Title

Among patients with unhealthy alcohol use, those with HIV are less likely than those without to receive evidence-based alcohol-related care: A national VA study.

Authors

Williams, Emily C
Lapham, Gwen T
Shortreed, Susan M
et al.

Publication Date

2017-05-01

DOI

10.1016/j.drugalcdep.2017.01.018

Peer reviewed

HHS Public Access

Author manuscript

Drug Alcohol Depend. Author manuscript; available in PMC 2018 May 01.

Published in final edited form as:

Drug Alcohol Depend. 2017 May 01; 174: 113–120. doi:10.1016/j.drugalcdep.2017.01.018.

Among patients with unhealthy alcohol use, those with HIV are less likely than those without to receive evidence-based alcohol-related care: A national VA study*

Emily C. Williams[1,3,6], **Gwen T. Lapham**[1,6], **Susan M. Shortreed**[6,7], **Anna D. Rubinsky**[1,8], **Jennifer F. Bobb**[6], **Kara M. Bensley**[1,3], **Sheryl L. Catz**[5], **Julie Richards**[3,6], and **Katharine A. Bradley**[1,2,3,4,6]

[1]Health Services Research and Development (HSR and D) Veterans Affairs (VA) Puget Sound Health Care System, Center of Innovation for Veteran-Centered Value-Driven Care (COIN) Veterans Affairs (VA) Puget Sound Health Care System, Seattle, WA

[2]Center of Excellence in Substance Abuse Treatment and Education (CESATE) Veterans Affairs (VA) Puget Sound Health Care System – Seattle Division; Seattle, WA

[3]Department of Health Services, University of Washington; Seattle, WA

[4]Department of Medicine, University of Washington, Seattle, WA

---

* Supplementary material can be found by accessing the online version of this paper at http://dx.doi.org and by entering doi:...

Address correspondence to: Emily C. Williams; VA Puget Sound Health Care System; 1660 S. Columbian Way, S-152; Seattle, WA 98108; PHONE (206) 277-6133; FAX (206) 764-2935; Email: emily.williams3@va.gov.

Contributors

This study was led my multiple PIs, Dr. Williams and Dr. Bradley. Dr. Williams served as lead principal investigator of the study and guided all stages of study design, analysis, interpretation and presentation. Drs. Bobb and Shortreed guided the data request and analysis; Dr. Rubinsky obtained and managed the data; Dr. Lapham conducted all analyses. Ms. Richards managed the study; Ms. Bensley contributed to literature search. Drs. Bradley and Catz contributed senior expertise regarding alcohol-related care and HIV, respectively. All authors contributed to study design, protocol development, and data interpretation and participated in iterative review of data analysis and presentation. Dr. Williams served as lead writer of the manuscript, and all authors contributed to and have approved the final manuscript.

Conflict of Interest

Dr. Shortreed worked on a grant awarded to Group Health Research Institute (GHRI) by Pfizer to evaluate a risk reduction initiative for long-term opioid therapy patients. She is also a co-Investigator on a grant awarded to GHRI from the Campbell Alliance, a consortium of pharmaceutical companies carrying out FDA-mandated studies regarding the safety of extended release opioids. Dr. Bradley owns stock in Pfizer Pharmaceuticals. All other authors declare no potential conflicts of interest.

Disclaimer

Views expressed in this article are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs, the United States Government, the University of Washington, the University of California or the Group Health Research Institute.

Author Disclosures

Role of Funding Source

This research was funded by a grant from the National Institute on Alcohol Abuse and Alcoholism (R21AA022866-01; Williams/Bradley PIs). Dr. Williams is supported by a Career Development Award from VA Health Services Research & Development (CDA 12-276), and Dr. Bradley is supported by a mid-career mentorship award from NIAAA (K24-AA022128).

A final version of the manuscript was approved for submission by VA Research & Development. However, the funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

[5]Betty Irene Moore School of Nursing, University of California at Davis, Sacramento, CA

[6]Group Health Research Institute, Seattle, WA

[7]Department of Biostatistics, University of Washington, Seattle, WA

[8]Kidney Health Research Collaborative, University of California, San Francisco and San Francisco VA Medical Center, San Francisco, CA

Abstract

Background—Alcohol use has important adverse effects on people living with HIV (PLWH). This study of patients with recognized unhealthy alcohol use estimated and compared rates of alcohol-related care received by PLWH and HIV− patients.

Methods—Outpatients from the Veterans Health Administration who had one or more positive screen(s) for unhealthy alcohol use (AUDIT-C≥5) documented in their medical records 10/2009–5/2013 were eligible. Primary and secondary outcomes were brief intervention documented ≤14 days after a positive alcohol screen, and a composite measure of any alcohol-related care (brief intervention, specialty addictions treatment or pharmacotherapy documented ≤365 days), respectively. Unadjusted and adjusted regression analyses compared alcohol-related care outcomes in PLWH and HIV− patients.

Results—The sample included 830,825 outpatients (3,514 PLWH), reflecting 1,172,606 positive screens (1–5 per patient). For PLWH, 57.0% (95% confidence interval 55.4–58.5%) of positive screens were followed by brief intervention, compared to 73.8% (73.7–73.9%) for HIV− patients [relative rate: 0.77 (0.75–0.79), p<0.001]. After adjustment, comparable proportions were 61.0% (59.3–62.6%) for PLWH and 73.7% (73.6–73.8%) for HIV− patients [adjusted RR=0.83 (0.80–0.85); p<0.001]. Secondary outcome results were similar: for PLWH and HIV− patients, 67.1% (65.7–68.6%) and 77.7% (95% CI 77.7–77.8%) of positive screens, respectively, were followed by any alcohol-related care after adjustment [adjusted RR=0.86 (0.85 – 0.88), p<0.001].

Conclusions—In this large national sample of VA outpatients with unhealthy alcohol use, PLWH were less likely to receive alcohol-related care than HIV− patients. Special efforts may be needed to ensure alcohol-related care reaches PLWH.

Keywords

Alcohol; HIV; Brief intervention; Alcohol Use Disorders; Disparities

1.0 Introduction

Alcohol use is associated with over 60 medical conditions and adversely impacts health in diverse ways (Rehm et al., 2010). Alcohol screening followed by brief intervention for patients screening positive for unhealthy alcohol use are recommended for all adult primary care patients (National Institute on Alcohol Abuse and Alcoholism, 2007) and were designated as essential benefits under health care reform (HealthCare.gov, 2013a, 2013b) based on efficacy trials demonstrating decreased drinking among primary care patients (Jonas et al., 2012). For patients with the most severe unhealthy alcohol use—alcohol use

disorders—specialty addictions treatment and/or pharmacotherapy are effective and recommended (National Institute on Alcohol Abuse and Alcoholism, 2007).

Human immunodeficiency virus (HIV) is now a chronic disease (Taddei et al., 2016) that is negatively influenced by alcohol use in multiple ways (Conigliaro et al., 2006; Williams et al., 2016b), including decreased engagement with and retention in HIV care (Hendershot et al., 2009; Monroe et al., 2016; Vagenas et al., 2015), complications of common comorbid conditions (Bryant et al., 2010; Freiberg et al., 2010; Gonzalez-Reimers et al., 2011; Neuman et al., 2012; Sarkar et al., 2015), increased frailty (Justice et al., 2016), and poorer survival (Justice et al., 2016). Further, evidence suggests that, at similar levels of drinking, alcohol use may have greater negative influences on patients living with HIV (PLWH) than HIV− patients, including such patients' being more likely to "feel a buzz" and having a higher risk for mortality and frailty (Justice et al., 2016; McGinnis et al., 2016). Therefore, receiving evidence-based alcohol-related care may be particularly important for PLWH.

Despite increased risks of unhealthy alcohol use for PLWH, little is known about whether unhealthy alcohol use is appropriately addressed among PLWH (Conigliaro et al., 2003; Metsch et al., 2008). While previous studies have suggested gaps in the quality of alcohol-related care provided to PLWH with unhealthy alcohol use (Conigliaro et al., 2003; Korthuis et al., 2011; Metsch et al., 2008; Strauss et al., 2009), they did not compare receipt of alcohol-related care among those with and without HIV. Moreover, they were conducted in small (Chander et al., 2016) and/or recruited (Chander et al., 2016; Conigliaro et al., 2003; Metsch et al., 2008) samples and in settings that had not yet implemented routine alcohol screening and brief intervention. However, even in settings with routine implementation of alcohol-related care for unhealthy alcohol use, PLWH may be less likely to receive recommended alcohol-related care than HIV− patients due to the complex care needs of PLWH and/or the possibility that HIV specialty care providers might be less prepared to address unhealthy alcohol use than generalist providers (Strauss et al., 2009). On the other hand, PLWH are recommended to have regular and frequent visits to manage their HIV (The White House, 2013; U.S. Department of Health and Human Services, 2016). Because frequent visits may offer increased opportunities to receive alcohol-related care, PLWH may be more likely to receive alcohol-related care than HIV− patients with less frequent visits.

The objective of this study was to estimate and compare rates of alcohol-related care received by PLWH and HIV− patients with recognized unhealthy alcohol use. We conducted this study in the Veterans Health Administration (VA), which is the largest provider of HIV care in the U.S. (Department of Veterans Affairs, 2010; Fultz et al., 2006) and has been recognized as a leader among healthcare systems in implementing alcohol screening and brief intervention (Moyer and Finney, 2010; Williams et al., 2011). Results of this study can help determine whether special efforts are needed to reach PLWH with unhealthy alcohol use when health systems implement screening and brief interventions for unhealthy alcohol use.

2.0 Methods

2.1 Setting, Data Source, and Sample

The nationwide VA includes 139 large facilities and over 900 clinics nationally. As a result of national performance measures that are linked to financial incentives for network directors (Kerr and Fleming, 2007), VA implemented alcohol screening in 2004 (Bradley et al., 2006) and brief intervention for patients screening positive for unhealthy alcohol use in 2007 (Lapham et al., 2012). VA's performance measures require annual screening with the validated Alcohol Use Disorders Identification Test Consumption (AUDIT-C) questionnaire (Bradley et al., 2006) and brief intervention consisting of advice to reduce or abstain from drinking and feedback linking alcohol use to health documented within 14 days of a positive screen for all patients with AUDIT-C scores≥5 (Lapham et al., 2012). To support facilities' meeting performance measures, clinical decision support tools embedded in the electronic health record (EHR) prompt VA providers to offer alcohol screening and brief interventions. Prompts for screening become "active" 9 months after the last AUDIT-C to catch patients whose annual appointments occur earlier than 12 months and prompts for brief interventions become active immediately following a positive screen (Bradley et al., 2006; Lapham et al., 2012; Williams et al., 2014). Consistent with the epidemiology of HIV in the U.S., PLWH at VA are disproportionately distributed across regions in the VA, but are included among patients receiving care at all VA medical centers (U.S. Department of Veteran Affairs, 2009).

VA EHR data from VA Informatics and Computing Infrastructure (VINCI) – a national VA data repository that contains clinical, enrollment, financial, administrative, pharmacy, and utilization data, Veteran benefits information, and more—were extracted for all patients who had any outpatient appointment between 10/1/09 and 5/30/13 and had one or more positive alcohol screens documented in the EHR at any time during the study period. Positive screens were defined as AUDIT-C scores ≥ 5, consistent with the VA's performance measure for brief intervention (Lapham et al., 2012; Williams et al., 2014). To maximize generalizability, patients could contribute multiple positive screens during the study period. However, only positive screens that were not preceded by another screen in the 9 months prior were included in order to obtain a sample of positive screens resulting from routine annual screening. Each positive screen was followed for up to one year (until 5/30/14) to assess outcomes. The study protocol, including waivers of written consent and HIPAA authorization, was approved by the VA Puget Sound Institutional Review Board.

2.2 Measures

2.2.1 Primary Independent Variable—HIV status was based on diagnostic codes from the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) in the 0–730 days prior to a positive AUDIT-C. Consistent with prior research (Fultz et al., 2006), patients who had 2 outpatient or 1 inpatient diagnosis code(s) for AIDS (042) and/or HIV infection (V08) were considered to be PLWH.

2.2.2 Outcomes—The primary outcome of interest was receipt of brief intervention in the 0–14 days following a positive screen consistent with the VA's performance measure for brief intervention. Brief intervention was measured based on text data that is generated when

care is documented in response to an EHR clinical reminder (McGinnis et al., 2011). Consistent with our previous studies, (Bradley et al., 2013; Lapham et al., 2015; Williams et al., 2014) documentation of any advice to reduce and/or abstain from drinking in the 0–14 days following a positive screen was considered receipt of brief intervention. Advice to reduce and/or abstain from drinking is a key component of evidence-based brief intervention that is incentivized by the VA's performance measure for brief intervention (Lapham et al., 2015; Whitlock et al., 2004).

Secondary outcomes were measured in the 0–365 days following a positive screen and included receipt of specialty addictions treatment measured based on visit codes for inpatient or outpatient addiction treatment (Williams et al., 2014); receipt of alcohol use disorder (AUD) medications measured as any filled prescription for acamprosate, disulfiram, topiramate, or oral or injectable naltrexone (Harris et al., 2010) based on the date the medication was dispensed (in the case of inpatients) or filled/picked up at a VA pharmacy or mailed (in the case of outpatients); and a dichotomous composite measure of any alcohol-related care measured based on documentation of any brief intervention, specialty addictions treatment, or AUD medications. Because multiple brief interventions may be more effective than single brief interventions (Jonas et al., 2012), the number of brief interventions received was measured based on the count of documented brief interventions in the 0–365 days following a positive screen.

2.2.3 Covariates—Gender, age, marital status, and race/ethnicity are all associated with both HIV and receipt of brief intervention (Burman et al., 2004; Pellowski et al., 2013; Williams et al., 2012) and were measured based on documentation in the EHR at the time of a positive screen. Eligibility for VA co-payments was used as a possible indicator of socio-economic status (Williams et al., 2012; Young et al., 2003). Because rates of brief intervention changed over time (Lapham et al., 2012), an indicator of fiscal year of positive AUDIT-C screen was constructed for each positive screen.

Due to strong associations between severity of unhealthy alcohol use and receipt of brief intervention (Burman et al., 2004; Volk et al., 1996), three measures of severity of unhealthy alcohol use were derived. AUDIT-C risk group (scores 5–8 vs. 9–12) was derived for each positive AUDIT-C (Rubinsky et al., 2013). Diagnoses for alcohol use disorders (e.g., abuse or dependence) and alcohol-attributable medical conditions (e.g., alcoholic cirrhosis) were each measured dichotomously (any vs none) based on ICD-9-CM codes (Appendix B[1]) documented 0–365 days prior to each positive alcohol screen. Tobacco use was based either on an ICD-9-CM code for tobacco use disorder or EHR text data indicating current smoker status (McGinnis et al., 2011) documented 0–365 days before each positive alcohol screen. Mental health and other non-alcohol substance use disorders were measured based on ICD-9-CM diagnostic codes documented 0–365 days prior to each positive screen and included: depressive disorders, posttraumatic stress disorder (PTSD), other anxiety disorders, other mood disorders, serious mental illness (schizophrenia, bipolar, and/or psychosis), stimulant use disorders (amphetamine and/or cocaine use disorders), opioid use disorders, and other drug use disorders (cannabis, hallucinogens and/or sedative). Outpatient

[1]Supplementary material can be found by accessing the online version of this paper at http://dx.doi.org and by entering doi:...

and inpatient healthcare utilization were measured in the 0–365 days prior to each positive alcohol screen and categorized based on their distributions in the data as: 0, 1–4, 5–10, 11–24, and ≥ 25 outpatient visits, and 0, 1, 2–3, and ≥ 4 inpatient days.

2.3 Analyses

Patient-level analyses using each patient's first positive AUDIT-C screen during the study period describe patient characteristics overall and for PLWH and HIV− patients; Chi square tests of independence assessed differences in the distribution of characteristics between the two groups.

With positive screens as the unit of analysis, modified Poisson regression models (Zou, 2004) were used to estimate the relative rate and 95% confidence intervals (CIs) of the primary and secondary outcomes for PLWH compared to HIV− patients while accounting for correlated data within patients. Poisson, as opposed to logistic, regression models were used to estimate relative rates because outcomes were expected to be common (Greenland, 1995; Zou, 2004). Standard errors were calculated using the robust sandwich estimator to account for correlation between screens recorded on the same patient over time and to account for the misspecification of the variance structure in the Poisson model (Greenland, 1995; Liang and Zeger, 1986; Zou, 2004). Marginal predictions (and 95% CIs) assuming the same covariate distribution in the PLWH and HIV− populations were calculated to describe the estimated prevalence of each dichotomous outcome, and the estimated mean number of brief interventions received, among PLWH and HIV− patients. The main adjusted model accounted for factors expected to confound the association between receipt of alcohol-related care and HIV, including socio-demographic characteristics, fiscal year of the positive screen, severity of alcohol use, and mental health and non-alcohol substance use disorders. An additional adjusted model also included both outpatient and inpatient utilization as covariates to assess if accounting for differential utilization among PLWH and HIV− patients changed findings.

Because specialty addictions treatment and medications are specifically indicated for patients with AUD (National Institute on Alcohol Abuse and Alcoholism, 2007), secondary analyses assessing receipt of specialty addictions treatment, AUD medications, and the composite outcome of any alcohol-related care (any brief intervention, specialty treatment, or medications) were conducted among the sub-sample of patients who had a documented diagnosis for AUD in the 0–365 days prior to a positive screen. Both descriptive analyses and regression models were repeated to estimate differences in these outcomes among PLWH and HIV− patients in this subsample.

Sensitivity analyses were conducted to assess whether conducting analyses at the patient level rather than the screen level altered results. All models were re-estimated at the patient level using only one screen per patient, with two approaches to selecting the screen: one approach selected a random positive screen for each patient with repeated positive screens; the other selected each patient's first positive screen in the study period.

All analyses were conducted using Stata 13 software (StataCorp., 2013).

3.0 Results

Between October 1, 2009 and May 30, 2013, 830,825 patients screened positive for unhealthy alcohol use (AUDIT-C ≥ 5), with 1,172,606 positive alcohol screens documented in the EHR. Mean number of screens per patient was 1.37 (median 1; interquartile range 1–2). Among all patients, 3,514 (0.4%) had documented HIV, contributing 4,649 positive screens to the analyses. Number of screens was similar across HIV status (mean 1.37, median 1, interquartile range 1–2 for HIV-; mean 1.35, median 1, interquartile range 1–4 for PLWH). Characteristics of patients at the time of their first positive screen are presented in Table 1, both overall and across HIV status. The prevalence of all characteristics differed significantly across HIV status (all p-values <0.001). PLWH were more likely than HIV− patients to be male, ages 30–64, black, unmarried, to have more severe unhealthy alcohol use including AUD, and to have mental health and other non-alcohol substance use disorders with the exception of PTSD, which was more common among HIV− patients.

For PLWH, 57.0% (95% confidence interval 55.4–58.5%) of positive screens were followed by brief intervention, compared to 73.8% (73.7–73.9%) for HIV− patients [relative rate: 0.77 (0.75–0.79), p<0.001] (Table 2). After adjustment, comparable proportions were 61.0% (59.3–62.6%) for PLWH and 73.7% (73.6–73.8%) for HIV− patients [adjusted RR=0.83 (0.80–0.85); p<0.001] (Table 2). Further adjustment for utilization attenuated differences slightly, but results were largely unchanged (Table 2).

Results for the secondary outcomes were similar: For PLWH and HIV− patients, 67.1% (65.7–68.6%) and 77.7% (95% CI 77.7–77.8%) of positive screens, respectively, were followed by any alcohol-related care after adjustment for covariates [adjusted RR=0.86 (0.85 – 0.88), p<0.001] (Table 2). The mean number of brief interventions documented was lower among PLWH than HIV− patients, and, although receipt of both specialty addictions treatment and AUD medications were more common among PLWH than HIV− in unadjusted models, these findings reversed after accounting for group differences (Table 2).

Findings from secondary analyses conducted among the sub-sample of patients who additionally had a clinically recognized AUD (cohort described in Appendix A[2]) were consistent. Among positive screens with a documented AUD, PLWH were less likely than HIV− patients to receive alcohol-related care for all measures after adjustment (Table 3).

All findings were unchanged in sensitivity analyses using one screen per patient, which were conducted to assess whether including only one positive screen per patient altered results.

4.0 Discussion

Despite the impact of unhealthy alcohol use on HIV-related care and outcomes, in this sample of over 800,000 VA outpatients who screened positive for unhealthy alcohol use, PLWH were less likely than HIV− patients to have recommended alcohol-related care documented in their EHRs. Specifically, in primary analyses, PLWH were 17% less likely than HIV− patients to have a documented brief intervention in the 14 days following a

[2]Supplementary material can be found by accessing the online version of this paper at http://dx.doi.org and by entering doi:...

positive screen for unhealthy alcohol use, and 14% less likely to have any alcohol-related care documented in the year after a positive screen, even after accounting for measured differences in the two populations.

Three previous studies have also identified room for improvement in receipt of alcohol-related care among PLWH with unhealthy alcohol use (Chander et al., 2015; Conigliaro et al., 2003; Metsch et al., 2008). In a sample of 881 PLWH from 3 VA HIV clinics, recruited prior to implementation of routine screening and brief intervention in the VA, Conigliaro et al. found that providers were often unaware of their patients' unhealthy alcohol use (Conigliaro et al., 2003). Similarly, Metsch et al. found that among 1,225 PLWH from 10 clinics in three U.S. cities, only 52% of those with unhealthy alcohol use reported discussing alcohol use with their providers (Metsch et al., 2008). Finally, in a survey of 158 HIV care providers from 8 U.S. clinics, few providers reported provision of evidence-based alcohol-related care (Chander et al., 2016). Our study, in a large national sample of patients receiving care across the U.S., builds on these studies' findings by suggesting that not only is unhealthy alcohol use often not addressed as part of HIV care, it is *disproportionately under-addressed* among PLWH compared to HIV− patients, even in a healthcare system in which brief intervention is expected to be routinely offered to all outpatients with unhealthy alcohol use annually (Bradley et al., 2006; Lapham et al., 2012; Williams et al., 2011). Despite the myriad risks of alcohol use for PLWH (Williams et al., 2016b)—ranging from HIV transmission (Scott-Sheldon et al., 2016; Shuper et al., 2010) to poor engagement with and outcomes of HIV treatment (Hahn and Samet, 2010; Hendershot et al., 2009; Monroe et al., 2016; Vagenas et al., 2015) and greater prevalence and complications of common comorbid conditions (National Institutes of Health, 2015)—and research suggesting that at similar levels of alcohol use, alcohol's influence on health may be greater for PLWH relative to HIV − patients (Justice et al., 2016; McGinnis et al., 2016), PLWH were less likely than HIV− to receive evidence-based alcohol-related care.

While reasons for the observed differences in receipt of alcohol-related care are unknown, several factors likely contribute. First, it is likely that many PLWH receive their care in HIV or Infectious Disease clinics rather than in primary care. Provider practices, attitudes, and training regarding provision of alcohol-related care may differ in these clinics from those in general primary care clinics. A previous study of 112 HIV care providers from 7 hospital-based care centers in New York City found that the majority of providers had not received any training regarding alcohol brief intervention and that many providers reported low levels of "role legitimacy" for supporting their patients in reducing their alcohol use (Strauss et al., 2009). In an audiotape study of 434 patients and 45 providers recruited from HIV clinics in four geographically-dispersed U.S. cities, the quality of patient-provider communication was worse for patients with unhealthy alcohol use than those without (Korthuis et al., 2011). It may also be that documentation practices—including the proclivity to use EHR clinical reminders to document alcohol counseling—vary across types of providers or clinics. For instance, we measured brief intervention documented using a clinical reminder embedded in the EHR, and it is possible that HIV providers were less likely than general medicine providers to document brief interventions using clinical decision support. HIV providers might also view other, more biomedical, domains of care as more important. One study among 66 patients with HIV and 110 HIV care providers found that both patients and

providers perceived alcohol use as a low priority for HIV clinical care relative to other domains of care (Fredericksen et al., 2015).

Finally, gaps in alcohol-related care for PLWH may also be due to the complexity of PLWH who, in this study, were more likely to have mental health and other substance use disorders and to reflect populations particularly vulnerable to poor health, such as racial/ethnic minorities (Pellowski et al., 2013). However, findings from this study do not entirely support that the clinical complexity of PLWH may be a deterrent. Specifically, despite greater mental health and substance use comorbidity and greater representation of social vulnerabilities, PLWH were *more, not less,* likely than those without HIV to receive specialty addictions treatment and AUD medications with associations reversing only after adjustment. While it could be that other indications for treatment (e.g., mental health disorders) entirely accounted for differences, it could also be that patient characteristics that are disproportionately represented among PLWH are important determinants of receiving alcohol-related care. If the latter, patient complexity may not be a deterrent to provision of care. Further research is needed in HIV-specific care settings to understand causes of these observed gaps.

Targeted efforts may be required to ensure PLWH receive appropriate alcohol-related care. Since preventive brief interventions are most often provided in primary care, specialty HIV providers might need training in why and how to provide brief interventions (Strauss et al., 2009). Clinicians may be unaware of the effectiveness of brief interventions for reducing alcohol consumption, and the potentially greater impact of repeated brief interventions (Jonas et al., 2012), which could be integrated into HIV care given the frequency of visits. Such interventions typically include expressions of concern and feedback that drinking might be harming a patient's health, followed by advice and eliciting the patient's response (Saitz, 2005). For example, an HIV provider might say, "People often forget to take their medications after drinking, and alcohol can impact the immune system. I'm concerned that your drinking might be contributing to your forgetting to take your medications, which could worsen control of your HIV. Recommended limits for men are no more than 14 drinks a week on average and never over 4 standard sized drinks in a day (7 drinks a week and 3 in a day for women). Is cutting down your drinking something you would consider?" In addition, clinic-level interventions targeting the settings in which patients receive care could be developed. Given the many competing demands of HIV care, as well as the fact that HIV patients receive care in specialty treatment settings, it may be that targeting HIV specialists at a systems level, e.g., different types of EHR notifications or nurse-pharmacy-based interventions (Oslin et al., 2014) could improve provision of alcohol-related care. Similarly, unique approaches, such as training social workers or other HIV care team members to offer evidence-based alcohol-related care (Mertens et al., 2015), or use of mobile health technology (Hasin et al., 2014), might also increase the delivery of alcohol-related care to PLWH.

This study has several limitations. While use of EHR data enabled a large evaluation comparing receipt of alcohol-related care in a national sample of PLWH and HIV− patients, such data also has limitations. These data were used to identify PLWH based on diagnoses that were documented proximally (within two years prior) to AUDIT-C screening.

Therefore, HIV diagnoses that were only documented prior to the beginning of the study period (and not at subsequent visits) were missed, which would have resulted in misclassification. However, in the VA, diagnoses are documented at each encounter (and often “carried forward”), so it is unlikely that HIV would be missed. Additionally, our primary outcome was measured using data that results from documentation in electronic clinical decision support embedded in the EHR (Williams et al., 2014). This measure may not be reflective of the care actually provided (Williams et al., 2016a) and, similar to other process measures of care based on documentation in the EHR, is not a reflection of the quality of brief intervention offered. Notably, brief intervention documented outside of clinical reminders may have been missed. While providers across the VA are expected to use clinical reminders (Kerr and Fleming, 2007), if documentation practices varied systematically between HIV and other clinics, with HIV clinic providers less likely to use EHR clinical reminders, it could have contributed to observed results. Covariates relied on measures available in EHRs and residual confounding based on unmeasured differences between PLWH and HIV− patients is also possible. Finally, generalizability of results may be limited due to the VA sample. However, the VA is the largest provider of HIV care in the US and a leader in implementation of alcohol-related care (Williams et al., 2011).

This national study highlights important gaps in documented alcohol-related care for PLWH in a health system with high rates of routine alcohol screening and brief intervention (Williams et al., 2011). Findings suggest that—even in systems with population-based implementation of alcohol screening and brief interventions—specific efforts targeting PLWH will likely be necessary to ensure that alcohol-related interventions reach this vulnerable population of patients with unhealthy alcohol use for whom the risks of alcohol use are particularly grave.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

No further acknowledgments are listed beyond those listed in the manuscript and above.

References

Bradley KA, Chavez LJ, Lapham GT, Williams EC, Achtmeyer C, Rubinsky AD, Hawkins EJ, Saitz R, Kivlahan DR. When quality indicators undermine quality: Bias in a quality indicator of follow-up for alcohol misuse. Psychiatr Serv. 2013; 64:1018–1025. DOI: 10.1176/appi.ps.201200449 [PubMed: 23852137]

Bradley KA, Williams EC, Achtmeyer CE, Volpp B, Collins BJ, Kivlahan DR. Implementation of evidence-based alcohol screening in the Veterans Health Administration. Am J Manag Care. 2006; 12:597–606. [PubMed: 17026414]

Bryant KJ, Nelson S, Braithwaite RS, Roach D. Intergrating HIV/AIDS and alcohol research. Alcohol Res Health. 2010; 33:167–178. [PubMed: 23584058]

Burman ML, Kivlahan DR, Buchbinder MB, Broglio K, Zhou XH, Merrill JO, McDonell MB, Fihn SD, Bradley KA. Alcohol-related advice for VA primary care patients: Who gets it, who gives it? J Stud Alcohol. 2004; 65:621–630. [PubMed: 15536772]

Chander G, Hutton HE, Lau B, McCaul ME. Brief intervention decreases drinking frequency in HIV-infected, heavy drinking women: Results of a Randomized Controlled Trial. J Acquir Immune Defic Syndr. 2015; 70:137–145. DOI: 10.1097/QAI.0000000000000679 [PubMed: 25967270]

Chander G, Monroe AK, Crane HM, Hutton HE, Saag MS, Cropsey K, Eron JJ, Quinlivan EB, Geng E, Mathews WC, Boswell S, Rodriguez B, Ellison M, Kitahata MM, Moore RD, McCaul ME. HIV primary care providers-Screening, knowledge, attitudes and behaviors related to alcohol interventions. Drug Alcohol Depend. 2016; doi: 10.1016/j.drugalcdep.2016.01.015

Conigliaro J, Gordon AJ, McGinnis KA, Rabeneck L, Justice AC. How harmful is hazardous alcohol use and abuse in HIV infection: Do health care providers know who is at risk? J Acquir Immune Defic Syndr. 2003; 33:521–525. [PubMed: 12869842]

Conigliaro J, Justice AC, Gordon AJ, Bryant K. Role of alcohol in determining human immunodeficiency virus (HIV)-relevant outcomes: A conceptual model to guide the implementation of evidence-based interventions into practice. Med Care. 2006; 44:S1–6. DOI: 10.1097/01.mlr.0000223659.36369.cf

Department of Veterans Affairs. [Last Accessed 12/29/2016] HIV/Hepatitis C QUERI Strategic Plan. 2010. http://www.queri.research.va.gov/about/strategic_plans/hiv.pdf

Fredericksen RJ, Edwards TC, Crane HM, Crane PK, Merlin J, Gibbons LE, Rao D, Batey DS, Dant L, Páez E, Church A, Patrick DL. Patient and provider priorities for self-reported domains of HIV clinical care. AIDS Care. 2015; 27:1255–1264. DOI: 10.1080/09540121.2015.1050983 [PubMed: 26304263]

Freiberg MS, McGinnis KA, Kraemer K, Samet JH, Conigliaro J, Curtis ER, Bryan K, Kuller LH, Justice AC. The association between alcohol consumption and prevalent cardiovascular diseases among HIV-infected and HIV-uninfected men. J Acquir Immune Defic Syndr. 2010; 53:247–253. DOI: 10.1097/QAI.0b013e3181c6c4b7 [PubMed: 20009766]

Fultz SL, Skanderson M, Mole LA, Gandhi N, Bryant K, Crystal S, Justice AC. Development and verification of a “virtual” cohort using the National VA Health Information System. Med Care. 2006; 44:S25–30. DOI: 10.1097/01.mlr.0000223670.00890.74 [PubMed: 16849965]

Gonzalez-Reimers E, Alvisa-Negrin J, Santolaria-Fernandez F, Ros-Vilamajó R, Martin-González MC, Hernández-Betancor I, García-Valdecasas-Campelo E, González-Díaz A. Prognosis of osteopenia in chronic alcoholics. Alcohol. 2011; 45:227–238. DOI: 10.1016/j.alcohol.2010.09.002 [PubMed: 21051177]

Greenland S. Avoiding power loss associated with categorization and ordinal scores in dose-response and trend analysis. Epidemiol. 1995; 6:450–454.

Hahn JA, Samet JH. Alcohol and HIV disease progression: Weighing the evidence. Curr HIV/AIDS Rep. 2010; 7:226–233. DOI: 10.1007/s11904-010-0060-6 [PubMed: 20814765]

Harris AH, Kivlahan DR, Bowe T, Humphreys KN. Pharmacotherapy of alcohol use disorders in the Veterans Health Administration. Psychiatr Serv. 2010; 61:392–398. DOI: 10.1176/appi.ps.61.4.392 [PubMed: 20360279]

Hasin DS, Aharonovich E, Greenstein E. HealthCall for the smartphone: technology enhancement of brief intervention in HIV alcohol dependent patients. Addict Sci Clin Pract. 2014; 9:5.doi: 10.1186/1940-0640-9-5 [PubMed: 24533631]

HealthCare.gov. [Last Accessed 12/29/2016] What are my preventive care benefits?. 2013a. https://www.healthcare.gov/what-are-my-preventive-care-benefits/

HealthCare.gov. [Last Accessed 12/29/2016] What does marketplace health insurance cover?. 2013b. https://www.healthcare.gov/what-does-marketplace-health-insurance-cover/

Hendershot CS, Stoner SA, Pantalone DW, Simoni JM. Alcohol use and antiretroviral adherence: Review and meta-analysis. J Acquir Immune Defic Syndr. 2009; 52:180–202. DOI: 10.1097/QAI.0b013e3181b18b6e [PubMed: 19668086]

Jonas DE, Garbutt JC, Amick HR, Brown JM, Brownley KA, Council CL, Viera AJ, Wilkins TM, Schwartz CJ, Richmond EM, Yeatts J, Evans TS, Wood SD, Harris RP. Behavioral counseling after screening for alcohol misuse in primary care: A systematic review and meta-analysis for the U.S. Preventive Services Task Force. Ann Intern Med. 2012; 157:645–654. DOI: 10.7326/0003-4819-157-9-201211060-00544 [PubMed: 23007881]

Justice AC, McGinnis KA, Tate JP, Braithwaite RS, Cook RL, Edelman EJ, Fiellin LE, Freiberg MS, Gordon AJ, Kraemer KL, Marshall BD, Williams ED, Fiellin DA. Risk of mortality and physiologic injury evident with lower alcohol exposure among HIV infected compared with uninfected men. Drug Alcohol Depend. 2016; 161:95–103. DOI: 10.1016/j.drugalcdep.2016.01.017 [PubMed: 26861883]

Kerr EA, Fleming B. Making performance indicators work: Experiences of US Veterans Health Administration. BMJ. 2007; 335:971–973. [PubMed: 17991979]

Korthuis PT, Saha S, Chander G, McCarty D, Moore RD, Cohn JA, Sharp VL, Beach MC. Substance use and the quality of patient-provider communication in HIV clinics. AIDS Behav. 2011; 15:832–841. DOI: 10.1007/s10461-010-9779-8 [PubMed: 20703792]

Lapham GT, Achtmeyer CE, Williams EC, Hawkins EJ, Kivlahan DR, Bradley KA. Increased documented brief alcohol interventions with a performance measure and electronic decision support. Med Care. 2012; 50:179–187. DOI: 10.1097/MLR.0b013e3181e35743 [PubMed: 20881876]

Lapham GT, Rubinsky AD, Shortreed SM, Hawkins EJ, Richards J, Williams EC, Berger D, Chavez LJ, Kivlahan DR, Bradley KA. Comparison of provider-documented and patient-reported brief intervention for unhealthy alcohol use in VA outpatients. Drug Alcohol Depend. 2015; 153:159–166. DOI: 10.1016/j.drugalcdep.2015.05.027 [PubMed: 26072218]

Liang KY, Zeger SL. Longitudinal data analysis using generalized linear models. Biometrika. 1986; 73:13–22.

McGinnis KA, Brandt CA, Skanderson M, Justice AC, Shahrir S, Butt AA, Brown ST, Freiberg MS, Gibert CL, Goetz MB, Kim JW, Pisani MA, Rimland D, Rodriguez-Barradas MC, Sico JJ, Tindle HA, Crothers K. Validating smoking data from the Veteran's Affairs Health Factors dataset, an electronic data source. Nicotine Tob Res. 2011; 13:1233–1239. DOI: 10.1093/ntr/ntr206 [PubMed: 21911825]

McGinnis KA, Fiellin DA, Tate JP, Cook RL, Braithwaite RS, Bryant KJ, Edelman EJ, Gordon AJ, Kraemer KL, Maisto SA, Justice AC. Number of drinks to "feel a buzz" by HIV status and viral load in men. AIDS Behav. 2016; 20:504–511. DOI: 10.1007/s10461-015-1053-7 [PubMed: 26936030]

Mertens JR, Chi FW, Weisner CM, Satre DD, Ross TB, Allen S, Pating D, Campbell CI, Lu YW, Sterling SA. Physician versus non-physician delivery of alcohol screening, brief intervention and referral to treatment in adult primary care: The ADVISe cluster randomized controlled implementation trial. Addict Sci Clin Pract. 2015; 10:26.doi: 10.1186/s13722-015-0047-0 [PubMed: 26585638]

Metsch LR, Pereyra M, Colfax G, Dawson-Rose C, Cardenas G, McKirnan D, Eroglu D. HIV-positive patients' discussion of alcohol use with their HIV primary care providers. Drug Alcohol Depend. 2008; 95:37–44. DOI: 10.1016/j.drugalcdep.2007.12.006 [PubMed: 18243580]

Monroe AK, Lau B, Mugavero MJ, Mathews WC, Mayer KH, Napravnik S, Hutton HE, Kim HS, Jabour S, Moore RD, McCaul ME, Christopoulos KA, Crane HC, Chander G. Heavy alcohol use is associated with worse retention in HIV care. J Acquir Immune Defic Syndr. 2016; doi: 10.1097/qai.0000000000001083

Moyer A, Finney JW. Meeting the challenges for research and practice for brief alcohol intervention. Addiction. 2010; 105:963–964. discussion 964–965. DOI: 10.1111/j.1360-0443.2010.02907.x [PubMed: 20659056]

National Institute on Alcohol Abuse and Alcoholism. Helping Patients Who Drink Too Much: A Clinician's Guide. 2007. (Updated 2005 Edition) http://pubs.niaaa.nih.gov/publications/Practitioner/CliniciansGuide2005/clinicians_guide.htm

National Institutes of Health. NIH HIV/AIDS Research Priorities and Guidelines for Determinng AIDS Funding. 2015. https://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-137.html

Neuman MG, Schneider M, Nanau RM, Parry C. Alcohol consumption, progression of disease and other comorbidities, and responses to antiretroviral medication in people living with HIV. AIDS Res Treat. 2012; 2012:751827.doi: 10.1155/2012/751827 [PubMed: 22496971]

Oslin DW, Lynch KG, Maisto SA, Lantinga LJ, McKay JR, Possemato K, Ingram E, Wierzbicki M. A randomized clinical trial of alcohol care management delivered in Department of Veterans Affairs

primary care clinics versus specialty addiction treatment. J Gen Intern Med. 2014; 29:162–168. [PubMed: 24052453]

Pellowski JA, Kalichman SC, Matthews KA, Alder N. A pandemic of the poor: Social disadvantage and the U.S. HIV epidemic. Am Psychol. 2013; 68:197–209. DOI: 10.1037/a0032694 [PubMed: 23688088]

Rehm J, Baliunas D, Borges GL, Graham K, Irving H, Kehoe T, Parry CD, Patra J, Popova S, Poznyak V, Roerecke M, Room R, Samokhvalov AV, Taylor B. The relation between different dimensions of alcohol consumption and burden of disease: An overview. Addiction. 2010; 105:817–843. ADD2899 [pii]. DOI: 10.1111/j.1360-0443.2010.02899.x [PubMed: 20331573]

Rubinsky AD, Dawson DA, Williams EC, Kivlahan DR, Bradley KA. AUDIT-C scores as a scaled marker of mean daily drinking, alcohol use disorder severity, and probability of alcohol dependence in a U.S. general population sample of drinkers. Alcohol Clin Exp Res. 2013; 37:1380–1390. DOI: 10.1111/acer.12092 [PubMed: 23906469]

Saitz R. Clinical practice. Unhealthy alcohol use. N Engl J Med. 2005; 352:596–607. DOI: 10.1056/NEJMcp042262 [PubMed: 15703424]

Sarkar DK, Jung MK, Wang HJ. Alcohol and the immune system. Alcohol Res. 2015:37.

Scott-Sheldon LA, Carey KB, Cunningham K, Johnson BT, Carey MP. Alcohol use predicts sexual decision-making: A systematic review and meta-analysis of the experimental literature. AIDS Behav. 2016; 20:19–39. DOI: 10.1007/s10461-015-1108-9

Shuper PA, Neuman M, Kanteres F, Baliunas D, Joharchi N, Rehm J. Causal considerations on alcohol and HIV/AIDS--a systematic review. Alcohol Alcohol. 2010; 45:159–166. DOI: 10.1093/alcalc/agp091 [PubMed: 20061510]

StataCorp. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP; 2013. http://www.stata.com/support/faqs/resources/citing-software-documentation-faqs/ (Version Release 13)

Strauss SM, Munoz-Plaza C, Tiburcio NJ, Maisto SA, Conigliaro J, Gwadz M, Lunievicz J, Norman R. HIV care providers' role legitimacy as supporters of their patients' alcohol reduction. Open Infect Dis J. 2009; 3:13–20. DOI: 10.2174/1874279300903010013 [PubMed: 20556238]

Taddei TH, Lo Re V 3rd, Justice AC. HIV, aging, and viral coinfections: Taking the long view. Curr HIV/AIDS Rep. 2016; 13:269–278. DOI: 10.1007/s11904-016-0327-7 [PubMed: 27614654]

The White House. Accelerating improvements in HIV prevention and care in the United States through the HIV care continuum initiative. 2013. https://www.aids.gov/federal-resources/national-hiv-aids-strategy/hiv-care-continuum-initiative-fact-sheet.pdf

U.S. Department of Health and Human Services. HIV/AIDS Care Continuum. 2016. https://www.aids.gov/federal-resources/policies/care-continuum/

U.S. Department of Veteran Affairs. [last accessed 10/4/2016] The State of Care for Veterans with HIV/AIDS. 2009. http://www.hiv.va.gov/provider/policy/state-of-care/veterans.asp

Vagenas P, Azar MM, Copenhaver MM, Springer SA, Molina PE, Altice FL. The impact of alcohol use and related disorders on the HIV continuum of care: A systematic review : alcohol and the HIV continuum of care. Curr HIV/AIDS Rep. 2015; 12:421–436. DOI: 10.1007/s11904-015-0285-5 [PubMed: 26412084]

Volk RJ, Steinbauer JR, Cantor SB. Patient factors influencing variation in the use of preventive interventions for alcohol abuse by primary care physicians. J Stud Alcohol. 1996; 57:203–209. [PubMed: 8683970]

Whitlock EP, Polen MR, Green CA, Orleans T, Klein J. Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: A summary of the evidence for the U.S. Preventive Services Task Force. Ann Intern Med. 2004; 140:557–568. [PubMed: 15068985]

Williams EC, Achtmeyer CE, Young JP, Rittmueller SE, Ludman EJ, Lapham GT, Lee AK, Chavez LJ, Berger D, Bradley KA. Local implementation of alcohol screening and brief intervention at five Veterans Health Administration primary care clinics: Perspectives of clinical and administrative staff. J Subst Abuse Treat. 2016a; 60:27–35. DOI: 10.1016/j.jsat.2015.07.011 [PubMed: 26297322]

Williams EC, Hahn JA, Saitz R, Bryant K, Lira MC, Samet JH. Alcohol use and Human Immunodeficiency Virus (HIV) Infection: Current knowledge, implications, and future directions. Alcohol Clin Exp Res. 2016b; 4:2056–2072. DOI: 10.1111/acer.13204

Williams EC, Johnson ML, Lapham GT, Caldeiro RM, Chew L, Fletcher GS, McCormick KA, Weppner WG, Bradley KA. Strategies to implement alcohol screening and brief intervention in primary care settings: A structured literature review. Psychol Addict Behav. 2011; 25:206–214. DOI: 10.1037/a0022102 [PubMed: 21517141]

Williams EC, Lapham GT, Hawkins EJ, Rubinsky AD, Morales LS, Young BA, Bradley KA. Variation in documented care for unhealthy alcohol consumption across race/ethnicity in the Department of Veterans Affairs Healthcare System. Alcohol Clin Exp Res. 2012; 36:1614–1622. DOI: 10.1111/j.1530-0277.2012.01761.x [PubMed: 22404130]

Williams EC, Rubinsky AD, Chavez LJ, Lapham GT, Rittmueller SE, Achtmeyer CE, Bradley KA. An early evaluation of implementation of brief intervention for unhealthy alcohol use in the US Veterans Health Administration. Addiction. 2014; 109:1472–1481. DOI: 10.1111/add.12600 [PubMed: 24773590]

Young BA, Maynard C, Boyko EJ. Racial differences in diabetic nephropathy, cardiovascular disease, and mortality in a national population of veterans. Diabetes Care. 2003; 26:2392–2399. [PubMed: 12882868]

Zou G. A modified poisson regression approach to prospective studies with binary data. Am J Epidemiol. 2004; 159:702–706. [PubMed: 15033648]

Highlights

- Disparities in receipt of alcohol-related care among HIV+ and HIV− patients exist.
- Alcohol use is disproportionality under-addressed among PLWH relative to HIV-.
- Special efforts may be needed to ensure that HIV+ patients receive adequate care.

Drug Alcohol Depend. Author manuscript; available in PMC 2018 May 01.

Table 1

Characteristics of VA outpatients with unhealthy alcohol use (AUDIT-C 5) at first recorded positive screened between 2009–2013: Overall and across by HIV status

	HIV+ (3,514)		HIV− (827,311)				Total (830,825)	
	N	(%)	N	(%)	Chi-Square value	*p*-value	N	(%)
Female	70	(2.0)	25,624	(3.1)	14.26	<0.001	25,694	(3.1)
Age					913.14	<0.001		
18–29	105	(3.0)	100,314	(12.1)			100,419	(12.1)
30–44	575	(16.4)	120,785	(14.6)			121,360	(14.6)
45–64	2,581	(73.4)	426,693	(51.6)			429,274	(51.7)
65+	253	(7.2)	179,519	(21.7)			179,772	(21.6)
Race/ethnicity†					419.78	<0.001		
Asian American/Pacific Islander	36	(1.0)	13387	(1.7)			13,423	(1.7)
Black	1,974	(57.4)	129,503	(16.7)			131,477	(16.9)
Hispanic/Latino	299	(8.7)	55388	(7.1)			55,687	(7.1)
Native American	39	(1.1)	8936	(1.2)			8,975	(1.2)
White	1,091	(31.7)	568,388	(73.3)			569,479	(73.1)
Marital status†					1936.19	<0.001		
Divorced/Separated	1,146	(33.0)	239,101	(29.3)			240,247	(29.4)
Married	411	(11.8)	351,327	(43.1)			351,738	(43.0)
Never Married/Single	1,802	(51.8)	194,349	(23.9)			196,151	(24.0)
Widowed	117	(3.4)	30,042	(3.7)			30,159	(3.7)
VA eligibility status†					7.68	0.021		
Full VA Coverage	590	(16.8)	145,369	(17.6)			145,959	(17.6)
Service connection <50%	738	(21.0)	185,234	(22.5)			185,972	(22.4)
Non-service connected	2,186	(62.2)	494,420	(59.9)			496,606	(59.9)
Fiscal year of first AUDIT-C					62.75	<0.001		
2010	1,323	(37.6)	342,592	(41.4)			343,915	(41.4)
2011	981	(27.9)	236999	(28.6)			237,980	(28.6)
2012	805	(22.9)	180,111	(21.8)			180,916	(21.8)
2013	405	(11.5)	67609	(8.2)			68,014	(8.2)

	HIV+ (3,514)		HIV− (827,311)				Total (830,825)	
	N	(%)	N	(%)	Chi-Square value	*p*-value	N	(%)
Major depression	553	(15.7)	57,109	(6.9)	422.81	<0.001	57,662	(6.9)
Other mood disorder	1,390	(39.6)	185,229	(22.4)	592.08	<0.001	186,619	(22.5)
Post Traumatic Stress Disorder (PTSD)	479	(13.6)	139,909	(16.9)	26.81	<0.001	140,388	(16.9)
Anxiety disorder	434	(12.4)	85,382	(10.3)	15.57	<0.001	85,816	(10.3)
Serious mental illness	528	(15.0)	41,366	(5.0)	734.52	<0.001	41,894	(5.0)
Stimulant use disorder	992	(28.2)	37,522	(4.5)	4443.87	<0.001	38,514	(4.6)
Opioid use disorder	292	(8.3)	14,355	(1.7)	873.31	<0.001	14,647	(1.8)
Other drug use disorder	490	(13.9)	37,013	(4.5)	728.11	<0.001	37,503	(4.5)
AUDIT-C categories (first)					20.03	<0.001		
5–8	2,559	(72.8)	629,191	(76.1)			631,750	(76.0)
9–12	955	(27.2)	198,120	(23.9)			199,075	(24.0)
Alcohol use disorder excluding remission	1,724	(49.1)	265,483	(32.1)	461.92	<0.001	267,207	(32.2)
Alcohol specific condition	87	(2.5)	13,716	(1.7)	14.33	<0.001	13,803	(1.7)
Outpatient visits in past year					3129.61	<0.001		
0	39	(1.1)	165,449	(20.0)			165,488	(19.9)
1–4	430	(12.2)	278,353	(33.6)			278,783	(33.6)
5–10	863	(24.6)	167,276	(20.2)			168,139	(20.2)
11–24	1,118	(31.8)	135,026	(16.3)			136,144	(16.4)
≥25	1,064	(30.3)	81,207	(9.8)			82,271	(9.9)
Inpatient visits in past year					1478.18	<0.001		
0	2,658	(75.6)	762,894	(92.2)			765,552	(92.1)
1	498	(14.2)	44,292	(5.4)			44,790	(5.4)
2–3	261	(7.4)	15,551	(1.9)			15,812	(1.9)
≥4	97	(2.8)	4,574	(0.6)			4,671	(0.6)

[†]Total N varies for characteristic due to missing values: race/ethnicity (n 779,041); marital status (n 818,293); VA eligibility status (n 828,536)

Drug Alcohol Depend. Author manuscript; available in PMC 2018 May 01.

Table 2

Receipt of Alcohol-related Care among patients living with HIV (PLWH) and HIV-VA Patients Screening Positive for Unhealthy Alcohol Use (AUDIT-C≥5) between 2009 and 2013

	PLWH %	95% CI	HIV− %	95% CI	RR ǂ	95% CI	p-value¥
Primary Outcome: Any Brief Intervention in the 0–14 Days Following Positive Screening							
Receipt of Brief Intervention							
Unadjusted	57.0	(55.4–58.5)	73.8	(73.7–73.9)	0.77	(0.75 – 0.79)	<0.001
Adjusted *	61.0	(59.3–62.6)	73.7	(73.6–73.8)	0.83	(0.80 – 0.85)	<0.001
Adjusted model including utilization **	62.6	(60.9–64.3)	73.7	(73.6–73.8)	0.85	(0.83 – 0.87)	<0.001
Secondary Outcomes Measured in the 0–365 Days Following Positive Screening							
	%	**95% CI**	**%**	**95% CI**	**RR**	**95% CI**	**p-value**
Composite: Receipt of Any Alcohol-Related Care¥							
Unadjusted	68.6	(67.1–70.0)	77.7	(77.6–77.7)	0.88	(0.86 – 0.90)	<0.001
Adjusted *±	67.1	(65.7–68.6)	77.7	(77.7–77.8)	0.86	(0.85 – 0.88)	<0.001
Adjusted model including utilization **	68.1	(66.6–69.5)	77.7	(77.6–77.8)	0.88	(0.86 – 0.89)	<0.001
Receipt of Specialty Addictions Treatment							
Unadjusted	27.6	(26.1–29.1)	10.8	(10.7–10.9)	2.56	(2.42 – 2.70)	<0.001
Adjusted *±	10.6	(10.0–11.1)	11.1	(11.1–11.2)	0.95	(0.90 – 1.00)	0.046
Adjusted model including utilization **	9.9	(9.4–10.4)	11.1	(11.1–11.2)	0.89	(0.85 – 0.94)	<0.001
Receipt of AUD Medications							
Unadjusted	3.8	(3.2 – 4.4)	3.1	(3.1 – 3.2)	1.21	(1.02–1.42)	0.025
Adjusted *±	2.2	(1.9 – 2.6)	3.2	(3.2 – 3.3)	0.70	(0.59 – 0.82)	<0.001
Adjusted model including utilization **	2.0	(1.7 – 2.4)	3.2	(3.2 – 3.3)	0.63	(0.53 – 0.74)	<0.001
Number of Brief Interventions Received	**Count**	**95% CI**	**Count**	**95% CI**	**RR¥**	**95% CI**	**p-value**
Unadjusted	0.91	(0.89 – 0.94)	1.02	(1.01 – 1.02)	0.90	(0.88 – 0.92)	<0.001
Adjusted *±	0.93	(0.91 – 0.95)	1.02	(1.02 – 1.02)	0.91	(0.89 – 0.93)	<0.001
Adjusted model including utilization **	0.93	(0.91 – 0.95)	1.02	(1.02 – 1.02)	0.91	(0.89 – 0.93)	<0.001

[*] Adjusted for gender, age, race/ethnicity, marital status, VA eligibility status, fiscal year in which positive screen occurred, mental health conditions, drug use disorders, and severity of unhealthy alcohol use (AUDIT-C risk group, diagnoses for alcohol use disorders, and alcohol-attributable medical conditions).

[±] Considered primary model

[**] Adjusted for gender, age, race/ethnicity, marital status, VA eligibility status, fiscal year in which positive screen occurred, mental health conditions, drug use disorders, and severity of unhealthy alcohol use (AUDIT-C risk group, diagnoses for alcohol use disorders, and alcohol-attributable medical conditions, and outpatient and inpatient utilization.

[ł] Relative Rate

[¥] p-value from test to evaluate if RR is equal to one.

[¥] Composite Outcome defined as any brief Intervention, specialty addictions treatment or AUD medications 0–365 days following positive screening

Drug Alcohol Depend. Author manuscript; available in PMC 2018 May 01.

Table 3

Receipt of Alcohol-Related Care across HIV Status among VA Patients who Screened Positive for Unhealthy Alcohol Use (AUDIT-C 5) and had a Clinically Recognized AUD between 2009 and 2013.

	PLWH %	95% CI	HIV− %	95% CI	RR[¥]	95% CI	p-value
Composite: Receipt of Any Alcohol-Related Care[¥]							
Unadjusted	79.2	(77.4–81.0)	83.0	(82.9–83.1)	0.95	(0.93–0.98)	<0.001
Adjusted[*±]	77.4	(75.7–79.1)	83.0	(82.9–83.1)	0.93	(0.91–0.95)	<0.001
Adjusted model including utilization[**]	78.1	(76.4–79.8)	83.0	(82.9–83.1)	0.94	(0.92–0.96)	<0.001
Receipt of Specialty Addictions Treatment							
Unadjusted	46.1	(43.8–48.4)	24.5	(24.4–24.7)	1.88	(1.79–1.97)	<0.001
Adjusted[*±]	24.7	(23.6–25.8)	25.0	(24.9–25.2)	0.99	(0.94–1.03)	0.565
Adjusted model including utilization[**]	23.5	(22.5–24.6)	25.0	(24.9–25.2)	0.94	(0.90–0.98)	0.006
Receipt of AUD Medications[**]							
Unadjusted	6.2	(5.2–7.3)	6.7	(6.6–6.8)	0.93	(0.79–1.11)	0.443
Adjusted[*±]	4.8	(3.9–5.6)	6.8	(6.7–6.9)	0.70	(0.59–0.84)	<0.001
Adjusted model including utilization[**]	4.4	(3.7–5.2)	6.8	(6.7–6.9)	0.65	(0.55–0.78)	<0.001

[*] Adjusted for gender, age, race/ethnicity, marital status, VA eligibility status, fiscal year in which positive screen occurred, mental health conditions, drug use disorders, and severity of unhealthy alcohol use (AUDIT-C risk group and alcohol-attributable medical conditions).

[±] Considered primary model

[**] Adjusted for gender, age, race/ethnicity, marital status, VA eligibility status, fiscal year in which positive screen occurred, mental health conditions, drug use disorders, and severity of unhealthy alcohol use (AUDIT-C risk group and alcohol-attributable medical conditions, and outpatient and inpatient utilization. Measured only among initial positive screens with an accompanying diagnosis for an alcohol use disorder (records n = 421,244)

[¥] Relative rate

[¥] Composite Outcome defined as any brief Intervention, specialty addictions treatment or AUD medications 0–365 days following positive screening