	27 (66.0%)	2.60	1.33, 5.09	
≥10 times	69 (9.7%)	35 (50.7%)	2.33	1.27, 4.27	
≥20 times	107 (14.9%)	41 (38.3%)	3.95	2.52, 6.44	
<b>No. people sharing drug by drawing into syringe used on a previous occasion by someone else before participant (last 6 months)</b>					<0.001**
None	181 (25.5%)	136 (40.8%)	1.00	-	
1 person	151 (21.1%)	71 (47.0%)	1.50	1.02, 2.20	
2 people	30 (4.2%)	22 (73.3%)	3.72	1.63, 8.53	
3 people	11 (1.5%)	8 (72.7%)	3.61	0.95, 13.78	
4-9 people	18 (2.5%)	15 (83.3%)	6.77	1.95, 23.70	
≥10 people	1 (0.1%)	1 (100%)	-	-	
≥20 people	2 (0.3%)	2 (100%)	-	-	
<b>No. times draw from drug solution in cooker accessed previously by someone else (last 6 months)</b>					<0.001**
Never	278 (38.9%)	114 (41.0%)	1.00	-	
1-3 times	130 (18.3%)	49 (37.7%)	0.73	0.48, 1.12	
4-9 times	79 (11.1%)	40 (50.6%)	1.64	0.99, 2.72	
≥10 times	89 (12.5%)	43 (48.3%)	1.16	0.72, 1.87	
≥20 times	135 (18.9%)	62 (45.9%)	1.88	1.24, 2.85	
<b>No. times draw from drug solution in cooker accessed previously by someone else's used needle (last 6 months)</b>					0.001**
Never	463 (64.8%)	191 (56.3%)	1.00	-	
1-3 times	107 (15.0%)	40 (37.4%)	1.82	1.19, 2.78	
4-9 times	49 (6.9%)	24 (49.0%)	1.23	0.71, 1.89	
≥10 times	31 (4.3%)	16 (51.6%)	1.42	0.76, 2.62	
≥20 times	40 (5.6%)	22 (55.0%)	2.08	1.19, 3.63	

\*Mantel-Haenszel chi-square test for trend

Table 5. Factors Associated with HCV Antibody in Multivariable Analysis\*

Variable	AOR (95% CI)
<b>A. Potential explanatory variables</b>	
Age † (per year)	2.11 (1.59-2.80)
Years injecting drugs †	1.63 (1.36-1.97)
Injection frequency (past 6 months) †	1.26 (1.09-1.45)
No. people who used a needle/syringe before participant (past 6 months)	1.24 (1.07-1.44)
No. people divided drugs with by drawing into syringe used by someone else before participant (past 6 months)	1.43 (1.11-1.86)
No. times drawing drugs from cotton accessed previously by someone else (past 6 months)	1.20 (1.02-1.40)
<b>B. Demographic characteristics</b>	
Gender (male)	