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Hepatitis C Incidence—a Comparison Between Injection and Noninjection Drug Users in New York City

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ABSTRACT *Hepatitis C virus (HCV) burdens injection drug users (IDUs) with prevalence estimated from 60–100% compared to around 5% among noninjection drug users (non-IDUs). We present preliminary data comparing the risk for HCV among IDUs and non-IDUs to inform new avenues of HCV prevention and intervention planning. Two cohorts, new IDUs (injecting ≤3 years) and non-IDUs (smoke/sniff heroine, crack or cocaine ≤10 years), ages 15–40, were street-recruited in New York City. Participants underwent risk surveys and HCV serology at baseline and 6-month follow-up visits. Person-time analysis was used to estimate annual HCV incidence. Of 683 non-IDUs, 653 were HCV seronegative, 422 returned for at least 1 follow-up visit, and 1 became HCV seropositive. Non-IDUs contributed 246.3 person-years (PY) yielding an annual incident rate of 0.4/100 PY (95% Confidence Interval [CI]=0.0-1.2). Of 260 IDUs, 114 were HCV seronegative, 62 returned for at least 1 follow-up visit, and 13 became HCV seropositive. IDUs contributed 36.3 PY yielding an annual incidence rate of 35.9/100 PY (95%CI=19.1–61.2). Among IDUs, HCV seroconverters tended to be younger (median age 25 vs. 28, respectively), and inject more frequently (61.5% vs. 34.7%, respectively) than nonseroconverters. These interim data suggest that IDUs may have engaged in high-risk practices prior to being identified for prevention services. Preventing or at least delaying transition into injection could increase opportunity to intervene. Identifying risk factors for transition into injection could inform early prevention to reduce onset of injection and risk of HCV.*

KEYWORDS *Injection drug use, Noninjection drug use, HCV incidence.*

Hepatitis C virus (HCV) continues to be highly prevalent among injection drug users (IDUs), with prevalence estimates ranging from 60% to 100%. HCV prevalence among noninjection (non-IDUs) remains low, typically around 5% in most studies.[1–8] Reported incidence for HCV in IDUs typically ranges from 10–37/100 person-years in the United States and abroad.[9–18] Published reports have shown high HCV incidence among recent-onset or "new" IDUs, with risk for HCV (and human immunodeficiency virus [HIV]) highest during the early stages of an injecting career,[4,12,16,17] although some reported an increasing cumulative risk.[19,20] This early high-risk period has been identified as occurring as early as 4 months through the first 3 years of injection drug use.[11,12,17,21–23] This report presents preliminary data comparing the risk for

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All research was approved by the New York Academy of Medicine's Institutional Review Board and conforms to the principles embodied in the Declaration of Helsinki.

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HCV among IDUs and non-IDUs in New York City to inform new avenues of HCV prevention and intervention planning.

In August 2000, extensive street outreach (including neighborhood mapping of high-risk neighborhoods) and screening of IDUs and non-IDUs began in Harlem and South Bronx neighborhoods of New York City, with special emphasis on enrollment of recent-onset (i.e., injecting 3 years or less before interview) or new IDUs. The majority of study participants were identified and enrolled after August 2002. Participants in the IDU cohort were eligible if they were 15–40 years of age and injected at least once in the past 2 months. Non-IDUs were eligible if they were 15–40 years of age, used heroin, crack, or cocaine 10 years or less, had no history of injection drug use or presence of stigmata, and used drugs at least once per week in the past 2 months. Study participants underwent baseline and 2-month follow-up visits over a 12-month period; these visits included risk surveys and blood draws for HCV serological testing. The institutional review boards at the New York Academy of Medicine and the New York Blood Center approved this study protocol, and informed consent was obtained from each study participant.

HCV antibodies were detected by enzyme-linked immunosorbent assay (Ortho HCV Version 2.0). Sera that were reactive on the first testing were retested in duplicate. Repeatedly reactive samples were confirmed by strip immunoblot assay (Chiron RIBA HCV 3.0 SIA). Participants returned 2 to 3 weeks later to learn their test results and receive referrals for medical care and other health and social services.

HCV seroconversion was determined by the presence of HCV antibody in previously seronegative participants. Date of HCV seroconversion was estimated to occur at the midpoint between the last seronegative visit and the first seropositive visit. Person-time analysis was used to estimate HCV incidence among cohort members who returned for follow-up.

As of August 2003, there were 683 non-IDUs tested for anti-HCV; 653 were HCV seronegative, 422 returned for at least one follow-up visit (mean follow-up time 3 months), and 1 participant became HCV seropositive. Non-IDUs contributed 246.3 person-years of follow-up time, yielding an annual incident rate of 0.4 per 100 person-years. Among 260 IDUs tested, 114 IDUs tested HCV seronegative, 62 returned for at least one follow-up visit (mean follow-up time 3 months), with 13 becoming HCV seropositive (Table 1). IDUs contributed 36.3 person-years of follow-up time, yielding an annual incidence rate of 35.9 per 100 person-years. Comparing HCV seroconverters to nonseroconverters, median age was 25 versus 28 years, respectively (Table 2). In terms of injection risk, a higher proportion of seroconverters reported high injection frequency (inject at least daily vs. less than daily) than nonseroconverters, 61.5% versus 34.7%, respectively. Among HCV-seronegative participants at baseline, at least one follow-up visit has been completed by 70% of IDUs and 73% of non-IDUs, with follow-up continuing.

TABLE 1. Comparison of HCV seroincidence rates between IDUs and non-IDUs in New York City, 2000–2003

Cohort	No. of HCV seroconverters	HCV seroconversion risk, %*	95% Confidence interval†
Non-IDU	1	0.4	(0.0–1.2)
IDU	13	35.9	(19.1–61.2)

*Calculated as number of HCV seronconverters per 100 person-years.

†The 95% confidence interval for non-IDU incidence estimate was based on a Poisson distribution; no assumption was made for the IDU incidence estimate confidence interval.

TABLE 2. Age and injection frequency of IDUs stratified by HCV seroconversion status in New York City, 2000–2003

		High injection frequency	
IDU seroconversion status (N = 62)*	Median age, years (range)†	N (%)	Odds ratio‡
HCV seroconverters	25 (23–39)	8 (61.5)	3.01
Non-HCV seronconverters	28 (17–40)	17 (34.7)	1.00

*Total number of IDUs who followed-up.
†Number (N) and proportion (%) who injected at least daily versus less than daily at baseline visit; $P < .08$.
‡95% confidence interval = 0.9–10.6.

The noteworthy finding, based on this interim analysis, is that hepatitis C incidence is dramatically higher in recent-onset IDUs than non-IDUs, even in the presence of HIV prevention efforts, which have likely contributed to declining HIV rates among IDUs.[24–26] This suggests that, by the time an IDU has been identified for prevention services, the IDU may have already engaged in high-risk practices such as unsafe syringe use that may lead to HCV transmission. In part, this is likely because of the high efficiency of HCV transmission indicated with increased HCV risk (as compared with HIV risk) from indirect sharing practices (i.e., sharing cookers, cotton, or rinse water).[5,27,28] Thus, the same prevention efforts that have been able to affect HIV transmission (which is less efficiently transmitted) among IDUs may not be effective in preventing the transmission of HCV.

It has also been suggested that safer injection practices, such as attending syringe-exchange programs and not sharing injection equipment, may not be employed during the start of an injecting career, suggesting that extant HIV prevention methods may be less useful in the context of HCV.[5,29–31] Thus, the limited efficacy of extant prevention efforts coupled with the high incidence of HCV among young IDUs emphasizes the need to expand prevention efforts.

These preliminary findings must be interpreted with some caution given the small sample size and relatively short follow-up period. It is also important to note that potential sources of bias were therefore not adequately explored in this report at this stage of the study. Namely, study retention as well as external validity may have influenced the point estimates, causing over- or underestimation. Given that data presented here reflect rates approximately midway through study completion (with some fluctuation in follow-up rates), incidence rates could be unstable at this time. Although larger studies of HCV risk in new or young IDUs are needed to confirm these findings, it is not likely that the disparity in HCV risk between IDUs and non-IDUs will ease, which is the primary focus of this report.[7,23]

These results suggest that, if injection could be prevented or at least delayed to increase opportunity to intervene with risk reduction messages, the burden of HCV among IDUs could be substantially reduced. Therefore, identifying risk factors for transition into injection could inform early prevention and intervention strategies not only to reduce injection drug use, but also to curtail risk of HCV. While prior noninjection drug use, particularly with heroin, cocaine, or crack, is a major risk factor for transition into injection drug use,[32–34] researchers have indicated that there are subgroups of illicit drug users who do not transition into injection drug use for fear of HIV and not wanting to be identified as an injector.[35,36] It is therefore conceivable that circumstances other than illicit noninjection drug use may be better predictors of transition into injection (e.g., high-risk social networks, lack of social

support, neighborhood characteristics, etc.). Identifying such factors so that messages can be expanded to target high-risk non-IDUs regarding the risk of injection drug use to prevent transition into injection is critical.

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