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Association Between Primary Care Provider Status and Preventive Health Care Among People Who Inject Drugs

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ORIGINAL RESEARCH

Association Between Primary Care Provider Status and Preventive Health Care Among People Who Inject Drugs

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Introduction: People who inject drugs (PWID) are at increased risk for preventable, communicable infections, such as hepatitis B. Preventive care, such as hepatitis B vaccination, is often delivered through primary care providers (PCPs). However, PWID may not have access to PCPs and, therefore, may receive preventive care through other sites. We aimed to characterize PCP and preventive care use among PWID in Maine.

Methods: This is a cross-sectional study of PWID hospitalized with infections associated with injection drug use in Maine from January 2019 to May 2020. Descriptive analyses were used to identify characteristics of participants, rates of screening, and vaccination of participants with and without PCPs. Logistic regression analyses were performed to explore the relationship between PCP status and delivery of preventive services for PWID. Hepatitis B vaccination was an outcome of interest.

Results: Of 101 participants, 68 (67%) had a PCP. Overall rates of hepatitis C (93%) and HIV (85%) screening were high and did not differ based on PCP status. More participants with PCPs had previously received a hepatitis B vaccination (62% of those with PCPs, 33% of those without PCPs; $P = .006$). Only half of those with PCPs recalled receiving a hepatitis B vaccination through a PCP office. Having a PCP was predictive of having received the hepatitis B vaccination (adjusted odds ratio, 3.59; 95% CI, 1.27-7.58; $P = .014$).

Conclusions: Many PWID in Maine engage with PCPs and preventive care. Results from this study call for enhanced delivery of preventive services and linkages to care for PWID.

Keywords: substance use disorders, preventive health care, hepatitis B vaccine, primary care

Maine is experiencing an overdose crisis.¹ In parallel, there have been increasing rates of injection-associated infections, such as communicable diseases (eg, hepatitis A, B, and C), and risk of bacterial infections (eg, cellulitis, infective endocarditis).²⁻⁴

There are many prevention strategies to combat these infections, including hepatitis A and B vaccination, HIV pre-exposure prophylaxis (PrEP), harm reduction services, and screening to identify,

treat, and prevent community transmission.^{5,6} Yet, people who inject drugs (PWID) face barriers to accessing these services. These preventive services are often delivered through primary care providers (PCPs); however, some PWID have difficulty accessing primary care due to competing priorities, housing instability, and lack of transportation.⁷ Also, our health care system creates challenges for PWID, such as inconsistencies in health care providers, extensive wait times, and lack of provider skill. In one study, less than 60% of primary care residents felt that they had the ability to work with PWID. They reported trust, reliability, compliance, and stigma as barriers to forming an appropriate physician-patient relationship.^{7,8}

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In 2016 to 2017, researchers in Boston, Massachusetts, found that “dehumanizing” negative interactions with health care professionals led PWID to postpone health care visits, conceal information about drug use, and minimize their pain level or symptoms. Instead, these patients obtained care from community-based organizations or syringe service programs (SSPs).⁹ Although community-based organizations and SSPs are a great resource for PWID that may provide harm reduction education, disease screening, sterile drug supplies, counseling, and linkages to care, they are not usually designed to deliver full-spectrum preventive care services.¹⁰

A few small studies examined whether PWID who have PCPs are receiving preventive care from their PCP. In 141 PWID recruited from SSPs in Massachusetts, participants with a PCP received more preventive services and vaccines than those without a PCP, but they still got less than a third of recommended care options. Only 62% informed their PCP of their drug use, which affected how preventive care was discussed.¹⁰ Another study found that 75% of PWID in Denver, Colorado, and 83% of PWID in Seattle, Washington, saw their primary care provider within the past year for an acute problem, rather than for preventative care. These findings show that opportunities are missed to promote health in PWID who are already engaged in care.¹¹

For this study, we examined the interaction of primary and preventive care engagement among PWID. We chose hepatitis B vaccination as a marker for receiving preventive services in the primary care setting, as this vaccine can be challenging to deliver in community or inpatient settings. Hepatitis B vaccination requires multiple doses (2-3 doses, depending on the formulation) over 1 to 6 months, and, therefore, multiple clinical encounters.

In Maine, there have been alarming increases in acute hepatitis B infections among young people, which has been attributed to injection drug use. The state has seen a seven-fold increase from 2012 to 2017, with 53% of cases attributed to injection drug use.¹² In 2019, the rate of acute hepatitis B cases in Maine was the highest in the United States.¹³ Acute hepatitis B can lead to hospitalization and, rarely, fulminant liver failure.¹⁴ Though chronic infection is less likely to develop among people who acquire hepatitis B in adulthood, 11% of chronic infections in Maine are attributed to injection drug use.¹²

Hepatitis B is highly transmissible with limited treatment options, and chronic hepatitis B infection can ultimately lead to cirrhosis and hepatocellular carcinoma.⁶ In addition to vaccination, risk can be mitigated by harm reduction education and safe injection practices. Although, and unfortunately, a recent evaluation of harm reduction practices in this study cohort found low rates of using safe injection techniques.¹⁵

There are many other preventive services indicated for PWID. Screening for HIV and hepatitis C identifies those who need treatment and helps prevent new cases. HIV can be prevented using PrEP, which is indicated for PWID who have shared injection equipment or been in a drug treatment program within 6 months. PrEP is also indicated for anyone who has sex with a PWID or has multiple sexual partners with infrequent condom use.¹⁶ Hepatitis A vaccination should be offered to people who use injection or non-injection drugs.¹⁷ Screening for other sexually transmitted infections and tuberculosis is recommended, as well as other preventive services that are age-appropriate, such as annual influenza vaccination.¹⁷ This study aimed to examine (1) the prevalence of PCP use among PWID in Maine, (2) whether PWID are receiving recommended preventive services focused on viral hepatitis and HIV, and (3) whether having a PCP is associated with an increased odds of having received a hepatitis B vaccination.

METHODS

Participants

Study participants included people aged 18 to 65 years who were hospitalized with infections associated with injection drug use from January 2019 to March 2020. Four hospital sites (Maine Medical Center, Maine General, Eastern Maine Medical Center, and Pen Bay Medical Center) in Maine were selected from regions with a high potential for communicable disease outbreaks.¹⁸ Insurance status included Medicare, Medicaid, commercial, and dual insurance. Patients were excluded if they were unable to provide consent due to intubation, psychosis, or other reasons, or if they had suicidal or homicidal ideations. Participants received a \$25 gift card as compensation for their time completing the survey.

Data collection

Data were collected as part of the “Rural Harm Reduction Access and Regional Trends (Rural

Heart)” study, which is an observational cohort study examining barriers to using syringe services in Maine.¹⁵ Data were collected through audio computer-assisted surveys and medical chart review. Data were de-identified for the analysis. Informed consent was obtained from all participants. Data on hepatitis B infection were collected from self-report and problem list documentation in the electronic medical record which did not include serologies.

Variable description

PCP use was defined as either (1) responding “yes” to the survey question “Do you have a doctor that you consider your primary care doctor, or main doctor?” or (2) having a PCP listed in the electronic medical record during hospitalization. Preventive care was defined using self-reported and serologic evidence of HIV and hepatitis C screening, self-reported PrEP use, and self-reported completion of multidose vaccines or serologic evidence of immunity. Race and sexual orientation were not included in this analysis due to low variability. “Male” includes cisgender male and transgender male; “female” includes cisgender female and transgender female. Homelessness was defined as self-reported status of staying in a shelter or on the street within the past 6 months, or having primary residence in a park, vehicle, abandoned building, or other location. Hepatitis B vaccination was defined as either (1) self-report of receiving a full vaccine course or (2) having documented positive hepatitis B surface antibodies without evidence of hepatitis B infection. Data on timing of hepatitis B vaccination, such as pediatric or adult receipt, were not available. Hepatitis B infection was defined as having a positive surface antigen and/or detectable hepatitis B DNA. A combination of self-report and laboratory data were used in this determination because serologies were not available for all participants, and data on hepatitis B core antibody status were not obtained. Hepatitis A immunity was determined by self-report of vaccination or by hepatitis A immunoglobulin G or total antibody positive, which could be derived from vaccination or natural infection. Hepatitis C exposure was defined as prior exposure to hepatitis C, but no evidence of chronic infection. Hepatitis C infection was defined as acute or chronic hepatitis C infection with detectable hepatitis C RNA. Participant age was stratified by less than 40 years or greater than or equal to 40 years. We chose this cutoff to identify people at highest

risk of hepatitis B acquisition who would likely benefit most from vaccination.¹²

Data analysis

We conducted a cross-sectional descriptive analysis to examine differences in characteristics of participants with and without PCPs, as well as with and without hepatitis B vaccination. Variables of interest included demographics, health care use, infection history (focused on preventable communicable diseases), preventive care, and SSP use. Bivariate analysis using Student’s t-tests and chi-square or Fischer exact tests, where appropriate, were performed to identify associations between having a PCP and hepatitis B vaccination.

Exploratory multivariable logistic regression was performed to examine the association between having a PCP and hepatitis B vaccination. Variables for the model were chosen based on clinical relevance (age, insurance status) and findings from the bivariate logistic regression analysis with $P < .10$ (use of SSPs). Participants who had hepatitis B exposure or infection were not excluded from the analysis but were considered unvaccinated. Analyses were conducted in Stata/IC 16, SAS (version 9.4), and R (version 3.6).

This study was approved by the MaineHealth Institutional Review Board.

RESULTS

The study included 101 participants. Sixty-eight participants (67%) had a PCP, most of whom (75%, $n = 51$) had seen their PCP within the past 12 months. The most common reasons for not having a PCP included cost (57%), feeling judged in the past (27%), and not having insurance (15%). Some participants cited multiple reasons including “Other” reasons cited by <10% of participants which included having old PCP, being afraid, do not need PCP, do not know any PCP. Among participants, 85% ($n = 58$) with a PCP had insurance and 48% ($n = 16$) without a PCP had insurance ($P \leq .001$). Seventy-one percent of participants ($n = 72$) were age 18 to 39 years, and 44% ($n = 44$) of participants self-identified as male and 56% (57) self-identified as female. The cohort of patients with PCPs contained a significantly lower percentage of males (37%, $n = 25$) than those without PCPs (58%, $n = 19$; $P = .046$) (Table 1).

Table 1. Descriptive Analysis of Demographics Stratified by Primary Care Physician*

	Total, No. (%)	With PCP, No. (%)	Without PCP, No. (%)	P value
All	101	68 (67)	33 (33)	
Age, y (range 21-58)				
18-39	72 (71)	49 (72)	23 (70)	.806
40+	29 (29)	19 (28)	10 (30)	
Self-identified gender				
Female	57 (56)	43 (63)	14 (42)	.048
Male	44 (44)	25 (37)	19 (58)	
Insurance status				
Has insurance	74 (73)	58 (85)	16 (48)	<.001
No insurance	25 (25)	8 (12)	17 (52)	
Unknown	2 (2)	2 (3)	0	
Rurality				
Rural (isolated and small rural)	18 (18)	14 (21)	4 (12)	.409
Urban (large rural and metropolitan)	83 (82)	54 (79)	29 (88)	
Housing status				
Unhoused	46 (46)	29 (43)	17 (52)	.401
Stable housing	55 (54)	39 (57)	16 (48)	
Ever incarcerated				
Yes	90 (89)	60 (88)	30 (91)	1.00
No	11 (11)	8 (12)	3 (9)	

Abbreviations: PCP, primary care provider.

Hepatitis B vaccination history was the only preventive measure that was significantly more common among people who had PCPs: 62% (n = 42) of patients with a PCP had a hepatitis B vaccine versus 33% (n = 11) of those without a PCP ($P = .006$). Among the 35 patients with a PCP who reported their vaccination location, 21 (60%) reported vaccination at a PCP office. Twenty-two (22%) of all participants reported that hepatitis A and B vaccinations at SSPs had been “helpful.” Participants were also asked about their contact with other sites where vaccines could potentially be administered. Ninety (89%) participants had been incarcerated in the past, 61 (60%) had engaged with outpatient medication for addiction treatment in their lifetime, and 67 (66%) had ever used SSPs.

When stratified by PCP status, there were no significant differences in screening rates for hepatitis C (93% of those with a PCP, 94% of those without

a PCP; $P = .545$), HIV (88% of those with a PCP, 82% of those without a PCP; $P = .972$), or hepatitis A immunity (62% of those with a PCP, 48% of those without a PCP; $P = .231$). Hepatitis C infections were common (75%, n = 76) among the cohort and not associated with PCP status. HIV infection was uncommon (1%, n = 1). Ever discussing PrEP with a health care provider was rare (7%), regardless of PCP status. However, 24 (24%) of participants reported being somewhat or very willing to take a daily pill to prevent HIV (Table 2).

When stratified by status of hepatitis B vaccination, there were no significant differences in demographics or health characteristics (Table 3). In the multivariable analysis (Table 4), participants with a PCP had 3.59 times higher odds of having completed a full course of a hepatitis B vaccination versus those without a PCP (95% CI, 1.28-7.59; $P = .014$).

Table 2. Descriptive Analysis of Preventive Care Stratified by Having a Primary Care Physician

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	Total, No. (%) (N = 101)	With PCP, No. (%) (n = 68)	Without PCP, No. (%) (n = 33)	P value*
Last saw PCP				
<30 days	NA	26 (38)	NA	
<12 months	NA	25 (37)	NA	--
12+ months	NA	7 (10)	NA	
Unknown	NA	10 (15)	NA	
Reason for no PCP[†]				
Cost/Insurance	NA	NA	17 (52)	--
Location	NA	NA	5 (15)	
Felt judged in past	NA	NA	9 (27)	
Ever used a syringe service program	67 (66)	49 (72)	18 (55)	.081
Ever received outpatient medication for addiction treatment				
Yes	61 (60)	49 (72)	12 (36)	.001
No	40 (40)	19 (28)	21 (67)	
Ever had a hepatitis C test				
Yes	94 (93)	63 (93)	31 (94)	.545
No	5 (5)	4 (6)	1 (3)	
Unknown	2 (2)	1 (1)	1 (3)	
Known hepatitis C exposed or infected				
Yes	76 (75)	49 (72)	27 (82)	.286
No	25 (25)	19 (28)	6 (18)	
Completed hepatitis B vaccination				
Yes	53 (52)	42 (62)	11 (33)	.006
No	47 (47)	25 (37)	22 (67)	
Unknown	1 (1)	1 (1)	0	
Known hepatitis B infection[‡]				
Completed hepatitis A vaccination	8 (8)	4 (6)	4 (12)	.433
Completed hepatitis A vaccination				
Yes	58 (57)	42 (62)	16 (48)	.231
No	41 (41)	25 (37)	16 (48)	
Unknown	2 (2)	1 (1)	1 (3)	
Known hepatitis A infection				
Yes	1	0	1	--
HIV status				
Ever had HIV test	86 (85)	60 (88)	27 (82)	.370
HIV-positive	1 (1)	1 (1)	0	
Ever discussed PrEP with a health care provider				
Yes	8 (8)	6 (9)	2 (6)	--
Pill daily HIV scale				
Willing	24 (24)	16 (24)	8 (24)	.937
Not willing	77 (76)	52 (76)	25 (76)	

Table 3. Descriptive Analysis of Study Population Stratified by Hepatitis B Vaccination

	Total, No. (%) (n = 100)*	With hepatitis B vaccination, No. (%) (n = 53)	Without hepatitis B vaccination, No. (%) (n = 47)	P value
PCP status				
Has PCP	67 (67)	42 (79)	25 (53)	.006
No PCP	33 (33)	11 (21)	22 (47)	
Age <40 y				
	72 (72)	38 (72)	34 (72)	.943
Self-identified gender[†]				
Female	56 (56)	32 (60)	24 (51)	.349
Male	44 (44)	21 (40)	23 (49)	
Insurance status				
Has insurance	73 (73)	39 (74)	34 (72)	.639
No insurance	25 (25)	12 (23)	13 (28)	
Rurality				
Rural (isolated and small rural)	18 (18)	11 (21)	7 (15)	.603
Urban (large rural and metropolitan)	82 (82)	42 (79)	40 (85)	
Homelessness				
Yes	45 (45)	24 (45)	21 (45)	.952
No	55 (55)	29 (55)	26 (55)	
Ever used a syringe service program				
Yes	66 (66)	39 (74)	27 (57)	.089
No	34 (34)	14 (26)	20 (43)	
Known hepatitis C exposed or infected				
Yes	75 (75)	40 (75)	35 (74)	.908
No	25 (25)	13 (25)	12 (26)	
Ever received outpatient medication for addiction treatment				
Yes	60 (60)	32 (60)	28 (60)	.935
No	40 (40)	21 (40)	19 (40)	

Abbreviations: PCP, primary care provider.

*Any data that does not add to N =101 is due to missing data.

Table 4. Logistic regression analysis between hepatitis B vaccination and potential predictors

Predictor variable	Unadjusted OR	P value	Multivariable-adjusted OR	P value
Primary care provider	3.36 (1.40-8.08)	.007	3.59 (1.30-9.94)	.014
Age <40 years	0.97 (0.40-2.32)	.943	0.89 (0.350-2.26)	.806
Ever used syringe service program	2.06 (0.89-4.78)	.091	1.91 (0.780-4.68)	.157
Insurance status	1.24 (0.50-3.09)	.640	0.62 (0.206-1.85)	.390

DISCUSSION

Among this cohort of PWID hospitalized in Maine with injection-related infections, the proportion of participants with a PCP (67%) and a PCP visit in the past 12 months (51%) is comparable to rates seen in prior literature. In a survey of PWID recruited from several SSPs in Massachusetts, 60% of respondents saw their PCP in the past year.¹⁰ Based on a 2018 study of health care use among PWID, 53% of patients residing in Medicaid expansion states reported having a usual source of health care.¹⁹ Notably, Maine expanded Medicaid around the time that this study began enrollment. This expansion may have contributed to a greater number of participants with PCPs than we anticipated, given that cost and insurance issues were among the top-cited reasons for not having a PCP among participants in this study.

Although hepatitis B vaccination was the only preventive care measure that was significantly more common among participants with PCPs than those without PCPs, only 60% of those with PCPs confirmed receiving the vaccine at a PCP office. Although recall bias could play a role, particularly for those who may have received hepatitis B vaccination in infancy, having a PCP may reflect motivation to engage in preventive care.

Many strategies have been described and evaluated for improving rates of hepatitis B vaccination among PWID. In a targeted vaccination program for PWID in the Netherlands, factors associated with completing hepatitis B vaccination included administration at addiction care centers and flexibility in vaccine location for subsequent doses.²⁰⁻²¹ Other promising strategies include providing financial incentives for vaccination, using accelerated vaccination schedules, and offering peer interventions.^{6,21} In recent years, the state health department in Maine had a program that identified patients were eligible for hepatitis B vaccination and called their PCPs

to encourage offering hepatitis B vaccination. This program also partnered with community-based organizations in high-prevalence counties.²² This program is an encouraging example of local health care and public health partnerships that address this need for preventive care.¹² We hope that the unprecedented innovations and collaborations underway to promote COVID-19 vaccination will create infrastructure and momentum for vaccination and prevention campaigns for hepatitis B and other infections.

Regarding other preventive care outcomes, almost all participants had HIV and hepatitis C screening at least once, regardless of PCP status. This finding suggests that screening is successfully occurring in settings outside PCP offices. Rates of hepatitis A immunity were suboptimal at 47%. Although data was not adequate to determine the contribution of vaccine-derived immunity, this finding demonstrates missed opportunities to vaccinate people at risk, particularly given high rates of homelessness and risk of hepatitis A exposure in shelters.³ Also, very few participants have been offered PrEP, even though a quarter reported willingness to take a daily pill to prevent HIV. Any PCP can prescribe PrEP, though many are not confident in doing so. A survey of trainees at this institution identified non-amenable clinic workflows and preceptor unfamiliarity as barriers to PrEP prescribing.²³

Although barriers to accessing primary care should be further explored and addressed, we should also consider other strategies to provide preventive care for people without PCPs. These strategies include facilitating vaccination through offices that treat opioid disorder, hospitals, SSPs, and jails because the participants in this study heavily interacted with these settings. Though there have been successful models of vaccination programs in correctional facilities, as of 2020, the jail medical contractors in Maine did not offer hepatitis vaccinations, despite

promotion by state health department officials.²² There have also been successful models of vaccination onsite at SSPs. One program in Alaska that incentivized vaccination at \$20 to \$50 per shot yielded higher vaccination rates than usual care, with over 80% of patients completing 3 doses.²⁴ The Centers for Disease Control and Prevention suggests offering comprehensive and integrated services. These services include outreach to facilitate access to addiction treatment and preventive services, supportive structures (eg, co-location of services), and offering linkages to care upon release from jail.¹⁷ The inpatient hospital setting and medical respite facilities seem particularly well suited to provide vaccinations to patients who need prolonged medical care for their complex infections, such as the participants in this study. Inpatient vaccination is preceded and currently orderable at our institution.

Notably, for all participants in this study, even those who saw PCPs and/or received recommended infectious disease vaccinations or screening, the current systems did not prevent them from becoming hospitalized with a serious invasive infection. Harm reduction tools, such as education on safer techniques for drug consumption, is a critical part of infection prevention that should be incorporated into health care settings alongside other components, such as vaccinations.

This study has several limitations. First, we were unable to capture the timing and frequency of preventive care receipt, which is an important component of screening. Second, the data collection did not capture whether the participants with PCPs had discussed their drug use with their PCPs. Third, the reasons for not engaging in preventive care were not explored. It is possible that participants were offered but declined preventive services, for example, due to time constraints. Fourth, the data points available to determine prior exposure to hepatitis B were limited (no core antibody was available). This limitation may have affected assignment of vaccination status, though we have no reason to believe that this limitation would have a differential effect based on PCP status. Fifth, there was insufficient data to determine the location or timing of hepatitis B vaccination administration. Some participants born after 1991 may have received hepatitis B vaccination as children. We attempted to address this limitation by adjusting for age in the multivariate analysis.²⁵

Finally, we were unable to examine other important preventive measures for this population (eg, other vaccinations, sexually transmitted infection screening and education, tuberculosis screening, overdose prevention).

CONCLUSIONS

Many PWID who were hospitalized in Maine for invasive infections have received primary and preventive care. In our study, having a PCP was associated with receiving hepatitis B vaccination. However, there are still missed opportunities to fill in gaps in preventive care in PCP and non-PCP settings. Further research on PCP use among PWID in Maine should explore patients' cost concerns and reasons for not receiving preventive services in the primary care setting. Although this goal of optimizing primary care access and use is being pursued, health care facilities and community settings in Maine should partner to provide recommended vaccinations and other preventive services for PWID throughout Maine's communities.

Conflicts of interest: None

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