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ORIGINAL PAPER

HIV Standard of Care for ART Adherence and Retention in Care Among HIV Medical Care Providers Across Four CNICS Clinics in the US

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Abstract

Despite the issuance of evidence-based and evidence—informed guidelines to improve engagement in HIV care and adherence-related outcomes, few studies have assessed contemporary adherence or engagement support practices of HIV care providers in US clinics. As a result, the standard of HIV care in the US and globally remains poorly understood. This programmatic assessment approach aimed to identify the strengths and gaps in the current standard of HIV care from the perspective of HIV care providers. A self-administered Standard of Care measure was developed and delivered through Qualtrics to HIV care providers at four different HIV care sites as a part of a multisite intervention study to improve engagement in HIV care and ART adherence. Providers were asked to provide demographic and clinic specific information, identify practices/strategies applied during typical initial visits with HIV-positive patients and visits prior to and at ART initiation, as well as their perceptions of patient behaviors and adequacy of HIV care services at their clinics. Of the 75 surveys which were completed, the majority of respondents were physicians, and on average, providers have worked in HIV care for 13.5 years. Across the sites, 91% of the providers' patient panels consist of HIV-positive patients, the majority of whom are virally suppressed and 1/5 are considered "out of care." Few resources were routinely available to providers by other staff related to monitoring patient adherence and engagement in care. During typical initial visits with HIV positive patients, the majority of providers report discussing topics focused on behavioral/life contexts such as sexual partnerships, sexual orientation, disclosure, and other sources of social support. Nearly all providers emphasize the importance of adherence to treatment recommendations and nearly 90% discuss outcomes of good adherence and managing common side effects during ART start visits. Overall, providers do not report often implementing practices to improve retention in care. Survey results point to opportunities to enhance engagement in HIV care and improve ART adherence through systematic data monitoring and increased collaboration across providers and other clinic staff, specifically when identifying patients defined as "in need" or "out of care." Trial Registration: Clinicaltrials.gov NCT01900236.

Keywords HIV · Standard of care · Engagement in care · ART adherence · Retention

Resumen

A pesar de la publicación de pautas basadas en la evidencia y basadas en la evidencia para mejorar la participación en la atención del VIH y los resultados relacionados con la adherencia, pocos estudios han evaluado la adherencia contemporánea o las prácticas de apoyo a la participación de los proveedores de atención del VIH en las clínicas de los Estados Unidos. Como resultado, el nivel de atención del VIH en los Estados Unidos y en todo el mundo sigue siendo poco conocido. Métodos: se desarrolló una medida estándar de cuidado autoadministrada a través de Qualtrics a proveedores de atención del VIH en cuatro sitios diferentes de atención del VIH como parte de un estudio de intervención multisitio para mejorar la participación en la atención del VIH y la adherencia al tratamiento antirretroviral. Se solicitó a los proveedores que proporcionen información demográfica y clínica específica, identifiquen las prácticas/estrategias aplicadas durante las visitas iniciales típicas

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con pacientes con VIH y las visitas antes y durante el inicio del tratamiento antirretroviral, así como sus percepciones de los comportamientos de los pacientes y la adecuación de los servicios de atención del VIH en su clinicas. de las 75 encuestas que se completaron, la mayoría de los encuestados eran médicos y, en promedio, los proveedores han trabajado en la atención del VIH durante 13.5 años. En todos los sitios, el 91% de los paneles de pacientes de los proveedores están conformados por pacientes VIH positivos, la mayoría de los cuales se suprimen de forma viral y 1/5 se consideran “fuera de la atención”. Pocos recursos estaban rutinariamente disponibles para los proveedores por otro personal relacionado con Monitorear la adherencia del paciente y el compromiso en la atención. Durante las visitas iniciales típicas con pacientes VIH positivos, la mayoría de los proveedores informan sobre temas relacionados con el comportamiento/contextos de vida, como las relaciones sexuales, la orientación sexual, la divulgación y otras fuentes de apoyo social. Casi todos los proveedores enfatizan la importancia de la adhesión a las recomendaciones de tratamiento y casi el 90% discute los resultados de una buena adherencia y el manejo de los efectos secundarios comunes durante las visitas iniciales de ART. En general, los proveedores no informan a menudo la implementación de prácticas para mejorar la retención en la atención. los resultados de la encuesta apuntan a oportunidades para mejorar la participación en la atención del VIH y mejorar la adherencia al tratamiento antirretroviral mediante el monitoreo sistemático de los datos y una mayor colaboración entre los proveedores y otro personal clínico, específicamente al identificar a los pacientes definidos como “necesitados” o “fuera de la atención”.

Introduction

As the United States (U.S.) embarks on an aggressive strategic plan to reach the updated National HIV/AIDS Strategy (NHAS) and 90-90-90 targets [1], mapping the services, strategies, and programs targeting engagement in care and ART adherence that constitute ‘standard of care’ becomes increasingly pertinent to identifying gaps and opportunities for improvement in health series delivery [2]. Although operationalization of HIV-care engagement varies in both practice and research, clinical engagement can be thought of as encompassing at least three components: linkage to care, retention, and re-entry after a gap in care [3]. Engagement, while related, is distinct from adherence, which focuses on ART initiation, adherence and uninterrupted persistence over time. Currently, in the US and internationally, efforts to collect data relative to these important indicators have led to substantial advances in the documentation of engagement and adherence. Through improvements in data monitoring, the cascade of HIV care in the US has gained considerable clarity. In 2014, of the 1.2 million Americans estimated to be living with HIV, 86% had been diagnosed, 40% were engaged in HIV care, 37% were prescribed ART and 30% were virally suppressed [4]. The “outcomes gaps” and “outcome goals” are clear. However, the extent to which HIV clinics across the US incorporate recommendations and guidelines to close these gaps and reach these goals remains relatively under-explored, particularly for care engagement and ART adherence.

Strategies to enhance engagement in care and ART adherence throughout the continuum (aka, treatment cascade) have been recommended in the literature as well as via practice guidelines. These recommendations can be used to inform clinic practices and to assess whether programs and services, which are currently being offered as standard of care in HIV clinics in the US, align with the current evidence base. Within programmatic evaluations, standard offerings to patients in clinical care that are evidence-informed are considered strengths of programs, while a lack of recommended services indicate gaps or areas for potential improvement. Measures of ‘standard of care’ for engagement in HIV care are not yet well-established for use in such evaluations. In the literature there are a number of recommendations for optimizing engagement. For example, Holtzman and colleagues [5] offered several recommendations, including the use of patient navigators for outreach, expansion of facility hours, appointment and medication reminder systems or devices, addressing barriers to care such as housing instability or transportation, and strategic selection of antiretroviral therapy (ART) regimens.

Evidence-based and evidence-informed guidelines to improve engagement in HIV care and adherence behaviors have also been issued. Organizations, such as the HIV/AIDS Bureau at the U.S. Department of Health and Human Services [6] and the World Health Organization [7], also provide extensive guides for clinical care and standards for quality HIV care. A concise set of guidelines issued by an international team of researchers and practitioners (International Association for Providers in AIDS Care: IAPAC) highlighted several key practices: (1) systematic monitoring of successful entry into care and retention in care; (2) routine collection of self-reported ART adherence in all patients; (3) the use of reminder devices and communication technologies with an interactive component; and (4) individual one-on-one ART education and adherence support as high evidence recommendations to improve engagement in care and ART adherence for people living with HIV (PLWH) [8]. Recently, these recommendations were re-issued [9], with additional guidelines for increasing engagement in care, ART adherence, and viral suppression. Specifically, the reissued IAPAC guidelines recommend the use of electronic health records and other clinic databases or surveillance systems to monitor retention in care. Moreover, the new recommendations stress the importance of engagement and reengagement of patients who are lost to follow up or miss clinic appointments. Additionally, the guidelines identify strategies to optimize HIV care for select key populations including women, men who have sex with men (MSM), transgender individuals, sex workers, migrant and unstably housed populations, persons engaged in substance use, and people who are incarcerated.

These recommendations and guidelines can be used to evaluate the current state of affairs in terms of which practices related to engagement and adherence support are common or standard in the US, and which areas are less optimally included in standard service delivery. While it is well recognized that medical care providers and other clinic staff have a crucial role to play in promoting engagement and adherence, [5, 8, 10] standard practice is less understood. Amico [11] surveyed 51 care providers attending a professional conference on their use of strategies to support adherence and retention in care in their clinic populations. The study observed that adherence monitoring was a common strategy during clinic visits and that the most commonly reported adherence support strategies included discussion/counseling, systems navigation support, and the provision of pill boxes/organizers. The majority of clinicians in that sample reported that the adherence promotion strategies in use were “adequate but in need of improvement.” In Harman et al. [10], phone-based surveys of various HIV clinical care settings in New York and Connecticut suggested that standard practice included assessing and addressing patients’ willingness and commitment to take ART medications, however formal intervention packages and approaches were uncommon.

Finally, de Bruin et al. [12] developed a measure that was informed by a literature search to assess standard care quality (SCQ) of comparator arms within interventions which aim to improve adherence to ART. In the form of a checklist, this instrument was distributed to the authors of the studies included in the review to assess which of the listed features of ART adherence services were in place at each site to evaluate the SCQ components relative to active adherence interventions under study. Standard of care activity items included strategies such as use of illustrative materials to transfer information, encouraging storing spare doses in different places and use of alarm devices, and inquiring about side effects. Study results suggested that the SCQ measure was reliable, and analyses indicated that clinically relevant outcomes such as viral suppression were observed to be significantly impacted by SCQ.

The literature to date highlights the variability and impact of “standard of care” on important HIV health outcomes. Using the most recent literature and recommendations, and drawing from previous assessment efforts, we sought to develop and implement a Standard of HIV Care measure offered online to be completed by HIV-care providers (physicians, nurse practitioners, physician assistants) at 4 different HIV care clinics participating in the CFAR (Center For AIDS Research) Network of Integrated Clinical Systems (CNICS). We used this as a programmatic evaluation strategy to identify which recommended standard of care strategies were most frequently implemented from the perspectives and experiences of HIV care providers, highlighting both the strengths and gaps in current service delivery.

Methods

Development of the SOC Survey

To determine the standard of care strategies to promote engagement in HIV care and ART medication adherence among PLWH, a self-administered Qualtrics survey was designed by a diverse panel of interdisciplinary investigators as part of a multisite intervention study designed to improve early retention in care, ART adherence, and viral suppression among PLWH establishing initial outpatient HIV care (NCT01900236). The survey aimed to capture current SOC practices at Ryan White funded HIV care clinics by asking providers to self-report strategies they use or are otherwise available related to adherence and retention for newly enrolled and existing patients on their panel. Specifically, as part of a large randomized trial, we used the measure to characterize the standard of care prior to the implementation of a retention- and adherence-focused intervention protocol. Participating CNICS sites were located in Baltimore, Maryland; Birmingham, Alabama; Chapel Hill, North Carolina; and Seattle, Washington. All CNICS sites are academically affiliated and thus may represent high quality of care.

Measures

The SOC survey was designed for the purposes of this work. The measure was advised by previous measures [11–13] and guidelines [8]. Survey questions began with items about provider demography (age, gender), role at clinic, years in service at clinic and in HIV care provision, and information about one’s patient panel (size, proportion HIV-positive, demography). Providers were then asked to evaluate statements about the HIV information they provide patients (e.g., ‘I explain about medicines and how they fight HIV’), advice (e.g., ‘I tell patients that failing to come to care as recommended is dangerous to their health’) and questions they ask patients (e.g., I ask about patients’ sources of social support’) typically included in their first visits with HIV-positive patients new to care. Response options included: yes (this is characteristic typical of the first few visits), no (not typical of the first few visits), or ‘another staff member does this’. Details on which other staff member provided the service or implemented the strategy were not collected. A similar pattern of questioning is used for medical visits prior to and at ART initiation. Providers were also asked to provide estimates for the percentage of their panel of HIV-positive patients who miss ART doses from time-to-time, percent durably virally suppressed, their patients’ overall rate of adherence, and their perceived adequacy of retention in care and ART adherence services offered at the clinic. Items varied depending on responses, with a maximum of 47 items (see supplemental file containing full set of items). Items that are not well supported by guidelines or part of patient-centered care, but nonetheless may be used, were also included (e.g., I tell patients that people still do die from HIV). In addition to the SOC, providers completed a brief set of items detailing the descriptive characteristics of their patient panels and their perceptions of patient adherence and retention in care, as well as clinical status, among patients in their panel.

Implementation of the SOC Survey

Implementation of the survey was approved by the Institutional Review Board (IRB) at each participating site. The Principal Investigator of the study and lead investigators at each site identified a list of health care providers at their respective clinics. A list of 97 providers was generated, which included physicians, nurse practitioners, nurses and physician assistants. Surveys were delivered in Qualtrics, accessed through an emailed unique survey link and could be started, stopped and restarted as needed. No identifying information was collected for providers. Survey completion was completely voluntary and sites were allowed to decide whether to offer compensation.

Analysis

Item responses were exported from Qualtrics to Microsoft Excel and reviewed for within-range responses and any potential errors in data collection. Cleaned data were uploaded to PASW v 18 (SPSS) for analysis of descriptive characteristics and overall frequencies for the various strategies included in the survey. Overall implementation of recommended strategies and best practices was characterized by the proportion of providers self-reporting use of the strategy during a typical visit. Analyses are descriptive and summarized across all participating sites.

Results

Sample

From November 2013 to January 2014, a total of 75 logins, out of the 97 surveys sent (77.3%) produced surveys where the provider progressed to the final question (considered a complete survey). Surveys took an average of 15 min to complete. The majority of survey responders identified as female (64%), the mean age of the sample was 50.7 years (range 30–81; SD ± 12.95), and the majority were physicians (76%), followed by nurse practitioners (12%), nurses (9%), and physician assistants (3%). The average respondent reported 13.5 years working in the HIV care (range 0.17–34.8 years, SD = ± 1.10) and the average years working in the current clinic was 9.9 years (range: 0.17–28.4, SD = 8.25). On average, respondents saw HIV positive patients 1 day a week at the clinic (64%), followed by 2 days per week (14.7%) and 5 days per week (13.3%), as expected and commonplace in academically affiliated HIV clinics.

Patient Panel Characteristics

The mean number of patients on providers’ panels across all sites, regardless of HIV status, was 153 (range 0–600; with the one person reporting 0 appearing to “float” services to multiple patients at the clinic but with no unique panel) (Table 1). On average, provider panels included 136 HIV-positive patients (range 0–600), representing about 91% of one’s patient panel. Each year, an average of 19 new HIV positive patients were added to a provider’s panel (range 0–80). Overall, 70.3% (of 74 responding) had patient panels that consisted only of HIV-positive individuals.

As indicated in Table 1, on average, providers estimated that slightly over half of individuals on their panels were gay, bisexual or transgender (52.3%) and above 40 years of age (55.0%). Less than 20% of patients were considered “newly in care” (18.2%), as defined as first enrolled into HIV care less than a year ago. A similar proportion of patients were reported as being ‘out of care’ for over 6 months (19.2%).

Estimated Engagement and Suppression of Patient Panel

As indicated in Table 1, regardless of whether patients were on ART, providers, on average, estimated that 74.6% of patients were virally suppressed. On average, 87.8% of patients were reported as being presently on ART. For patients who were currently on ART, providers, on

Table 1 Patient panel characteristics

	Mean (SD)
Number of patients on provider panels	152.55 (134.094)[a]
Number of patients who are HIV-positive	136.18 (120.563)[a]
Number of HIV patients added to provider panel each year	18.81 (17.746)[b]
HIV-positive patient panels (regardless of whether or not patients are on ART)	Mean proportions (%)
Virally suppressed	74.60
Presently on ART	87.81
Presently on ART and virally suppressed	82.28
Out of care—failed to attend scheduled medical visits for 6 + months	19.17
Newly in care (first enrolled into HIV care less than a year ago) (n = 74)	18.16
Current drug users(have used in the past 3 months)	23.99
Former drug users (previously used, but not in the last 3 months)	39.19
Patients who have mental health issues only (without substance use comorbidity)	37.03
Gay, bisexual, or transgender	52.31
Women	32.52
Above 40 years of age	54.96

[a] Two values greater than [2000] censored

[b] One value greater than [100] censored

average, estimated that 82.3% of their patients were virally suppressed, an increase from the total average proportion of patients who were virally suppressed regardless of ART receipt.

Moreover, of those patients on ART, providers on average, estimated that 46.2% exaggerated their level of adherence when reporting to their medical care providers. Providers assessed that 59.4% of patients missed doses of ART from time to time and that 80.0% of patients had adequate adherence to maintain durable viral suppression.

Resources Provided (Systematic Data Monitoring of Engagement and Adherence)

Respondents were asked to report on the resources provided to them by other staff members at their clinics related to systematic monitoring of patient adherence and engagement in care. Less than 10% of providers reported receiving a list of patients on their panel who were suspected or known to be non-adherent (6.7%) and only 17.3% received a list of patients on their panel who were viremic. Additionally, 28% of providers reported receiving each of the following: a list of services presently available at the clinic to support ART adherence, a list of services presently available at the clinic to support retention in HIV care, a list of patients on their panel who have no-showed and not rescheduled, or are otherwise considered out of care.

Strategies for "New to Care" Patients

Table 2 provides information related to the proportion of respondents and/or other staff members who implemented specific strategies in their typical first few visits with HIV-positive patients. The categories in Table 2 represent the same general wording as was used in the actual survey measure. Strategies were divided into three major foci: (1) discussion around behavioral and life contexts, (2) living with HIV, and (3) biomedical implications and definitions.

In terms of discussions focused on behavioral context, the most common topics reported by respondents included sexual partnerships (92%), sexual orientation (90.7%), disclosure of HIV status to others (90.7%), sources of social support (88%), and reasons to come to care (82.7%). According to respondents, the item most frequently implemented by a staff member other than the respondent was asking about patients' specific barriers to coming to care (16%).

When discussing living with HIV, providers most frequently reported that they talked about "adjusting to living with HIV" (77.3%) and "telling patients that failing to come to care as recommended is dangerous to their health" (69.3%). About 29.3% of providers reported that "other staff members" provided information related to medication storage during visits for pre-ART or with patients who recently initiated ART.

The survey also included items related to the practice of providing patients with information about biomedical implications of diagnosis. Almost all respondents indicated the

Table 2 Strategies included in typical first few visits with HIV-positive patients

Strategy included in typical first few visits with HIV-positive patients	Proportion of respondents implementing the strategy (%)	Proportion of respondents who report that another staff member does this (%)
Recommended strategies		
Life context/behaviors		
Ask about sexual partnerships	92.00	6.67
Ask about sexual orientation	90.67	6.67
Ask about patients' disclosure to others about their status	90.67	4.00
Ask about patients' sources of social support	88.00	9.33
Talk about reasons to come to care	82.67	8.00
Ask about patients' specific barriers to coming to care	53.33	16.00
Forewarn patients of common barriers to getting to care	41.33	6.67
Life with HIV		
Talk about adjusting to living with HIV	77.33	9.33
Tell patients that failing to come to care as recommended is dangerous to their health	69.33	5.33
I tell patients that lots of people struggle to come to care regularly	36.00	6.67
Provide information on drug storage information (pre-ART or recently initiated ART visits)	22.67	29.33
Biomedical implications/definitions		
Explain what viral load and CD4 mean	96.00	2.67
Explain medicines and how they fight HIV	94.67	4.00
Explain what HIV is and what it does in the body	85.33	8.0
Provide information about drug interactions (pre-ART or recently initiated ART visits)	70.67	18.67
Other messages not generally considered patient centered[a]		
Tell patients that people still do die from HIV	49.33	5.33
Tell patients that most people can manage to get to care if it is important to them	36.00	5.33

[a] Strategies that should be used cautiously/judiciously given potential to erode patient-centered care

following four strategies were reported as being included in visits with HIV-positive patients (whether addressed by the respondent or other staff members): (1) explain what viral load and CD4 mean (98.7%), (2) explain ARV medicines and how they fight HIV (98.7%), (3) Explain what HIV is and what it does in the body (93.3%), and (4) provide information about medication interactions (89.3%).

Strategies for Patients in Care-ART Start

Table 3 lists the adherence support strategies used by respondents or staff at their clinics. Commonly used strategies (those reported by 75% or more of the sample) included: emphasizing the importance of adherence to treatment recommendations (98.7%), listing the positive outcomes of good adherence (90.7%), listing common side effects and how to deal with them (89.3%), identifying a regimen that has a dosing schedule that fits with the patients' lifestyle (88%), listing the negative consequences of non-adherence (86.7%), explaining how medication should be taken (84%), discussing of general adherence barriers and ways to overcome them (78.7%), and providing some ideas for dealing with side effects (76%). Strategies that may challenge patient-centered care and therefore negatively impact engagement in care, are also noted in Table 3. These include items such as not spending much time discussing non-adherence unless people are struggling (33.3%), telling patients that most of their patients are high adherers to ART (26.7%), and trying to instill a feeling of accountability/responsibility so patients feel that perfect adherence is something they agreed to do (41.3%). Although these items appear far less frequently in this sample compared to recommended approaches, their prevalence suggests a need to re-evaluate standard of care practices in light of new guidelines.

Ongoing Adherence and Engagement Strategies

Table 4 includes the strategies providers used during ongoing care visits to address engagement in care and adherence behaviors. Over half (68%) of providers reported that

Table 3 Strategies to support adherence included in pre-ART or recently initiated ART visits

Strategy to support adherence included in pre-ART or recently initiated ART visits	Proportion of respondents implementing the strategy (%)	Proportion of respondents who report that another staff member does this (%)
Recommended strategies		
Emphasize the importance of adherence to treatment recommendations	98.67	1.33
List the positive outcomes of good adherence	90.67	5.33
List common side effects and how to deal with them	89.33	8.00
Identify a regimen that has an intake schedule that fits with patients' lifestyle	88.00	10.67
List the negative consequences of non-adherence	86.67	5.33
Explain how medication should be taken	84.00	14.67
Discussion of general adherence barriers and ways to overcome them	78.67	8.00
Provide some ideas for dealing with side effects	76.00	10.67
Working with patients to identify daily cues (ex. Brushing teeth) and plan medication intake at these times	74.67	14.67
Encourage patients to use a pill box	73.33	12.00
Provide instructions for what to do if a dose is missed	69.33	14.67
Talk about negative feelings towards medications/adherence	66.67	5.33
Talk about making medication intake plans when patients plan to go on a holiday or on weekends	56.00	9.33
Express confidence in patients that they can have really high/perfect adherence[a]	56.00	4.00
Encourage patients to use alarm devices to remember to take medication	56.00	14.67
Write down dosing schedule (time, name of meds, number of pills)	52.00	17.33
Encourage patients to store spare doses of medication in difference places (car, work)	44.0	6.67
Strategies not generally considered consistent with patient-centered care[a]		
Try to instill a feeling of accountability/responsibility so patients feel that perfect adherence is something they agreed to do	41.33	2.67
Do not spend much time discussing nonadherence unless people are struggling	33.33	2.67
Tell patients that most of my patients are high adherers to ART	26.67	4.00
Do not mention non-adherence or commonness of occasional missed doses to avoid creating that expectation	25.33	2.67
Tell patients that I would be disappointed/upset if they failed to adhere	1.33	4.00

[a] Strategies that should be used cautiously/judiciously given potential to erode patient-centered care

Table 4 Responses to questions about ongoing care visits with HIV-positive patients

Response selected	Proportion selecting/marking yes (%)
At EACH ongoing care visit with HIV-positive patients (select one)	
I ask patients about potential barriers to getting to next care appointment	21.3
I do not discuss coming into care, but it is addressed by other clinical staff*	4.0
I do not address coming into next care appointment unless there is a demonstrated problem with attendance	68.0
I do not discuss coming into care	6.7
At EACH ongoing care visit with HIV-positive patients on ART (select all that apply)	
I ask patients to estimate their rate or level of ART adherence	86.7
I remind patients of negative effects of non-adherence	36.0
I ask about facilitators of ART adherence	33.3
I do not discuss adherence unless suspect something is going poorly	10.7

they do not discuss attendance at the following appointment unless the patient has demonstrated a problem with attendance. Overall, practices to improve retention in care were infrequently implemented (< 10%). The most common strategy to support ART adherence behaviors over the long term was asking patients to estimate their rate of ART adherence, with 86.7% of providers reporting that they practiced this strategy.

Adequacy of Current Strategies/Services

Providers were also asked to evaluate how adequate their clinic's services were for supporting retention in HIV care and for supporting ART adherence. A six item scale was used to assess adequacy beliefs: Very adequate = 1; Adequate = 2; Somewhat adequate = 3; Somewhat inadequate = 4; Inadequate = 5; Very inadequate = 6. On average, providers described their clinic's services for supporting retention and ART adherence as falling between adequate and somewhat adequate (2.4 and 2.2, respectively).

Discussion

Informed by prior measures and evidence-informed recommendations [8, 11, 12], this study aimed to categorize the standard of HIV care as implemented for new patients in four major HIV clinics in the US, an important step in improving service delivery and increasing engagement in HIV care, ART adherence and viral suppression. Moreover, respondents estimated that approximately 20% of their HIV-positive patients were "out of care" or otherwise poorly engaged, while the majority of their patients living with HIV were presently on ART and virally suppressed. Few respondents reported receiving training or information related to patient adherence behaviors and resources available to support adherence and engagement in care, practices which are crucial to improving care across the HIV continuum [9].

These survey results suggest a major opportunity for system-level improvements in the form of approaches to enhance data monitoring for care engagement and ART adherence, with timely feedback to front-line providers. Recent guidelines emphasize the importance of systematic monitoring of retention in HIV care and ART adherence for all patients in order to improve both engagement in HIV care across the continuum and clinical outcomes [9, 14]. Despite results which indicate that many beneficial SOC practices are implemented at these clinics, services may not be adequately reaching all patients defined as "in need," "out of care," or less engaged in care, in the absence of systematic monitoring and feedback. Furthermore, data collected through systematic monitoring systems can be used to develop effective and targeted quality improvement initiatives and interventions to improve the delivery of clinical HIV care [5]. Hu et al. [14], established the beneficial role of utilizing VL surveillance data as a method to track patient engagement in care and thereby inform targeted efforts to improve the continuum of HIV care. Further emphasizing the importance of bridging the gap between providers and other clinic staff in the context of systematic monitoring as an effort to improve quality of care, de Bruin et al. [12]. observed that the quality of standard care is associated with viral load. The incorporation of systematic monitoring of engagement and ART adherence within standard HIV care is recommended at both the clinical and public health population levels [9].

Other opportunities exist to enhance care coordination. Current guidelines recommend applying task shifting/sharing between physicians and other health care providers as a method to facilitate ART initiation and maintenance [9]. Moreover, Holtzman et al. [5], emphasized the need for further research related to the role which multidisciplinary care teams can play in impacting adherence outcomes. Herrmann et al. [15], demonstrated that strategies such as raising awareness among staff and patients concerning adherence behaviors, as well as consistent monitoring, can have an observable positive impact on medication adherence. However, crucial to this recommendation is communication between staff and physicians to ensure that patients are not lost to follow-up and are receiving targeted care.

The importance of identifying and promoting strategies to improve retention in care, an essential step to achieving UNAIDS'90-90-90' goals [1], is emphasized by respondents' estimates that approximately 20% of their patient panels are currently "out of care". Research related specifically to retention in care, in the larger context of engagement in care, is necessary to identify effective strategies to reduce the number of patients who are poorly engaged in care, or have fallen out of care entirely [5]. Our survey results support the need to further investigate current retention strategies and identify interventions which target retention in care. More sophisticated unpacking of potential differences in the implementation of strategies by sub-groups would also help to identify service gaps and potential bias, as well as identify groups that may be missed by current resources.

Limitations to the current survey results include small sample size, closed-ended survey with minimal room for qualitative exploration, reliance on self-reported data, and characterization of provider impressions of services without other corroboration. Despite the small sample size, our results are representative of these four sites combined and provide an important and valuable illustration of common practices in terms of HIV care in these settings. A larger and more diverse sample would have allowed for examination of the extent to which services varied by sub-groups of respondents or by sites generally or by patient characteristics. With the current study, we were only able to present the overall characterization of services provided by medical care providers generated by the SOC survey instrument. Recognizing challenges related to providers' limited time, we chose to administer a close-ended survey as a means to increase efficiency and facilitate quick data collection despite various skip patterns within the survey. Although this method limits the potential for qualitative exploration, we felt that efficiency was essential to increase response rates, therefore capturing a more representative depiction of the current standards of care. Moreover, using evidence-informed guidelines to develop our survey allowed us to efficiently address the awareness and implementation of "best practices" from a large number of front-line HIV service providers. While provider self-report may over-estimate services or indicate that the particular clinic provides a service that most patients might say is not offered, there is value in understanding the provider perspective as it highlights what providers observe in their practice and therefore feel is already taken care of or is in need of improvement. Additionally, this approach provides a much-needed starting point for understanding the current standard of HIV care and future applications will be able to tackle perceptions of patients. While the 4 academically affiliated clinics included in this study may not be representative of ambulatory HIV care practices nationally, these data provide important insights identify potential gaps in engagement and adherence standards, providing a prototype for survey assessment more broadly across care settings.

In summary, the data suggests there are opportunities to enhance engagement and ART adherence via systematic data monitoring at a health system level with timely provider feedback and with increased collaboration amongst front-line providers and other clinic staff as a means to identify patients defined as "in need" or "out of care." This approach allows for the implementation of more targeted, patient-centered care with the goal of improving patient engagement in care, ART adherence, and ultimately, clinical health outcomes as a result. Additionally, given the availability of current guidelines related to providing quality HIV care, there is a need to better understand how these recommendations translate into practice in an effort to facilitate patient-centered care and re-evaluate prevalent strategies which do not align with these recommendations.

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Compliance with Ethical Standards

Conflict of interest Authors had no conflicts of interest with the work presented.

Ethical Approval All procedures were in accordance with the ethical standards of the UAB and participating site IRBs and with the 1964 Helsinki declaration and its later amendments and comparable ethical standards. All participants provided consent prior to completing the survey questions.

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