HCV among The Miriam Hospital and Rhode Island Hospital Adult ED Patients

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ABSTRACT

The Emergency Department (ED) appears to be an ideal place to conduct hepatitis C virus (HCV) screening. We aimed to estimate the prevalence of prior HCV test positivity among adult (18–64 year-old) patients at The Miriam Hospital and Rhode Island Hospital EDs, as well as the undiagnosed HCV antibody seroprevalence among patients with any self-reported injection or non-injection drug use who agreed to undergo rapid HCV antibody testing. The prevalence of prior HCV test positivity among 8,500 adult ED patients was approximately 4.6%, and the previously undiagnosed HCV antibody seroprevalence among 621 drug-using adult ED patients was 1.6%. Among the ten ED patients with a positive rapid HCV antibody test not previously diagnosed, eight were born after 1965 and six never had injected drugs. If current HCV screening recommendations were followed exclusively in this setting, this practice would have missed half of those with a positive rapid HCV antibody test.

KEYWORDS: hepatitis C, mass screening, substance abuse, emergency medicine, seroepidemiologic studies

INTRODUCTION

The United States (US) Centers for Disease Control and Prevention (CDC) and US Public Health Service Task Force (USPHSTF) currently recommend a one-time screening test for the hepatitis C virus (HCV) for those born between 1945 and 1965 ("baby boomers") and continuous risk-based screening for those at higher risk for infection, such as people who inject drugs.[1-3] However, HCV screening for other populations, particularly for those who use non-injection drugs, has been encouraged by others,[4,5] especially since most people who use drugs do not inject them. The need to understand the value of HCV antibody screening among those who use any type of drug is particularly relevant to Rhode Island. Our state has one of the highest reported prevalences of drug dependency (9-13%) and has one of the highest percentages of its citizens reporting illicit drug use.[6]

Because of the success of HIV-screening efforts in emergency departments (EDs),[7-13] the overlapping risk for HIV and HCV, high prevalence of drug use,[14] and access-to-care challenges faced by many ED patients,[15] the ED would appear to be an ideal location to conduct HCV screening and link patients to care. Further, if the prevalence of prior HCV test positivity is high among ED patients, interventions to increase linkage to care also could be a viable means to expand our capacity to cure and reduce the downstream damage of HCV, including end-stage liver disease and liver cancer. We aimed to estimate the prevalence of patient-reported prior HCV test positivity among a random sample of adult (18-64 years-old) patients at The Miriam Hospital and Rhode Island Hospital EDs, as well as the HCV antibody seroprevalence among patients with any self-reported drug use who agreed to undergo rapid HCV antibody testing.

METHODS

Study Design and Setting

This investigation involved a secondary analysis from two studies: Increasing Viral Testing in the ED (InVITED) and Brief Intervention for Drug Misuse in the ED (BIDMED). These two studies were conducted concurrently at The Miriam Hospital and Rhode Island Hospital EDs from July 2010-December 2012. The Lifespan Institutional Review Board approved the two studies.

Data Collection

The InVITED and BIDMED studies included two components: (1) an assessment of the prevalence of patient-reported prior HCV test positivity (i.e., a positive HCV test of any kind – an HCV antibody test, which is a screening test that identifies prior exposure to HCV; or an HCV ribonucleic acid (RNA) polymerase chain reaction (PCR) test, which is a confirmatory test that identifies a current HCV infection and ongoing viral replication) among a random sample of adult ED patients, and (2) rapid HCV antibody screening among drug-using study participants who self-reported that they never had a positive HCV test.

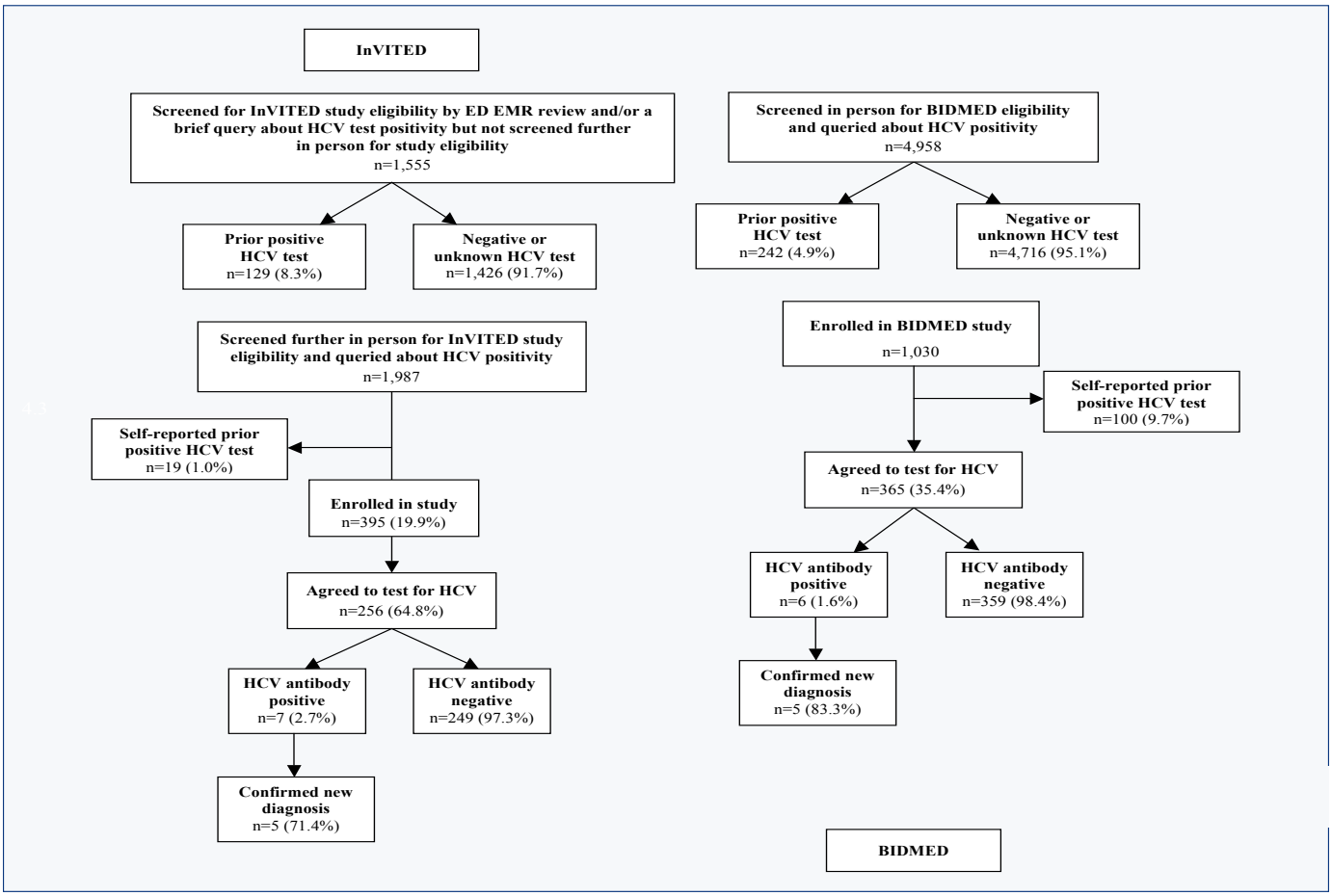
Efforts to estimate the prevalence of patient-reported prior HCV test positivity differed slightly between the two studies. For the InVITED study, trained research assistants (RAs) first reviewed the ED electronic medical records (EMRs) of a random sample of ED patients awaiting medical care and noted if the nursing or medical staff had recorded that the patient previously had been diagnosed with HCV (regardless of status of the infection – chronic, cured with medications, or spontaneously resolved). For patients who had

no other apparent exclusion criteria for InVITED by the ED EMR review, the RAs would approach those who otherwise appeared to be study eligible and briefly ask them if they ever had a positive HCV test (of any kind). If they answered affirmatively or met any other study exclusion criteria, they were not evaluated further. Those who were potentially study eligible, whose EMR ED did not indicate a history of any positive HCV test, and who denied on initial query that they ever had a positive HCV test were asked a series of follow-up questions to determine study eligibility, including a more extensive assessment of their HCV testing history. For BIDMED, a random sample of patients underwent a similar EMR review, and those whose review indicated that they might be study eligible were interviewed in person. This group had the same extensive assessment of their HCV testing history as those for the InVITED study. However, HCV was not an exclusion criterion for BIDMED. If patients in either study informed the RAs during this extensive assessment that they had previously tested positive for HCV, these data were recorded.

As part of the eligibility assessments for both studies, patients self-administered the *Alcohol, Smoking and Substance Involvement Screening Test, Version 3* (ASSIST V.3.) using an audio computer-assisted self-interviewer (ACASI).[16] The ASSIST queried them about their lifetime and past three-month drug use or misuse. Using the ACASI system, patients also completed questionnaires about the specific drugs that they had used and their sexual and drug use/misuse risk-taking behaviors within the past three months. For the InVITED study, patients were study eligible if they reported any drug use within the previous three months, were not known to be HIV-infected, or never had a positive HCV test. For BIDMED, patients were study eligible if their responses to the ASSIST indicated that they would qualify for a brief or more intensive intervention for their drug misuse. Patients were otherwise eligible for both studies if they were 18-64 years-old; English- or Spanish-speaking; not critically ill or injured; not prison inmates, under arrest, nor undergoing home confinement; not presenting for an acute psychiatric illness or an evaluation for substance misuse; not intoxicated; and did not have a physical disability or mental impairment that prevented them from providing consent for participating in the study.

All participants in the InVITED study were offered rapid HCV antibody screening. Participants who self-reported in the BIDMED study that they never had a positive HCV

Figure 1. InVITED and BIDMED studies HCV positive test history and HCV antibody test prevalence



Key: ED = Emergency Department; EMR = Electronic Medical Record; HCV = Hepatitis C Virus

test also were offered rapid HCV antibody testing. The RAs performed the rapid HCV antibody test using a fingerstick for blood (OraQuick® HCV rapid antibody test, OraSure Technologies, Inc., Bethlehem, PA). Test results were available within 20 minutes.

Data Analysis

To estimate patient-reported prior HCV test positivity among adult ED patients, for the InVITED study we tabulated the number of patients whose ED EMR indicated or who informed the RAs during the initial study-eligibility assessment that they previously had been informed that they had a positive HCV test. For the InVITED and the BIDMED studies, we also tabulated the number of patients who informed the RAs during the HCV testing history assessment that they ever had a positive HCV test. We compared patients who reported a positive HCV test to those who denied ever having a positive HCV test (i.e., prior negative test, never tested, or did not know if they had been tested) by their demographic characteristics using Wilcoxon rank-sum or Pearson's X^2 testing, as appropriate. An α=0.05 level of significance was used for these comparisons. We also calculated HCV antibody-testing uptake among study participants and the HCV antibody seroprevalence among those tested. We recorded the demographic characteristics, self-reported potential HCV risk factors, and self-reported drugs used of those with a positive test.

RESULTS

Figure 1 depicts the patient-reported prior HCV test positivity, HCV antibody-screening uptake, and HCV antibody-screening results for the two studies. Of the 3,542 ED 18–64 year-old patients assessed for InVITED study eligibility (EMR review, brief query and/or in-person study-eligibility assessment), the prevalence of a self-reported history of any positive HCV test was 3.9%. Of the 4,958 assessed in-person for BIDMED study eligibility, this prevalence was 4.9%. When data from both studies was combined, the self-reported prevalence was approximately 4.6%. Of those who completed the ASSIST in both studies, 49.5% reported any drug use within the past three months. Among the 390 patients across both studies who reported ever having a positive HCV test, 50.3% were under 50-years-old (i.e., were not "baby boomers" – not born between 1945 and 1965). In comparing the demographic characteristics of the 390 patients across both studies who reported ever having a positive HCV test vs. the 8,110 who denied ever having a positive HCV test (**Table 1**), more of those with a history of a positive HCV test were male and white or white/non-Hispanic.

Among the 621 patients in both studies who agreed to be tested for HCV, 1.6% had a previously undiagnosed positive HCV antibody test. As shown in **Table 2**, among the ten participants from both studies with a previously undiagnosed positive HCV antibody test, only one was female, none were HIV-infected, eight were born after 1965, most identified the

Table 1. Comparison of demographic characteristics by history of any positive HCV test

	InVITED EMR & brief query screen			InVITED in-person screen			BIDMED in-person screen		
	HCV (+)	HCV (–) or unknown status		HCV (+)	HCV (–) or unknown status		HCV (+)	HCV (–) or unknown status	
Demographic Characteristics	**n=129**	**n=1426**	**p-value**	**n=19**	**n=1968**	**p-value**	**n=242**	**n=4716**	**p-value**
	%	%	p <	%	%	p <	%	%	p <
Age (years)									
18-24	2.3	12.8	0.0	0.0	21.8	0.1	2.5	20.9	0.0
25-34	8.5	17.7		26.3	24.8		13.2	24.6	
35-49	34.9	33.0		36.8	30.0		36.0	31.7	
50-64	54.3	36.4		36.8	23.5		48.4	22.7	
Gender									
Male	66.7	54.5	0.0	68.4	42.7	0.0	57.4	43.4	0.0
Female	33.3	45.4		31.6	57.3		42.6	56.6	
Ethnicity/Race									
White	69.0	60.8	0.4			0.8			0.0
Black	17.8	16.4							
White, non-Hispanic				73.7	64.0		69.0	59.8	
White, Hispanic				5.3	10.4		6.6	11.6	
Black/African-American, non-Hispanic				15.8	16.2		16.5	16.2	
Black/African-American, Hispanic				0.0	5.1		5.0	6.8	
Other	12.4	20.2		5.3	4.3		2.9	5.6	
Health insurance status									
Private	13.2	20.9	0.0	10.5	44.1	0.1	10.3	40.6	0.0
Governmental	55.8	31.1		52.6	32.2		57.4	34.3	
None	11.6	22.0		36.8	23.5		32.2	24.9	
Don't know/Refuse to answer	19.4	26.0		0.0	0.2		0.0	0.2	

EMR=Electronic Medical Record; HCV=Hepatitis C Virus; HCV (+)=history of any positive HCV test; HCV (-)=no history of any positive HCV test

Table 2. Confirmed new HCV antibody positive study participants

		Usual source of medical care	Prior HCV testing	Time elapsed since last HCV test	Injection drug use	Lifetime drug use	Past 3 months drug use
Male							
Subject	**Age**						
A	25	ED	Don't know	N/A	Never	Marijuana, cocaine or crack, methamphetamines, inhalants, illicit opioid, amphetamines	Marijuana, cocaine or crack, methamphetamines, inhalants
B*	25	ED	No	N/A	P3M	Marijuana, cocaine or crack, methamphetamines, hallucinogens, illicit opioid, benzodiazepines, methadone or buprenorphine, prescription opioid analgesics	Marijuana, cocaine or crack, Methamphetamines, hallucinogens, illicit opioids, benzodiazepines, methadone or buprenorphine, prescription opioid analgesics
C	29	PC	Yes	Don't know	Never	Marijuana, cocaine or crack, hallucinogens, illicit opioids, amphetamines, benzodiazepines, prescription opioid analgesics	Illicit opioids, benzodiazepines
D	32	CHC	Yes	< 2 years but > 1 year	Never	Marijuana, illicit opioids, benzodiazepines, methadone or buprenorphine	Marijuana
E*	32	ED	Yes	≤ 5 years but > 2 years	P3M	Marijuana, cocaine or crack, hallucinogens, illicit opioids, benzodiazepines, methadone or buprenorphine, prescription opioid analgesics	Cocaine or crack, illicit opioids, prescription opioid analgesics
F	34	ED	Yes	< 5 years but > 2 year	Never	Marijuana	Marijuana
G	35	ED	No	N/A	Never	Marijuana, cocaine or crack, hallucinogens	Marijuana, cocaine or crack
H*	41	ED	Yes	< 6 months	Ever	Marijuana, cocaine or crack, illicit opioids	Marijuana
I*	49	PC	Yes	< 6 months	Ever	Marijuana, cocaine or crack, illicit opioids, benzodiazepines	Marijuana
Female							
Subject	**Age**						
J*	52	PC	No	N/A	Never	Marijuana, cocaine or crack, illicit opioids, methadone	Marijuana

*Met Centers for Disease Control & Prevention recommendations for HCV screening by age cohort (born 1945-1965) or IDU

CHC=Community Health Clinic; ED=Emergency Department; HCV=Hepatitis C Virus; IDU=Injection Drug Use; P3M=Past 3 Months; N/A =Not Applicable; PC=Primary Care; IDU=Injection Drug Use

ED as their usual source of medical care, most had previously been tested for HCV, six had never injected drugs, and marijuana was the drug most often reported used within the past three months. Of these ten participants, five did not meet current CDC HCV screening criteria: were not born between 1945 and 1965 (not "baby boomers") and never injected drugs.

DISCUSSION

Extrapolating from the data from this study and the annual patient volumes among 18–64 year-olds at The Miriam Hospital and Rhode Island Hospital EDs, approximately 5,346 non-critically ill or injured, non-acutely psychiatrically ill 18–64 year-olds per year could be estimated ever to have had a positive HCV test (116,225 patients/year x 4.6% prevalence). Although not directly comparable, this prevalence is much greater than the 1.3% estimated prevalence of HCV antibody positivity reported for the US general population (all ages) using data from the 2001–2010 National Health and Nutrition Examination survey (NHANES).[17] Further, if HCV antibody screening were instituted among a similar group of 18–64 year-olds at these EDs who might report any type of drug use within the prior three months (49.5%), we can anticipate that 920 people (116,225 patients/year x 49.5% drug use prevalence x 1.6% HCV seropositivity) over a one-year period would have a positive HCV antibody test. These results indicate that a substantial number of patients are known to have been or could have a positive HCV test at these EDs. This finding suggests the need to consider screening and assure linkage to care for those with HCV from the ED who are not already in care. Many of these patients do not have regular sources of medical care, which leaves the ED as the place where they would be tested for HCV. The study results also indicate that despite the current focus on "baby boomers" and people who inject drugs, half of those newly diagnosed with HCV had never injected drugs and were not "baby boomers."

This investigation had a number of limitations. The study cannot estimate the HCV antibody seroprevalence among patients not evaluated for study eligibility (e.g., critically ill or injured patients, intoxicated patients, patients with an acute psychiatric problem) and cannot assess the extent of HCV positivity among those patients evaluated at other EDs in Rhode Island. It also is likely that the patient-reported history of prior HCV test positivity among ED patients was underestimated, since patients whose ED EMR indicated that they were otherwise not study eligible were not interviewed. The study also could not determine the status of these patients' current HCV care, which would impact estimates on need for linkage to care. Nevertheless, the results provide a minimum estimate of the extent of prior HCV

test positivity and HCV antibody test seroprevalence among these patients. Also, we do not know the risk-taking behaviors (e.g., injection-drug use) among those who were not interviewed. In addition, if our study exclusively had focused instead on all "baby boomers," the estimates of undiagnosed HCV antibody seroprevalence might have been different.

In conclusion, a substantial number of The Miriam Hospital and Rhode Island Hospital adult ED patients are impacted by HCV. Approximately 1.6% of drug-using patients have HCV and are unaware of their status. Further, it appears that if current HCV screening recommendations were followed exclusively, this practice might miss a substantial number of those impacted by HCV. We are hopeful that these findings might lead to an expansion of HCV screening in Rhode Island EDs and linkage to care efforts and perhaps revision of current HCV screening recommendations.

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