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Unmet needs for ancillary care services are associated with HIV clinical outcomes among adults with diagnosed HIV

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Abstract

Ancillary care services are essential for supporting care engagement and viral suppression among persons with HIV. Estimating unmet needs for ancillary care services may help address care barriers and improve clinical outcomes, but recent, nationally representative estimates are lacking. Using CDC Medical Monitoring Project data from 2015–2018, we report representative estimates of unmet needs for ancillary care services and associations with HIV clinical outcomes among U.S. adults with HIV. Data were collected through interview and medical record abstraction. We described weighted percentages for all characteristics and associations with HIV clinical outcomes using prevalence ratios with predicted marginal means, adjusting for potential confounding. Substantial unmet needs were reported; unmet needs were higher among persons with social determinants of poor health, persons who engaged in drug use or binge drinking, and those who experienced depression or anxiety. Having unmet needs for care was associated with adverseHIV clinical outcomes, with a dose response effect between number of unmet needs and outcomes. Expanding ancillary care access based on a comprehensive care model, strengthening partnerships between providers to connect patients to essential services, and tailoring services based on need may help reduce disparities in unmet needs and improve outcomes.

Keywords

HIV; unmet needs; HIV care continuum; social determinants of health; Ryan White HIV/AIDS Program

Introduction

Ancillary HIV care services are defined as those that comprehensively support care engagement and viral suppression among people with HIV—including HIV support services, such as case management; non-HIV medical services, including dental and mental health care and substance use disorder treatment; and subsistence services, such as assistance with food and shelter (Conviser & Pounds, 2002). Recognizing the importance

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of incorporating ancillary care services into routine HIV care, Congress passed the Ryan White Comprehensive AIDS Resources Emergency (CARE) Act of 1990, establishing the Ryan White HIV/AIDS Program (RWHAP). The RWHAP provides comprehensive care and support services to people with diagnosed HIV in the United States who have low income and are uninsured or underserved (Health Resources and Services Administration; S.2240 - Ryan White Comprehensive AIDS Resources Emergency Act of 1990). However, thirty years later, people with HIV continue to experience unmet needs for ancillary care services (Centers for Disease Control and Prevention, 2020).

Implementing a comprehensive care model in HIV care facilities can decrease unmet needs for services among people with HIV, many of whom have co-occurring conditions that could complicate HIV care and management, such as substance use disorder or mental illness, or financial barriers, including unstable housing (Centers for Disease Control and Prevention, 2020; Gallant et al., 2017; Hartzler et al., 2017; Remien et al., 2015). In addition to addressing these barriers, offering comprehensive care services in a single setting ensures that people remain engaged with the healthcare system and feel supported. Finding ways to engage people with HIV who are suboptimally in care is of national priority to ensure all people with HIV can maintain viral suppression (HHS).

Although numerous studies have established the connection between having unmet needs for support services and poor HIV clinical outcomes (Ashman et al., 2002; Dandachi et al., 2019; Reeder et al., 2019), many have not extensively explored unmet needs by social determinants of health — including socioeconomic status and healthcare access – and other characteristics. Further, these studies are limited to certain geographic areas or in scope – focusing on one or a handful of services – and most are outdated. Having recent estimates on unmet needs for ancillary care services is important for addressing barriers to HIV care and improving HIV clinical outcomes, a key goal in the HIV National Strategic Plan (HHS).

In this analysis, we used recent, nationally representative data from the 2015–2017 data cycles of the CDC Medical Monitoring Project (MMP) to assess unmet needs for a wide variety of ancillary care services, differences in unmet needs by selected characteristics, and associations between individual unmet needs and HIV outcomes along the continuum of care, including retention in care, antiretroviral therapy (ART) adherence, and sustained viral suppression. These data could ultimately help inform efforts through the HIV National Strategic Plan to improve clinical outcomes among people with HIV.

Methods

Sampling and data collection

MMP is a national surveillance system that collects annual, cross-sectional data on social determinants of health and behavioral and clinical characteristics among adults with HIV in the United States. MMP uses a complex survey design with a two-stage methodology to report nationally representative estimates. In the first stage, 16 states and Puerto Rico are sampled from all 50 U.S. states, the District of Columbia, and Puerto Rico. In the second stage, random samples of adults with diagnosed HIV are selected from each jurisdiction from the National HIV Surveillance System, a census of all persons with diagnosed HIV in

the United States. (Beer et al., 2019a) The response rate at the first stage was 100%, and at the second stage, ranged from 40%–46% by cycle year.

During the 2015–2017 data cycles, information was collected from June of each cycle year through May of the following year. MMP staff conducted face-to-face and phone interviews among selected participants, during which data on demographic, behavioral, and clinical characteristics – including use of, and need for, a variety of ancillary care services – were collected. For each service type, participants were asked if they received the service; persons who did not receive the service were asked if they needed the service. Medical records were abstracted for elements of HIV care engagement and viral load test results at the usual source of HIV care. MMP is conducted as a part of routine surveillance and is considered non-research. Participating jurisdictions obtained institutional review board approval as needed; informed consent was obtained from all participants.

Measures

Ancillary care services were grouped into three categories, including HIV support services, such as case management; non-HIV medical services, including dental and mental health care and substance use disorder treatment; and subsistence services, such as assistance with food and shelter. Unmet need was defined as needing, but not receiving, a particular ancillary care service.

Retention in HIV care was defined as having ≥2 elements of outpatient HIV care ≥90 days apart in the 12 months prior to interview. ART adherence was measured based on dose adherence in the past 30 days and was dichotomized as 100% adherence versus other. Sustained viral suppression was defined as having all viral load measurements in the past 12 months be <200 copies/mL or undetectable.

Household poverty threshold was based on the Department of Health and Human Services poverty guidelines (Assistant Secretary for Planning and Evaluation). Binge drinking was defined as having ≥5 alcoholic beverages for men, and ≥4 alcoholic beverages for women in one sitting, during the 30 days prior to interview. Symptoms of depression and generalized anxiety disorder during the past two weeks were assessed using previously validated scales (Patient Health Questionnaire-8 and Generalized Anxiety Disorder-7, respectively) and categorized based on clinically meaningful cutpoints (Kroenke et al., 2009; Spitzer et al., 2006). Attendance at a RWHAP-funded facility was based on reported usual source of HIV care. All characteristics, unless otherwise noted, were based on the past 12 months.

Analysis

We reported the percentage of persons who had at least one unmet need for HIV support services, non-HIV medical care services, and subsistence services, overall and by selected social determinants of health, behavioral characteristics, and clinical outcomes. Next, we examined associations between unmet needs for individual ancillary care services and HIV clinical outcomes, including retention in HIV care, ART adherence, and sustained viral suppression. We reported weighted percentages, with corresponding 95% confidence intervals (CIs), and prevalence ratios with predicted marginal means to compare differences between groups ($P < .05$).

Associations between unmet needs for care services and HIV clinical outcomes were adjusted for healthcare coverage, incarceration in the past 12 months, race/ethnicity, age at the time of interview, and report of any drug use in the past 12 months, which were all considered potential confounders. Alongside all prevalence ratios, we reported 95% confidence intervals and *p*-values, but also highlighted associations that remained statistically significant after multiple comparisons adjustment using the Bonferroni correction (modified $P = .05$/number of comparisons). Data were weighted to adjust for person nonresponse and post-stratified to known population totals by age, race/ethnicity, and sex from the National HIV Surveillance System. All analyses were conducted using SAS, version 9.4 (SAS Institute, Cary, NC), and SAS-callable SUDAAN, version 11.0.3 (RTI International, NC).

Results

Overall, 54.3% of adults with diagnosed HIV had ≥1 unmet need for an ancillary care service; 18.3% had ≥1 unmet need for an HIV support service, 30.8% had ≥1 unmet need for a non-HIV medical care service, and 28.2% had ≥1 unmet need for a subsistence service (Table 1). Persons who were younger, female, or living at or below the poverty threshold were more likely to report ≥1 unmet need for services for HIV support, non-HIV medical care, and subsistence. Notably, compared with those with any private coverage, people with only public healthcare coverage (excluding those who solely relied on RWHAP assistance) or with no healthcare coverage were also more likely to report unmet needs for all domains of ancillary care services. Persons who were homeless, incarcerated, used drugs, or reported symptoms of depression and generalized anxiety disorder were also more likely to report unmet needs for ancillary care services. The strength of these associations varied by both service type and characteristics of persons with HIV. For instance, when examining unmet needs by race/ethnicity, we observed that Blacks/African Americans (PR: 1.88; 95% CI: 1.67–2.12), Hispanics/Latinos (PR: 1.52; 95% CI: 1.35–1.72), and persons of other racial/ethnic groups (PR: 1.65; 95% CI: 1.41–1.93) were more likely than Whites to have unmet needs for subsistence services. Disparities in unmet needs for subsistence services were also observed by poverty level and history of homelessness. Regardless of service type, people with symptoms of depression and generalized anxiety disorder were significantly more likely to have unmet needs for ancillary care services.

The greatest unmet needs were for dental care (24.9%), Supplemental Nutrition Assistance Program or Special Supplemental Nutrition Program for Women, Infants, and Children (SNAP or WIC) services (12.4%), shelter or housing services (12.1%), and mental health services (9.5%; Table 2). After adjusting for potential confounding, several unmet needs for care were still associated with not being retained in care, not being ART adherent, and not being virally suppressed. Notably, key HIV support services, such as having unmet needs for HIV case management services (aPR: 1.82; 95% CI: 1.58–2.09), medicine through the AIDS Drug Assistance Program (ADAP) (aPR: 1.90; 95% CI: 1.57–2.31), and patient navigation services (aPR: 1.89; 1.62–2.21) were associated with not being retained in care. Unmet needs for adherence support services (aPR: 1.40; 95% CI: 1.18–1.67) and receipt of medications through ADAP (aPR: 1.50; 95% CI: 1.37–1.64) were associated with ART dose nonadherence . Having unmet needs for receipt of medications through ADAP (aPR: 1.36;

95% CI: 1.18–1.57), HIV care management (aPR: 1.28; 95% CI: 1.15–1.41), and patient navigation services (aPR: 1.41; 95% CI: 1.27–1.56) were associated with not being virally suppressed. We observed a dose response effect between number of unmet needs and all HIV clinical outcomes, although 95% CIs were overlapping. Of all service types and clinical outcomes, having unmet needs for HIV support services had the strongest association with not being retained in care (aPR: 1.62; 95%: 1.46–1.79).

Discussion

Thirty years after establishment of the RWHAP, people with HIV continue to experience unmet needs for HIV ancillary care services; this is especially important for the large proportion of people with HIV experiencing co-occurring conditions or life circumstances that impeded regular medical care. Our findings demonstrate that a substantial proportion of people with HIV continue to experience unmet need for HIV care services and are more likely to experience adverse outcomes along the HIV care continuum.

We found that unmet needs for care were consistently higher among persons with certain demographic characteristics, including race/ethnicity, healthcare coverage, and homelessness. People with HIV who identify as non-White are more likely to live in areas with higher percentages of social determinants of poor health (Johnson Lyons et al., 2021), which could influence access to ancillary care services. Previous studies have demonstrated that people with social determinants of poor health are more likely to have adverse HIV clinical outcomes (Dasgupta et al., 2019; Palepu et al., 2004; Wainwright et al., 2020), and this may be because of unmet needs for related services. Those with non-private insurance coverage, particularly those with no healthcare coverage, were significantly more likely to have unmet needs for subsistence services, such as for assistance with transportation, meals, or housing. It is possible that even with the expansion of healthcare coverage options after the implementation of the Affordable Care Act, a large proportion of people with HIV may have limited healthcare coverage plans that do not fully cover the cost of ancillary care services needed to support health outcomes (National Alliance of State and Territorial AIDS Directors, 2019), although this should be further explored. Because comorbidities among persons with HIV are rising, coverage of multiple types of services may be necessary to fully address the healthcare needs of people with HIV (Gallant et al., 2017).

A number of patient-, practice-, and community-level interventions could be implemented to reduce disparities in ancillary care service access by social determinants of poor health (Andermann & Collaboration, 2016). At the patient level, providers can systematically assess social and structural challenges to accessing services, and link patients to services based on personal circumstances. At the practice level, the RWHAP has laid the groundwork for a comprehensive HIV care model to support patients in engaging in HIV care and address multiple health issues and social determinants of health in a single setting – particularly the most disadvantaged, who may have limited healthcare coverage and access. Provision of care is comprehensive and patient-centered, relying on patient navigators and case managers to ensure proper coordination of care services (Beane et al., 2014; Weiser et al., 2015). Peer navigation services are particularly important for people who may have had interruptions in care due to incarceration, unstable housing, or drug use (Cunningham

et al., 2018). Continuing to support the RWHAP structure by expanding this comprehensive care model to other HIV care facilities could help in improving access to ancillary care services in other non-RWHAP-funded facility settings. At the community level, maintaining strong partnerships with local community groups could be helpful for healthcare providers in connecting patients to services that may not otherwise be available. At a higher structural level, safety net programs, including the RWHAP and Medicaid, could be expanded to cover ancillary care services for more people who experience barriers to accessing services due to cost.

Although not directly assessed in this study, access to ancillary care services could vary geographically – with lower access in less urban areas – and is highly dependent on local service needs and characteristics of the local population of people with HIV (Committee on Review Data Systems for Monitoring HIV Care; Institute of Medicine; Ford MA, 2012; Dasgupta et al., 2016; Kimmel et al., 2018; Masiano et al., 2019). Determining local needs and matching service availability to these needs is critical for addressing disparities in healthcare access and improving HIV care engagement and viral suppression among people with HIV. In addition, stigma or healthcare-related discrimination – which could be related to one's HIV status, need for mental health services, or other risk behaviors – may lead to unmet needs for care and adverse HIV clinical outcomes (Baugher et al., 2019; Christopoulos et al., 2019; Kemnitz et al., 2017). Incorporating anti-discriminatory, anti-stigmatizing policies and practices in healthcare settings, as well as matching service availability to local public health need, may help decrease unmet needs for care.

People experiencing other challenges that have the potential to interrupt HIV care, including history of incarceration, injection drug use, and homelessness, were also more likely to have unmet needs for HIV support services and subsistence services. Further, those with symptoms of depression and generalized anxiety disorder were also more likely to experience unmet needs for all three domains of HIV ancillary care services. Of all ancillary care services, unmet needs for subsistence services, such as SNAP/WIC assistance and housing or shelter assistance, as well as mental health services, were among the highest. Issues related to poverty, homelessness, and mental health issues are pervasive among people with HIV (Beer et al., 2019b; Centers for Disease Control and Prevention, 2020; Pence et al., 2018; Wainwright et al., 2020). People with HIV who experience homelessness may also be more likely to engage in injection drug use and have mental health issues (Wainwright et al., 2020). People with HIV with these characteristics and co-occurring conditions may need additional support to engage in medical care and maintain viral suppression.

Although 95% CIs were overlapping, we observed a dose response effect between number of unmet needs and all outcomes along the HIV continuum of care. Having a greater number of unmet needs for care indicates that HIV patients may be experiencing multiple issues that are not being sufficiently addressed by the healthcare and social service system. Other health issues or life circumstances that impede care, such as mental illness, substance use disorder, or transportation barriers, could complicate HIV care and management, and if not addressed, may lead to worse HIV clinical outcomes. In addition, circumstances that cause

interruptions in care, such as incarceration and housing instability, create additional barriers to care that could be addressed through peer navigation and other HIV support services.

This study is not without limitations. Due to MMP's cross-sectional study design, we could not establish causality and can only describe associations between unmet needs and HIV clinical outcomes. Further, outcomes along the HIV care continuum are highly related to one another and we did not assess associations with outcomes independent of one another. Response rates were suboptimal, but results were adjusted for nonresponse and post-stratified to known population totals by age, race/ethnicity, and gender from the National HIV Surveillance System using established, standard methodology. Finally, because this analysis involved comparisons of multiple comparisons between characteristics and HIV continuum of care outcomes, these results should be interpreted with caution; however, even after taking a conservative approach in adjusting for multiple comparisons, most of the observed associations remained.

Substantial unmet need for HIV support services, non-HIV medical services, and subsistence services persists – especially among those with social determinants of poor health and mental health issues – after three decades of federal efforts to fill these gaps in our healthcare and social service systems. Unmet needs are associated with adverse outcomes along the HIV continuum of care, including retention in care, ART adherence, and viral suppression. Given that health equity for all people with HIV is a national priority (HHS), expanding access to ancillary care services according to local need through the RWHAP comprehensive care model, strengthening partnerships between local providers to connect patients to services that might otherwise not be available, and tailoring services based on individual need, may help reduce disparities in healthcare access, address medical care needs of people with HIV, and improve outcomes along the HIV care continuum.

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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Table 1.

Unmet needs for ancillary care services* by selected characteristics related to social determinants of health, behaviors, and clinical outcomes among adults with diagnosed HIV – United States, 2015–2018 (n = 11,914).

	≥1 HIV support services unmet needs				≥1 non-HIV medical care services unmet needs				≥1 subsistence services unmet needs			
	N	**wted row %**	**Unadjusted PR**	***P***	**n**	**wted row %**	**Unadjusted PR**	***P***	**n**	**wted row %**	**Unadjusted PR**	***P***
Overall	1957	18.3 (17.2–19.4)			3503	30.8 (29.6–32.1)			3287	28.2 (26.8–29.6)		
Age, in years				<0.001†				<0.001†				<0.001†
18–29	182	23.2 (19.2–27.1)	1.45 (1.21–1.74)		349	37.7 (33.9–41.4)	1.34 (1.19–1.51)		330	34.4 (30.1 – 38.8)	1.33 (1.16–1.52)	
30–39	369	21.5 (18.7–24.3)	1.35 (1.15–1.58)		678	35.8 (33.5–38.1)	1.27 (1.18–1.38)		609	31.9 (28.7–35.1)	1.23 (1.12–1.36)	
40–49	505	19.1 (17.5–20.7)	1.20 (1.06–1.35)		868	30.4 (28.4–32.5)	1.08 (1.00–1.17)		837	28.1 (26.3–30.0)	1.09 (1.01–1.18)	
≥50	901	15.9 (14.6–17.3)	Reference		1608	28.2 (26.5–29.8)	Reference		1511	25.9 (24.4–27.4)	Reference	
Gender				<0.001†				0.2460				<0.001†
Male	1341	17.3 (16.1–18.5)	Reference		2513	30.4 (29.1–31.8)	Reference		2203	26.0 (24.4–27.5)	Reference	
Female	587	21.7 (19.5–23.9)	1.25 (1.11–1.42)		925	31.7 (29.7–33.7)	1.04 (0.97–1.12)		1025	35.4 (33.1 – 37.6)	1.36 (1.25–1.48)	
Race/ethnicity				0.001†				<0.001†				<0.001†
White, non-Hispanic	522	16.5 (14.7–18.3)	Reference		895	26.8 (24.9–28.8)	Reference		626	18.5 (16.6–20.4)	Reference	
Black, non-Hispanic	771	17.2 (15.6–18.8)	1.04 (0.92–1.17)		1581	33.1 (31.2–35.0)	1.23 (1.13–1.35)		1684	34.9 (32.9–36.8)	1.88 (1.67–2.12)	
Hispanic/Latino	489	20.8 (17.7–23.8)	1.26 (1.05–1.51)		730	29.6 (26.8–32.4)	1.10 (0.98–1.24)		735	28.2 (26.2–30.2)	1.52 (1.35–1.72)	
Other	175	24.3 (20.5–28.1)	1.47 (1.20–1.81)		297	38.9 (34.9–42.8)	1.45 (1.27–1.66)		242	30.5 (26.8–34.2)	1.65 (1.41–1.93)	
Poverty threshold				0.001†				<0.001†				<0.001†
Above poverty threshold	953	16.8 (15.5–18.1)	Reference		1648	27.5 (26.2–28.8)	Reference		1305	21.4 (19.8–23.0)	Reference	
At or below poverty threshold	876	20.1 (18.3–21.9)	1.20 (1.08–1.33)		1620	34.9 (32.6–37.2)	1.27 (1.18–1.37)		1743	36.3 (34.4–38.2)	1.70 (1.56–1.84)	
Health insurance coverage				<0.001†				<0.001†				<0.001†

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	≥1 HIV support services unmet needs				≥1 non-HIV medical care services unmet needs				≥1 subsistence services unmet needs			
	N	**wted row %**	**Unadjusted PR**	***P***	**n**	**wted row %**	**Unadjusted PR**	***P***	**n**	**wted row %**	**Unadjusted PR**	***P***
Any Private	566	14.5 (13.2–15.9)	Reference		944	23.6 (22.2–25.0)	Reference		672	16.7 (15.1–18.2)	Reference	
Public only, excluding Ryan White/ADAP only	1176	19.4 (17.9–20.9)	1.33 (1.20–1.49)		2105	32.7 (31.0–34.5)	1.39 (1.29–1.49)		2210	33.7 (31.9–35.5)	2.02 (1.84–2.22)	
Ryan White/ADAP only	121	16.3 (12.9–19.6)	1.12 (0.87–1.43)		351	42.8 (38.8–46.8)	1.82 (1.62–2.04)		335	38.0 (34.8–41.3)	2.28 (2.01–2.59)	
No coverage	73	62.1 (50.7–73.5)	4.27 (3.43–5.31)		62	52.3 (42.1–62.6)	2.22 (1.81–2.72)		43	39.3 (27.2–51.3)	2.36 (1.72–3.23)	
Homelessness				<0.001†				<0.001†				<0.001†
Yes	277	28.8 (24.6–33.1)	1.67 (1.43–1.94)		471	47.1 (43.6–50.6)	1.61 (1.48–1.75)		554	53.5 (49.9–57.2)	2.07 (1.93–2.23)	
No	1680	17.3 (16.3–18.3)	Reference		3031	29.3 (28.1 – 30.5)	Reference		2732	25.8 (24.5–27.1)	Reference	
Incarceration				<0.001†				<0.001†				<0.001†
Yes	164	29.0 (24.7–33.3)	1.64 (1.41–1.90)		236	40.6 (35.6–45.6)	1.34 (1.16–1.54)		253	41.7 (36.3–47.2)	1.52 (1.34–1.73)	
No	1792	17.7 (16.7–18.7)	Reference		3266	30.3 (29.0–31.6)	Reference		3033	27.5 (26.1 – 28.8)	Reference	
Drug use				<0.001†				<0.001†				<0.001†
Yes	755	23.8 (21.4–26.2)	1.49 (1.32–1.68)		1394	40.9 (38.8–43.1)	1.55 (1.46–1.65)		1176	33.6 (30.5–36.6)	1.29 (1.18–1.42)	
No	1193	16.0 (14.9–17.0)	Reference		2093	26.4 (25.3–27.6)	Reference		2101	25.9 (24.6–27.3)	Reference	
Injection drug use				<0.001†				<0.001†				0.002†
Yes	100	31.8 (25.1–38.5)	1.77 (1.43–2.19)		167	50.8 (44.6–56.9)	1.67 (1.48–1.89)		142	40.0 (31.4–48.7)	1.44 (1.16–1.77)	
No	1851	17.9 (16.9–19.0)	Reference		3332	30.3 (29.1–31.6)	Reference		3138	27.9 (26.5–29.3)	Reference	
Binge drinking				0.041				<0.001†				0.587
Yes	322	20.7 (18.0–23.4)	1.16 (1.01–1.33)		646	36.8 (34.0–39.6)	1.24 (1.14–1.34)		492	27.5 (24.4–30.5)	0.97 (0.87–1.08)	
No	1624	17.9 (16.8–19.0)	Reference		2831	29.7 (28.5–31.0)	Reference		2766	28.3 (26.9–29.8)	Reference	
Major or other depression				<0.001†				<0.001†				<0.001†

	≥1 HIV support services unmet needs				≥1 non-HIV medical care services unmet needs				≥1 subsistence services unmet needs			
	N	**wted row %**	**Unadjusted PR**	***P***	**n**	**wted row %**	**Unadjusted PR**	***P***	**n**	**wted row %**	**Unadjusted PR**	***P***
Yes	692	31.1 (28.5–33.8)	2.11 (1.89–2.35)		1071	44.3 (41.8–46.8)	1.64 (1.51–1.77)		1067	44.2 (41.8–46.6)	1.86 (1.71–2.02)	
No	1248	14.8 (13.7–15.9)	Reference		2400	27.1 (25.7–28.5)	Reference		2195	23.8 (22.3–25.3)	Reference	
Moderate or severe generalized anxiety disorder				<0.001†				<0.001†				<0.001†
Yes	609	33.3 (30.5–36.0)	2.20 (1.99–2.44)		918	46.7 (44.1–49.3)	1.70 (1.57–1.84)		924	45.9 (43.3–48.5)	1.88 (1.74–2.04)	
No	1335	15.1 (14.1–16.1)	Reference		2569	27.4 (26.1–28.8)	Reference		2353	24.4 (23.0–25.9)	Reference	
Attended RWHAP-funded facility				0.980				0.035				<0.001†
Yes	1255	17.7 (16.4–19.0)	1.00 (0.89–1.13)		2350	31.4 (29.7–33.1)	1.09 (1.01 –1.19)		2419	31.5 (30.0–33.0)	1.49 (1.36–1.64)	
No	578	17.7 (16.1–19.3)	Reference		966	28.7 (26.9–30.5)	Reference		713	21.1 (19.2–23.0)	Reference	

*HIV support services included: HIV case management, medicine through ADAP, adherence support services, HIV peer group support, and patient navigation services. Non-HIV medical services included: dental care, mental health services, and drug or alcohol counseling or treatment. Subsistence services included: Supplemental Nutrition Assistance Program (SNAP) or Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), transportation assistance, meal or food services, and shelter or housing services.

†*P* values statistically significant after Bonferroni correction for multiple comparisons.

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Table 2.

Unmet needs for ancillary care services, overall and by retention in HIV care, ART adherence, and viral load status among adults with diagnosed HIV – United States, 2015–2018 (n = 11,914).

Unmet needs for ancillary care services	Overall		Not retained in care		Adjusted PR	*P*	Not ART adherent		Adjusted PR	*P*	Did not have sustained viral suppression		Adjusted PR	*P*
	n	wted col %	n	wted row %			n	wted row %			n	wted row %		
Total	11,914	100	1,691	20.7 (19.2–22.1)			5162	45.3 (44.1–46.5)			3,825	36.3 (34.6–38.0)		
HIV support service														
HIV case management services														
Yes	761	7.4 (6.6–8.1)	207	40.1 (35.1–45.0)	1.82 (1.58–2.09)	<0.001 *	451	64.3 (59.8–68.8)	1.26 (1.17–1.36)	<0.001 *	334	52.1 (47.5–56.7)	1.28 (1.15–1.41)	<0.001 *
No	11,022	92.6 (91.9–93.4)	1,454	18.9 (17.5–20.4)	Reference		4672	43.7 (42.5–44.8)	Reference		3,422	34.7 (33.0–36.4)	Reference	
Medicine through ADAP														
Yes	341	3.7 (3.2–4.2)	110	47.1 (39.9–54.2)	1.90 (1.57–2.31)	<0.001 *	224	72.2 (66.5–78.0)	1.50 (1.37–1.64)	<0.001 *	160	55.9 (48.1–63.7)	1.36 (1.18–1.57)	<0.001 *
No	11,195	96.3 (95.8–96.8)	1,525	19.6 (18.1–21.0)	Reference		4783	44.1 (42.9–45.3)	Reference		3,520	35.3 (33.6–36.9)	Reference	
Professional help remembering to take HIV medicines on time or correctly (adherence support services)														
Yes	89	0.8 (0.5–1.0)	–	–	–	0.798	60	69.6 (61.2–78.0)	1.40 (1.18–1.67)	0.002	36	40.7 (30.6–50.8)	1.00 (0.79–1.27)	0.978
No	11,696	99.2 (99.0–99.5)	1,626	20.1 (18.8–21.5)	Reference		5054	44.8 (43.6–46.0)	Reference		3,710	35.7 (34.0–37.4)	Reference	
HIV peer group support														

Unmet needs for ancillary care services	Overall		Not retained in care		Adjusted PR	*P*	Not ART adherent		Adjusted PR	*P*	Did not have sustained viral suppression		Adjusted PR	*P*
	n	wted col %	n	wted row %			n	wted row %			n	wted row %		
Yes	861	7.6 (7.0–8.2)	161	27.8 (23.2–32.4)	1.28 (1.09–1.49)	0.003	501	58.7 (54.8–62.7)	1.19 (1.10–1.28)	<0.001 *	330	42.2 (38.5–45.9)	1.07 (0.97–1.19)	0.184
No	10,925	92.4 (91.8–93.0)	1,502	19.9 (18.5–21.4)	Reference		4621	44.1 (42.9–45.3)	Reference		3,427	35.5 (33.7–37.3)	Reference	
Patient navigation service														
Yes	625	6.1 (5.3–6.9)	153	39.7 (32.1–47.3)	1.89 (1.62–2.21)	<0.001 *	368	62.3 (56.3–68.3)	1.26 (1.14–1.39)	<0.001 *	291	54.2 (48.1–60.4)	1.41 (1.27–1.56)	<0.001 *
No	11,161	93.9 (93.1–94.7)	1,512	19.3 (18.0–20.6)	Reference		4752	44.1 (42.9–45.3)	Reference		3,469	34.9 (33.2–36.5)	Reference	
non-HIV medical care service														
Dental care														
Yes	2,765	24.9 (23.6–26.1)	503	26.4 (24.1–28.8)	1.32 (1.19–1.47)	<0.001 *	1509	56.8 (54.6–59.1)	1.24 (1.18–1.31)	<0.001 *	1,090	43.4 (40.7–46.0)	1.18 (1.11–1.26)	<0.001 *
No	9,063	75.1 (73.9–76.4)	1,168	18.6 (17.1–20.1)	Reference		3636	41.4 (40.1–42.7)	Reference		2,685	33.6 (31.8–35.4)	Reference	
Mental health service														
Yes	1,069	9.5 (8.8–10.1)	204	27.7 (24.2–31.2)	1.29 (1.13–1.48)	<0.001 *	645	62.6 (58.7–66.5)	1.27 (1.18–1.38)	<0.001 *	437	45.8 (42.0–49.6)	1.18 (1.09–1.28)	<0.001 *
No	10,724	90.5 (89.9–91.2)	1,462	19.8 (18.3–21.2)	Reference		4477	43.4 (42.1–44.6)	Reference		3,324	35.0 (33.3–36.7)	Reference	
Drug or alcohol counseling or treatment														
Yes	257	2.2 (1.9–2.5)	52	29.9 (22.0–37.9)	1.23 (0.96–1.56)	0.112	181	73.8 (67.0–80.6)	1.40 (1.24–1.60)	<0.001 *	120	54.9 (47.4–62.4)	1.32 (1.12–1.57)	0.003
No	11,563	97.8 (97.5–98.1)	1,617	20.3 (18.8–21.8)	Reference		4958	44.6 (43.4–45.8)	Reference		3,651	35.6 (33.9–37.3)	Reference	

Unmet needs for ancillary care services	Overall		Not retained in care		Adjusted PR	*P*	Not ART adherent		Adjusted PR	*P*	Did not have sustained viral suppression		Adjusted PR	*P*
	n	wted col %	n	wted row %			n	wted row %			n	wted row %		
Subsistence services														
SNAP or WIC														
Yes	1,454	12.4 (11.5–13.3)	239	23.8 (20.9–26.8)	1.13 (0.99–1.30)	0.083	733	52.3 (49.1–55.5)	1.10 (1.03–1.17)	0.007	550	40.4 (36.8–44.0)	1.06 (0.97–1.16)	0.171
No	10,363	87.6 (86.7–88.5)	1,431	20.1 (18.6–21.5)	Reference		4407	44.2 (43.0–45.4)	Reference		3,220	35.4 (33.7–37.1)	Reference	
Transportation assistance														
Yes	983	8.4 (7.8–9.1)	186	27.5 (23.5–31.5)	1.25 (1.08–1.44)	0.003	556	58.8 (54.7–62.9)	1.15 (1.07–1.25)	0.001*	415	46.1 (42.6–49.6)	1.15 (1.05–1.26)	0.003
No	10,841	91.6 (90.9–92.2)	1,485	19.9 (18.4–21.4)	Reference		4588	44.0 (42.8–45.2)	Reference		3,360	35.1 (33.3–36.9)	Reference	
Meal or food service														
Yes	1,040	8.9 (8.0–9.8)	149	19.5 (15.9–23.2)	0.95 (0.78–1.16)	0.621	561	55.8 (51.7–60.0)	1.16 (1.07–1.25)	0.001*	408	40.9 (37.1–44.7)	1.06 (0.95–1.18)	0.337
No	10,777	91.1 (90.2–92.0)	1,521	20.7 (19.1–22.2)	Reference		4580	44.2 (43.0–45.4)	Reference		3,364	35.6 (33.7–37.4)	Reference	
Shelter or housing service														
Yes	1,408	12.1 (11.0–13.2)	276	27.1 (23.9–30.2)	1.26 (1.10–1.44)	0.001*	782	57.5 (54.7–60.3)	1.14 (1.06–1.22)	<0.001*	604	47.1 (43.7–50.6)	1.18 (1.09–1.28)	<0.001*
No	10,407	87.9 (86.8–89.0)	1,395	19.7 (18.1–21.2)	Reference		4358	43.6 (42.2–44.9)	Reference		3,168	34.5 (32.7–36.3)	Reference	
Number of unmet needs														
0	5,535	45.7 (44.5–47.0)	682	17.6 (15.8–19.3)	Reference		1946	36.3 (34.8–37.9)	Reference		1,474	30.7 (28.7–32.8)	Reference	

Unmet needs for ancillary care services	Overall		Not retained in care		Adjusted PR	*P*	Not ART adherent		Adjusted PR	*P*	Did not have sustained viral suppression		Adjusted PR	*P*
	n	wted col %	n	wted row %			n	wted row %			n	wted row %		
1	2,695	22.6 (21.6–23.7)	356	19.5 (17.0–21.9)	1.11 (0.96–1.29)	0.155	1217	47.2 (44.9–49.6)	1.21 (1.13–1.28)	<0.001*	840	34.8 (32.2–37.4)	1.07 (0.99–1.16)	0.090
2	1,514	12.9 (12.2–13.7)	227	21.4 (18.4–24.4)	1.21 (1.04–1.40)	0.014	761	51.2 (48.1–54.2)	1.24 (1.15–1.33)	<0.001*	570	41.3 (38.3–44.3)	1.21 (1.11–1.32)	<0.001*
≥3	2,097	18.7 (17.6–19.9)	409	28.7 (26.2–31.2)	1.51 (1.35–1.69)	<0.001*	1229	60.7 (58.4–63.1)	1.39 (1.32–1.48)	<0.001*	897	47.1 (44.3–49.9)	1.32 (1.23–1.42)	<0.001*
Service type														
HIV support service														
≥1 unmet need	1,957	18.3 (17.2–19.4)	414	31.8 (28.6–35.1)	1.62 (1.46–1.79)	<0.001*	1122	59.8 (57.0–62.7)	1.27 (1.21–1.34)	<0.001*	763	44.9 (41.8–48.0)	1.18 (1.09–1.27)	<0.001*
0 unmet needs	9,800	81.7 (80.6–82.8)	1,240	17.9 (16.5–19.3)	Reference		3998	42.0 (40.7–43.2)	Reference		2,990	34.0 (32.3–35.7)	Reference	
Non-HIV medical care service														
≥1 unmet need	3,503	30.8 (29.6–32.1)	611	25.5 (23.5–27.5)	1.29 (1.18–1.42)	<0.001*	1924	57.0 (55.0–59.1)	1.27 (1.21–1.34)	<0.001*	1,350	42.8 (40.3–45.3)	1.18 (1.11–1.25)	<0.001*
0 unmet needs	8,325	69.2 (67.9–70.4)	1,060	18.4 (16.8–19.9)	Reference		3221	40.0 (38.7–41.3)	Reference		2,426	33.0 (31.3–34.8)	Reference	
Subsistence service														
≥1 unmet need	3,287	28.2 (26.8–29.6)	548	23.9 (21.5–26.3)	1.19 (1.07–1.32)	0.001*	1701	53.8 (51.4–56.2)	1.14 (1.08–1.20)	<0.001*	1,303	43.1 (41.1–45.1)	1.16 (1.09–1.23)	<0.001*
0 unmet needs	8,527	71.8 (70.4–73.2)	1,120	19.2 (17.7–20.6)	Reference		3442	41.9 (40.7–43.2)	Reference		2,468	33.2 (31.3–35.2)	Reference	

Notes: Estimates with a coefficient of variation ≥ 0.30, and associated statistical testing results, are suppressed due to unreliability. Associations were adjusted for healthcare coverage, incarceration in the past 12 months, race/ethnicity, age at the time of interview, and report of any drug use in the past 12 months.

***P* values statistically significant after Bonferroni correction for multiple comparisons.