Predictors of Missed Hepatitis C Intake Appointments and Failure to Establish Hepatitis C Care Among Patients Living With HIV

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Background. We estimated and characterized the proportion of patients living with HIV (PLWH) who missed hepatitis C (HCV) intake appointments and subsequently failed to establish HCV care.

Methods. Logistic regression analyses were used to identify factors associated with missed HCV intake appointments and failure to establish HCV care among PLWH referred for HCV treatment between January 2014 and December 2017. In addition to demographics, variables included HIV treatment characteristics, type of insurance, liver health status, active alcohol or illicit drug use, unstable housing, and history of a mental health disorder (MHD).

Results. During the study period, 349 new HCV clinic appointments were scheduled for 202 unduplicated patients. Approximately half were nonwhite, and 80% had an undetectable HIV viral load. Drug use (31.7%), heavy alcohol use (32.8%), and MHD (37.8%) were prevalent. Over the 4-year period, 21.9% of PLWH referred for HCV treatment missed their HCV intake appointment. The proportion increased each year, from 17.2% in 2014 to 25.4% in 2017 (*P* = .021). Sixty-six of the 202 newly referred HCV patients (32.7%) missed their first HCV appointment, and 28 of these (42.4%) failed to establish HCV care. Having a history of MHD, CD4 <200, ongoing drug use, and being nonwhite were independent predictors of missing an intake HCV appointment. The strongest predictor of failure to establish HCV care was having a detectable HIV viral load.

Conclusions. The proportion of PLWH with missed HCV appointments increased over time. HCV elimination among PLWH may require integrated treatment of MHD and substance use.

Keywords. DAA; drug use; HCV; HIV; mental health disorders.

Curing hepatitis C virus (HCV) infection reduces HCV-associated morbidity and mortality [1]. Direct-acting antivirals (DAA) offer cure rates for HCV infection above 90% for patients living with HIV (PLWH) [2]. To optimally benefit from DAA treatment, PLWH must know their HCV status, access DAA treatment services early in the course of the disease, and adhere to DAA. The high proportion of PLWH with untreated HCV infection has important public health implications for controlling the HCV epidemic and increased health resource utilization due to HCV-related advanced liver complications [3, 4]. To address these issues, the American Association for the Study of Liver Diseases (AASLD) and The Infectious Diseases Society of America (IDSA) guidelines encourage access to DAA by recommending that "treatment of HCV in HIV-infected patients should be a priority for providers, payers, and patients" [5].

Most HCV-coinfected PLWH in care know their HCV status [6]. Following DAA licensing approval at the end of 2013, many PLWH coinfected with HCV sought DAA therapy actively, but they were often denied by their insurers when they did not have advanced liver fibrosis [7]. The favorable impact of the updated AASLD and IDSA guidelines contributed to lifting many payee restrictions to accessing DAA among PLWH. Anecdotally, in 2016, we observed that an increasing proportion of our PLWH referred for HCV treatment missed their intake hepatitis C clinic appointments.

Many "real world" studies of HCV among PLWH have evaluated DAA efficacy, safety, and potential differential response in comparison with HIV-uninfected patients [8–10]. Most of these studies were conducted in countries with universal health care access systems, with some of these settings having more robust systems and opportunities for retention in care than in the United States [11]. In the United States, the traditional models for PLWH receiving HCV treatment might have contributed to patients' disincentives to establish HCV care. Treatment of HCV has primarily been provied by specialists rather than HIV primary care providers, resulting in administrative barriers to HCV treatment, including consultation authorizations, insurance approvals, and varying travel distances. Factors associated

with missing an HCV intake appointment for DAA treatment among PLWH have not been described, probably because many HCV treatment models of care do not capture information about patients until after they are seen for HCV staging for DAA treatment consideration. A better understanding and identification of risk factors for missing HCV care intake appointments and failure to link to HCV care is needed to design effective interventions to increase the proportion of PLWH with known HCV coinfection accessing DAA therapy, thereby contributing to HCV global elimination efforts. Therefore, we evaluated the characteristics of scheduled PLWH coinfected with HCV at a university-based hepatitis coinfection clinic within an HIV primary care setting who failed to attend an initial HCV intake visit and, among them, those who failed to establish HCV care in subsequent scheduled appointments.

METHODS

Study Population and Procedures

The University of California, San Diego (UCSD), Owen Clinic provides HIV primary care to more than 3300 adult PLWH. Patients found to be coinfected with HCV are referred to the Owen HCV Hepatitis Co-Infection Clinic, a once-weekly subspecialty clinic colocated with the HIV primary care services [12]. The current study includes patients new to the Owen Hepatitis Co-Infection Clinic with HCV intake appointments scheduled from January 1, 2014, through December 31, 2017. There were 2 coprimary dichotomous outcome measures: (1) failure to attend the first scheduled HCV intake appointment (missed HCV care intake) and (2) failure to attend any HCV clinic appointment after referral (failure to establish HCV care). Institutional human research protection program approval by the UCSD Institutional Review Board was obtained before conducting the study.

Data were primarily derived from electronic medical records (EMRs). These data included patients' demographics, HIV transmission risk behaviors, and general HIV care parameters such as CD4 count and HIV viral load. For time-varying covariates, the value collected was the value most immediately before, but not longer than 6 months before, the date of the scheduled HCV intake appointment. Type of insurance was categorized into Medicare, Medicaid, Medicare with supplemental Medicaid, private insurance (including insurance obtained under the Affordable Care Act exchanges), and Ryan White insurance (a safety net insurance for otherwise uninsured PLWH). Unstable housing within 3 months of an initial scheduled HCV clinic intake appointment was identified through diagnosis code abstraction (eg, for homelessness or unstable housing) or medical record documentation of frequent short stays (up to 2 weeks) in motels or with friends and family in the absence of a primary residence. Engagement in HIV care was defined as having 2 or more visits with an HIV primary care provider in our clinic separated by ≥3 months in each calendar year for the entire defined study period or until the date of HCV

intake referral appointment, unless the patient transferred care or was incarcerated [13].

We also collected information on any history of a liver decompensation event before the time of scheduled HCV intake, HCV treatment history, laboratory data consistent with the standard of care for pre-DAA treatment liver staging procedure, and diagnosis codes to assess comorbidity burden, as measured by the Charlson Comorbidity Index [14]. Cirrhosis diagnosis was confirmed based on either liver biopsy, transient elastography score of ≥12.5kPa, a noninvasive FIB-4 score of >3.25, or imaging suggestive of liver stigmata consistent with cirrhosis before or at the time of the HCV intake appointment.

We also derived information on history of mental health disorders, active alcohol use, and active illicit drug use including intravenous drug use (IDU) from the EMR, and quarterly patient-reported outcomes (PROs) and behavioral risk ascertainment from the Owen Hepatitis Co-Infection Clinic. The EMR *International Classification of Diseases*, *Tenth Revision* (ICD-10), diagnostic codes of mental health disorder included major depression (F32, F33), bipolar disorder (F31), schizoaffective disorder (F25), generalized anxiety disorder (F41.1), schizophrenia (F23), and delusional disorder (F22). PROs included validated screening tools for drug use, alcohol, and mental health disorders [15]. These tools included measures of depressive symptoms (PHQ-9) [16], panic symptoms (PHQ-5) [17], alcohol use (Alcohol Use Disorders Identification Test–Clinical) [18], and substance use (The Alcohol, Smoking, and Substance Involvement Screening Test) [19]. Patients who attended the Owen HCV Co-Infection Clinic also completed the PHQ-9 inventory for depression screening and the National Institute on Drug Abuse–Alcohol, Smoking, and Substance Involvement Screening Test (NIDA-ASSIST) instruments [20]. Clinic notes in the EMRs from HIV providers and HIV psychiatry (a specialty clinic integrated into the Owen Clinic) were reviewed when available before the scheduled first HCV intake appointment to supplement the PROs with documentation of mental health disorder history, drug and alcohol use, and housing status. A history of a mental health disorder was defined as a diagnosis of a mental health disorder in the medical record or, specifically for depression, a PHQ-9 score of ≥10. Active drug use was a report of active illicit drug use on any of the patient's screening inventories or a report of active drug use in clinic notes within 3 months of the scheduled appointment. We defined active alcohol use as having an AUDIT-C score ≥4 or responding to the NIDA-ASSIST quick screen as having 5 or more drinks a day per week. We also included clinic note documentation of patients drinking 5 or more drinks on the same occasion on each of 5 or more days in the past 30 days [19–21].

Statistical Analysis

Descriptive statistics are presented using medians (with interquartile ranges [IQRs]) for continuous variables and frequencies and percentages for categorical variables. We estimated by

calendar year the proportion of new patients who missed their HCV intake appointments and, among them, the proportion who did not return for an HCV intake appointment (failure to establish HCV care). For the study, the last date of follow-up for those who failed to establish HCV care was December 31, 2017. To fit parsimonious prediction models for the 2 primary outcomes (initial "no show" and failure to establish HCV care), those covariates associated with the outcomes in bivariate analyses ($P \leq .1$) were entered into forward stepwise logistic regression models (probability to enter = .05). Model discrimination was assessed using receiver operating characteristic (ROC) area, and model calibration was evaluated using the Hosmer-Lemeshow chi-square statistic. Two-way interactions were assessed among final model covariates using a criterion of significance of $P \leq .10$. Potential predictors included demographics; HIV risk factors; CD4, and HIV viral load; type of insurance; HIV engagement in care; cirrhosis and prior liver decompensation; Charlson Comorbidity Index; active alcohol; any illicit drug use; unstable housing; and history of mental health disorder. Analyses were performed using Stata (Stata Statistical Software, release 14.2; StataCorp, College Station, TX).

RESULTS

Between January 2014 and December 2017, the Owen Hepatitis Co-Infection Clinic had 349 new HCV intake appointments for 202 patients. The 202 newly referred HCV patients had a median age of 51 years, 47.8% of them were nonwhite, 18.4% were female, and 53.2% had Medicaid insurance. By HIV risk factor, two-thirds were either non-IDU men who have sex with men (46.6%) or heterosexual with IDU history (20.1%). Along the HIV continuum of care, 21.5% did not meet our definition of engaged in HIV care, 96% of patients had prescribed antiretroviral therapy, and only 79.6% of patients had an undetectable HIV viral load. At the time of the scheduled intake HCV appointment, 25 patients (12.3%) were known to have cirrhosis, of whom 11 (42.3%) had a history of prior liver decompensation. Almost one-third of patients had active alcohol (32.8%) and drug use (31.7%). Overall, 37.8% of patients had a mental health disorder. This proportion was lower among those who did not miss their HCV intake appointment (33.1%) than among those who missed their HCV intake appointment (48.5%). There was no difference in the median number of psychiatry visits in the year preceding their HCV scheduled appointment between those who attended or did not attend an HCV intake appointment (Table 1).

During the 4-year study period, the overall proportion of missed new HCV intake care appointments was 21.5% (75 of 349). This proportion increased by calendar year 17.2% (16 of 93), 19.0% (18 of 95), 25.6% (23 of 90), and 25.4% (18 of 71) in 2014, 2015, 2016, and 2017, respectively ($P = .021$). Sixty-six of the 202 new patients (32.7%) did not attend their HCV intake appointment, and 28 of them (42.4%) failed to establish HCV

care. In bivariate analysis, missing an HCV intake appointment was more likely in those patients with a history of a mental health disorder (odds ratio [OR], 1.97; 95% confidence interval [CI], 1.08–3.59; $P = .027$), CD4 cell count <200 (OR, 4.26; 95% CI, 1.42–13.79; $P = .01$), active drug use (OR, 1.92; 95% CI, 1.03–3.58; $P = .039$), and who were nonwhite (OR, 2.13; 95% CI, 1.17–3.88; $P = .013$). We noticed a trend that patients younger than age 43 years—and those older than 56 years—were more likely to miss their HCV intake appointments than those between 43 and 55 years. In adjusted logistic regression analysis, missing an intake HCV appointment was more likely among patients with a history of mental health disorders, nonwhite persons, those with ongoing drug use, and those with a detectable HIV viral load. There were no interactions between any of the aforementioned covariates (Table 2).

Of the 66 patients who failed their first scheduled HCV intake appointment, 38 (57.6%) attended a rescheduled HCV intake appointment. The interval between their first scheduled intake appointment and completed intake appointment was a median (IQR) of 98 (35–175) days. Twenty-eight patients (42%) never returned for an intake HCV appointment after a median (IQR) of 538 (415–807) days of follow-up. Patients who failed to establish HCV care were more likely to have a CD4 cell count <200 (OR, 4.00; 95% CI, 1.08–13.70; $P = .032$), active drug use issues (OR, 3.03; 95% CI, 1.34–6.83; $P = .008$), and a detectable HIV viral load (OR, 3.91; 95% CI, 1.67–9.16; $P = .002$) than those who established HCV care. Multiple logistic regression models identified having a detectable HIV viral load as the only significant predictor when entered into a model mutually adjusted for active drug use (OR, 3.04; 95% CI, 1.24–7.44; $P = .015$) (Table 2).

DISCUSSION

To our knowledge, our study is the first to examine and characterize linkage to HCV treatment among PLWH coinfected with HCV in the DAA era. We observed a high rate of missed clinic appointments and failure to engage in HCV care. Missing an HCV intake appointment was associated with being nonwhite, having a CD4 cell count <200, a history of mental health disorders, and active drug use. These findings reinforce similar observations in the HIV literature that social conditions and psychosocial syndemics are associated with poor HIV treatment outcomes [22–24]. Lastly, having detectable HIV viremia was independently associated with both missed HCV intake appointments and failure to engage in HCV care.

Following licensing approval of DAA, the observed HCV intake no show rate rose each year. At the end of 2017, 1 in 4 newly scheduled HCV intake patients failed to attend their clinic appointments. We suspect that when DAA first became available, we had a large influx of self-motivated or symptomatic patients who demonstrated greater engagement in care. Subsequently, as insurance access for HCV treatment

Table 1. Bivariate Comparison of Predictors of Missing an Hepatitis C Intake Appointment and Failure to Establish Hepatitis C Care in HIV-Infected Patients

Covariates	All Patients (n = 202)	Comparison Failure to Attend to an HCV Intake Appointment			Comparison Failure to Establish HCV Care		
		Attended (n = 136)	Missed HCV Intake Appointment (n = 66)	P Value	Established HCV Care (n = 174)	Failed to Establish HCV Care (n = 28)	P Value
Sex							
Female	37 (18.3)	23 (16.9)	14 (21.2)	.77	32 (18.4)	5 (17.9)	.78
Male	162 (80.2)	110 (81.6)	51 (77.3)		139 (79.9)	23 (82.1)	
Transgender	3 (1.5)	2 (1.5)	1 (1.5)		3 (1.7)	0 (0.0)	
Age, y	51 (43–57)	52 (45–56.5)	47.5 (40–57)	.31	52 (43–57)	45.5 (39.5–56)	**.062**
Race							
Nonwhite	97 (48.0)	57 (41.9)	40 (60.6)	**.013**	82 (47.1)	15 (53.6)	.53
White	105 (52.0)	79 (50.1)	26 (49.4)		92 (52.9)	13 (46.4)	
Ethnicity							
Non-Hispanic	149 (73.8)	106 (77.9)	43 (65.2)	**.053**	130 (74.7)	19 (67.9)	.44
Hispanic	53 (26.2)	30 (22.1)	23 (34.8)		44 (25.3)	9 (32.1)	
HIV risk factor							
MSM	94 (46.5)	69 (50.7)	25 (37.9)	.25	84 (48.3)	10 (35.7)	.74
Heterosexual	28 (13.9)	19 (14.0)	9 (13.6)		24 (13.8)	4 (14.3)	
Hemophilia	7 (3.5)	3 (2.2)	4 (6.1)		5 (2.9)	2 (7.1)	
MSM + IDU	23 (11.4)	12 (8.8)	11 (16.7)		19 (10.9)	4 (14.3)	
Heterosexual + IDU	41 (20.3)	26 (19.1)	15 (22.7)		34 (19.5)	7 (25)	
Other, eg, perinatally acquired	9 (4.5)	7 (5.1)	2 (3.0)		8 (4.6)	1 (3.6)	
HIV risk: IDU							
Not IDU	138 (68.6)	99 (72.8)	39 (60)	.067	121 (69.9)	17 (60.7)	.33
IDU	63 (31.4)	37 (27.2)	26 (40)		52 (30.1)	11 (39.3)	
CD4+ count/mm^3	458 (298–715)	482 (338–720)	390 (260–708)	.10	476 (333–716)	339 (227–468)	.11
CD4 category							
0-	19 (9.4)	7 (5.1)	12 (18.2)	**.013**	13 (7.5)	6 (21.4)	.034
200-	46 (22.8)	31 (22.8)	15 (22.7)		38 (21.8)	8 (28.6)	
350-	137 (67.8)	98 (72.1)	39 (59.1)		123 (70.7)	14 (50.0)	
HIV pVL undetectable							
Yes	162 (80.2)	114 (83.8)	48 (72.7)	.063	146 (16.1)	16 (57.1)	**.001**
No	40 (19.8)	22 (16.2)	18 (27.3)		28 (83.9)	12 (42.9)	
Engage in HIV care							
No	44 (21.8)	29 (21.3)	15 (22.7)	.82	34 (19.5)	10 (35.7)	**.054**
Yes	158 (72.2)	107 (78.7)	51 (77.3)		140 (80.5)	18 (64.3)	
Known cirrhosis							
No	176 (81.1)	116 (85.3)	60 (90.9)	.26	150 (86.2)	26 (92.9)	.33
Yes	26 (12.9)	20 (14.7)	6 (9.1)		24 (13.8)	2 (7.1)	
Prior liver decompensation							
No	191 (94.6)	128 (94.1)	63 (95.5)	.69	164 (94.3)	27 (96.4)	.64
Yes	11 (5.4)	8 (5.9)	3 (4.5)		10 (5.7)	1 (3.6)	
Type of insurance							
Medicare	17 (8.4)	15 (11.0)	2 (3.0)	.17	16 (9.2)	1 (3.6)	.65
Medicaid	107 (53.0)	70 (51.5)	37 (56.1)		93 (53.4)	14 (50.0)	
Private	25 (12.4)	19 (14.0)	6 (9.1)		22 (12.6)	3 (10.7)	
Ryan White	8 (4.0)	6 (4.4)	2 (3.0)		6 (3.4)	2 (7.1)	
Medicare/Medicaid	45 (22.3)	26 (19.1)	19 (28.3)		37 (21.3)	8 (28.6)	
Active alcohol use							
No	135 (66.8)	90 (66.2)	45 (68.2)	.78	115 (66.1)	20 (71.4)	.58
Yes	67 (33.2)	46 (33.8)	21 (31.8)		59 (33.9)	8 (28.6)	
Active drug use							
No	139 (68.8)	100 (73.5)	39 (59.1)	**.038**	126 (72.4)	13 (46.4)	**.006**
Yes	63 (31.2)	36 (26.5)	27 (40.9)		48 (22.6)	15 (53.6)	

Table 1. (Continued)

Unstable housing							
No	178 (88.1)	123 (90.4)	55 (83.3)	.14	153 (87.9)	25 (89.3)	.89
Yes	24 (11.9)	13 (9.6)	11 (16.7)		21 (12.1)	3 (10.7)	
History of mental health disorder							
No	125 (61.9)	91 (66.9)	34 (51.5)	**.035**	108 (62.1)	17 (60.7)	.89
Yes	77 (38.1)	45 (33.1)	32 (48.5)		66 (37.9)	11 (39.3)	
Charlson Comorbidity Index	2 (1–4)	2 (1–4)	2 (1–4)	.72	2 (1–4)	1.5 (1–4)	.26

Data are presented as median (interquartile range) for continuous measures and No. (%) for categorical measures.

Abbreviations: HCV, hepatitis C virus; IDU, intravenous drug use; MSM, men who have sex with men; pVL, plasma viral load.

expanded, outreach increased to include patients who were less motivated, more marginalized, or suffered greater rates of ongoing psychosocial challenges such as mental health disorders and drug use [25].

A recent clinical trial enrolled 144 mainly black (93%) PLWH with ongoing IDU and a high prevalence of depression (61%). The clinical trial used cash incentives or peer mentors to improve HCV linkage to care and found that missing 1 or 2 HCV intake appointments was the most important independent negative predictor of initiation of HCV therapy [26]. Our study adds to the characterization of the reasons for HCV no show using a more ethnically diverse population and including broader mental health disorder categories beyond depression. Mental health disorders are not only prevalent among PLWH and increase risk for negative HIV outcomes [27] but are also associated with co-occurring conditions such as drug and alcohol use and high-risk sexual behaviors [22], behaviors associated with increased risk of HCV acquisition and reinfection [28, 29].

Using the Health Resources and Service Administration definition of engagement in care (having 2 or more visits with an HIV primary care provider separated by ≥3 months in each calendar year), lack of engagement in HIV care was not a

Table 2. Multiple Logistic Regression of Outcomes on Final Model Covariates[a]

Patient Characteristics	Missed HCV Intake Appointment Adjusted OR (95% CI)	Failure to Establish HCV Care Adjusted OR (95% CI)
History of mental health disorder	3.06[**] (1.55–6.08)	
Being nonwhite	2.91[**] (1.50–5.65)	
Active drug use	2.10[*] (1.05–4.20)	2.28 (0.97–5.41)
HIV pVL undetectable	0.44[*] (0.20–0.98)	0.33[*] (0.13–0.80)
ROC	0.71	0.69
Hosmer-Lemeshow χ^2	3.75	0.08
Hosmer-Lemeshow P value	.81	.78

Abbreviations: CI, confidence interval; HCV, hepatitis C virus; OR, odds ratio; pVL, plasma viral load; ROC, receiver operating characteristic curve.

[*] P < .05; [**] P < .01.

[a]Logistic regression models were adjusted for race, CD4 cell count, HIV viral load level, drug use, and mental health disorders. However, CD4 was not retained in the final models.

significant predictor of missing an HCV care intake appointment or failing to engage in HCV care in this study. One reason could be that although many of these patients attended some of their HIV primary care appointments, they may have had difficulty adhering to their antiretroviral therapy, with consequent detectable viremia.

We found that mental health disorders did not predict failure to establish HCV care. There are at least 2 possible explanations for this. First, engagement in HIV care, with access to integrated mental health services, may be protective for PLWH who have mental health disorders or active substance use. At the Owen Clinic, psychiatry referrals typically originate from the HIV provider and are independent of HCV status. Patients with established HIV care and mental health disorders are often already linked to mental health care before a referral to the HCV coinfection program. Therefore, an integrated mental health service can rally around people with mental and substance use disorders who are engaged in care to get them through HCV treatment, especially if they miss their first appointment and are triaged for increased support. Of note, most of our patients in this study who missed their HCV intake appointments eventually established HCV care. Second, the association between detectable viral load and failure to establish HCV care suggests that these patients were less involved in care in general. As a result, we may underestimate the burden of mental health disorders and active substance use in this population because of a lack of opportunity to assess and support these patients. In fact, in the DAA era, many patients entering into HIV care found to be coinfected with HCV are referred for HCV therapy even before being linked to psychiatry services. The latter may explain why mental and substance use disorders dropped out of the multivariable analysis of those who never attended an HCV care intake appointment. Currently, our Owen HCV Co-Infection and Owen psychiatry teams are working to enhance a clinical protocol whereby new Owen Clinic patients entering care with mental health disorders or substance use are linked immediately to mental health services without additional administrative referrals.

There are several limitations to this study. Our analysis of missed intake HCV care appointments did not include patients who canceled but rescheduled appointments. Patients who call

and reschedule an appointment may be treatment-seeking and attend the clinic at a later time [30]. Although it is infrequent that HIV providers do not initiate referral for HCV treatment in the DAA era, we did not explore nonreferrals in this study because we were conducting an independent study to understand the provider's reasons for not initiating hepatitis C treatment referral to inform our HCV elimination efforts. We were also unable to quantify clinic-level factors such as wait time from the referral day to the scheduled HCV intake appointment. It is known that longer wait time from the call to schedule a new patient visit to the appointment date is associated with failure to establish HIV care [30]. Noteworthy, our hepatitis coinfection clinic has a unique protocol that takes walk-in patients, has no restrictions on overbooking appointments, and never refuses services no matter how late the patient arrives [31]. We cannot determine whether patients who failed to engage in HCV care at our clinic established HCV care elsewhere. However, in sensitivity analyses of those patients who failed to establish HCV care and had subsequent HCV viral loads ordered by their HIV primary provider, patients still had active HCV disease reflected by detectable HCV viral loads. Our study was conducted in a single academic center, and results may not be generalizable to other parts of the United States or non–academically affiliated HIV clinics. In particular, our results may not be applicable to clinics that do not have an HCV coinfection clinic embedded within the HIV clinic, nor to care settings without providers experienced in treating HIV/HCV coinfection. Nevertheless, our HIV/HCV-coinfected patients under care may be reflective of ongoing realities in many HIV clinics in the United States, characterized by a high proportion of HIV patients with ongoing mental health disorders and insurance coverage that limits choice in access to care [32].

In conclusion, at the end of 2017, 1 in 4 PLWH referred for HCV therapy missed a scheduled intake appointment, and of those, 43% failed to establish HCV care after a median of 1.5 years from their first missed HCV appointment, despite improvements in access to DAA therapy. Being nonwhite and having a history of mental health disorders, ongoing drug use, and uncontrolled HIV infection were independent predictors of missing HCV intake appointments. Patients with a detectable HIV viral load were more likely to fail establishment of HCV care. Scaling up integration of mental health and substance use treatment services into HIV/HCV care should be routine and is essential to achieving HCV elimination.

Acknowledgments

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