



Recruitment of US Adolescents and Young Adults (AYA) into Human Immunodeficiency Virus (HIV)–Related Behavioral Research Studies: A Scoping Review

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Abstract

Purpose of Review The objective of this scoping review was to examine the range of published evidence on recruitment approaches and outcomes of US adolescents and young adults (AYA) ages (18–29 years) into human immunodeficiency virus (HIV)–related behavioral research studies during the past 10 years.

Recent Findings Implementation of effective behavioral research strategies among HIV at-risk and infected AYA is key to ending the HIV epidemic and necessitates successful recruitment strategies.

Summary A comprehensive search was executed across four electronic databases. Of the 1697 identified studies, seven met inclusion criteria with six of these seven directed to HIV prevention. Most studies used online recruitment as part of a hybrid strategy, and combined field-based/in-person and online methods. Recruitment strategies and outcomes, resources and compensation, procedures for consent, and timelines varied among all seven studies. Our results highlight the need for development of recruitment models in alignment with behavioral strategies aimed to treat and prevent HIV among US AYA.

Keywords HIV · Research subject · Recruitment · Clinical studies

Introduction

Presently there are 1.2 million human immunodeficiency virus (HIV)–infected individuals 13 years and older living in the US. Blacks/African Americans and Hispanics/Latinos represent 65% of all HIV infections, and young people ranging from 13 to 34 years of age make up 23% of the US HIV prevalence [1]. At year-end in 2018, the largest percentage of undiagnosed HIV infection was among persons aged 13–24 years (44.9%), followed by persons aged 25–34 years (29.3%) [2]. Between 2014

and 2018, HIV infection rates increased among persons aged 13–24 years [2]. Across all age cohorts, the primary risk factors for HIV acquisition are behavioral: male-to-male sex (66%), and female (16%) and male (4%) heterosexual contact [2]. Survey data from the Youth Risk Behavior Survey (YRBS) collected from 2005 to 2015 indicate that approximately half of all US high school students reported ever having sexual intercourse [3]. As such, trajectories of HIV risk begins with early sexual debut in adolescence and continue through adulthood, leading to behavioral interventions for HIV prevention [4–6].

The United States (U.S.) Department of Health and Human Services (HHS) initiated, *Ending the HIV Epidemic* in 2019, a strategic plan with the goal of a 90% reduction in new HIV cases by 2030 [7]. The pillars of this national initiative are HIV prevention, diagnosis, treatment, and outbreak response among high-risk and vulnerable cohorts [7]. A compendium of evidence-based strategies directed to HIV prevention, diagnosis, and treatment for HIV at-risk and infected individuals includes 194 studies, spanning the past

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14 years (2005–2019) [8]. Of these 194 interventions, a total of 51 studies included Black and African American, Hispanic, and Latino adolescents and young adults (AYA), ages 13–24 years of age, categorized as follows: HIV prevention (41 studies), HIV diagnosis (one study), HIV treatment (eight studies), or outbreak response (one study), (Appendix 1). *Ending the HIV Epidemic* is contingent upon using robust scientific data and evidence to develop effective strategies, resources, and programs targeting HIV-infected and at-risk cohorts; identification of best practices for reaching and recruiting these cohorts into such programs is also urgently needed [7, 9].

Participant recruitment, or the activities conducted across the lifespan of a research protocol, leading to enrollment or accrual [10] is a critical component of research success [11]. Recruitment challenges are described as a primary cause for premature termination of clinical trials [12, 13]. Yet to date, there is a paucity of evidence summarizing approaches and strategies for successful research recruitment of high-risk and vulnerable populations.

Blacks/African Americans and Hispanics/Latinos are underrepresented in HIV research trials; face long-standing barriers to research participation, deeply rooted in social norms and culture [14, 15] and experience participant mistrust and biases by research staff [16]. Recruitment of AYA into HIV-related research studies pose additional challenges, such as individual and community-levels barriers operationalized as follows: insufficient understanding of research, self-presentation bias, issues of parental consent, access to clinical research, mistrust, and stigma [17]. These recruitment barriers and gaps result in significant delay to the advancement of HIV-related behavioral research strategies for prevention, diagnosis, treatment, and outbreak response among Black/African American and Hispanic/Latino AYA.

Recruitment of participants is typically the responsibility of individual investigators at academic research institutions. However, investigators may not have the resources and/or experience to achieve participant accrual targets [10]. Moreover, published behavioral studies infrequently detail investigator initiated recruitment procedures, strategies, and or outcomes of these approaches [11] including related advantages or disadvantages. To the best of our knowledge, there have been no published literature reviews detailing recruitment methods of US AYA ages (18–29 years) into HIV-related behavioral research studies. Hence, the primary objective of this scoping review is to examine the range and extent of published evidence on recruitment approaches and outcomes of US AYA ages (18–29 years) into HIV-related behavioral research studies during the past 10 years. A secondary objective is to summarize

advantages and disadvantages of these recruitment approaches and identify gaps in the available published evidence base with recommendations for research and practice.

Methods

This review was guided by the methodological framework for scoping reviews outlined by Arksey and O'Malley (2005) and Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines [18]. A scoping review is conducted to rapidly identify key concepts underpinning a research area and relevant gaps [19]. Five stages have been proposed for conducting a scoping review: (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) charting the data, and (5) collating and summarizing [19].

Stage 1. Research Question

For the purposes of this present scoping review, our research question is, “What is known from the published evidence base on the recruitment of US AYA ages (18–29 years) into HIV-related behavioral research studies?” Consistent with the methodological framework of a scoping review, our approach was broad to minimize the potential of missing relevant citations [19]. We did however need to set parameters and three primary operational definitions to help manage the volume of evidence and identify relevant studies.

Adolescence/Young Adulthood Our rationale for study inclusion criterion of 18–29 year olds was due to increased HIV risk and rates of new infection in this cohort [2]. This age range (late teens to late twenties) is characterized as emerging adulthood, a distinct developmental phase remarkable for growth and exploration of relationship and career choices, and worldviews [20]. The life course of emerging adulthood is culturally constructed and represented by challenges, complexity, and opportunity [20], making it a prime time for HIV prevention and or risk reduction with behavioral interventions and programs.

HIV-Related Behavioral Research We defined HIV-related behavioral research as intervention studies directed to HIV prevention (i.e., HIV testing) or treatment (medication adherence) of HIV-infected or HIV at-risk AYA.

Recruitment was operationalized to broadly include activities conducted in a research protocol leading to participant enrollment in a research study, such as time, effort, expertise,

and availability of the research team; resources afforded to the recruiter; and the availability of infrastructure, tools, and data to rationally optimize recruitment activities as they are conducted [10, 21].

Stage 2. Identifying Relevant Studies

A health sciences librarian assisted in the development and performance of the literature search. Four bibliographic databases, PubMed, CINAHL, PsycINFO, and Web of Science, were systematically searched for studies focused on recruitment methods for engaging HIV-positive and at-risk emerging young adults in research. The final literature searches were carried out between March 10th and March 31st 2020.

Search Strategy

General search terms were selected a priori and revised based on preliminary findings. Examples of selected terms included HIV, recruitment, and clinical trials as topics, limiting to age groups corresponding with young adults. These terms were further defined so that “recruitment,” for example, was enhanced with synonyms such as *enroll*, *participate*, or “*willingness to participate*.” Standard medical subject heading terms (“MeSH” or CINAHL subject terms, and PsycINFO descriptors) were used along with keywords, truncation, and categorical limits for age and publication dates for approximately the last 10 years (See Table 3 in Appendix 2 for a complete search strategy). As terms were tested and strategies revised, studies were downloaded into an [Endnote database](#) and migrated to the [Covidence platform](#) [22] for final de-duplication. Study authors then performed manual review of abstracts for inclusion and exclusion, and data extraction.

Stage 3. Study Selection

Title and abstract screening was conducted by a primary reviewer; studies meeting a broad list of inclusion criteria were coded as “yes” (HIV-infected or at-risk population, conducted in US, behavioral intervention, study population with mean age greater than 17 years and/or less than 30 years). A primary reviewer completed full text review and was assisted by one trained, graduate-level reviewer to independently evaluate potentially relevant studies for final inclusion or exclusion by applying the full set of a priori inclusion/exclusion criteria.

Studies were selected for full text review if published in English in the continental US and addressing recruitment methods of HIV-positive and at-risk emerging adults for behavioral research. As emerging adults are

defined as individuals 18 to 29 years old, we included studies with total sample age stratification of $\geq 40\%$ in this age range [20]. We excluded studies not focused on recruitment of HIV-infected or at-risk emerging adults for HIV behavioral research. Biomedical, pharmacological drug testing and/ or HIV vaccine trials were therefore also excluded.

Stage 4. Charting the Data

Charting for a scoping review entails a descriptive analytic method in which key and standard information is collected on all included studies using a data charting form; this process is analogous to data extraction for a systematic review [19]. We charted the following information in a shared folder document: author, publication year, geographic location of recruitment, study design, purpose, inclusion criteria, recruitment timeline, sample characteristics, primary results, and conclusions (Table 1); recruitment strategies, resources needed, compensation, consent process, response rate(s), timeline, advantages, and disadvantages of each recruitment approach (Table 2). Categories for these tables were iterative in development, and expanded and refined during the process of scholarly discussion and team meetings. Charting of this data was collected by one researcher and reviewed by a second for agreement. A quality appraisal was not conducted, as the objective of this scoping review was to examine range and extent of published evidence on recruitment approaches and outcomes of US AYA ages (18–29 years) into HIV-related behavioral research studies.

Results

Stage 5. Collation and Summary

Overview Results of our search strategy are illustrated in Fig. 1 [18]. This search strategy yielded a total of 6766 citations; 1697 studies met criteria for full text review, and seven studies met full criteria for final inclusion. An overview of included studies is provided in Table 1.

Study Purpose When categorizing studies as per the national HIV initiative to end the HIV epidemic (HIV prevention, diagnosis, treatment, and outbreak response), five recruited participants for HIV prevention [11, 23–27]. Rapid HIV testing [25] and antiretroviral (ARV) adherence support for HIV treatment regimens [28] represented additional study goals. None of these seven studies recruited as part of research directed to HIV outbreak response.

Table 1 Overview of the included studies

Author/year/location	Study design/purpose	Inclusion criteria/recruitment timeline	Sample characteristics	Primary results/conclusions
Du Bois et al. (2012) [23] Chicago, IL	Pilot RCT Examine the impact of race/ethnicity on 3-stage recruitment process of YMSM for an online HIV prevention intervention	HIV-negative males (biological), history of unprotected anal intercourse in past 3 months Recruitment: 1 year for field-based/in-person primary screening, May 2009–2010	<i>N</i> = 660 Age: 18–24 years (<i>M</i> = 21.48, <i>SD</i> 1.74) Gender: Male 100% Race/ethnicity: Black 25% Latino 23% White 52%	No significant racial/ethnic differences observed at field-based/in-person primary screening or final stage of recruitment (Internet-based enrollment). At initial point of Internet-based recruitment (stage two): Black YMSM 66% less likely to complete online screener compared with whites (OR = 0.34, 95% CI 0.20, 0.57).
Garvey et al. (2018) [24] Los Angeles, CA	RCT Describe recruitment methods for a group-based (four sessions) motivational interviewing intervention to reduce sexual/substance abuse risk among homeless youth.	Homeless youth Specific recruitment timeline not reported: four, 16-week cycles	<i>N</i> = 200 Age: 18–25 years Gender: NR Race/ethnicity: NR	3-month follow-up: 91% retention Average attendance at ≥ two sessions: 79%
Iribarren et al. (2018) ¹ [25] New York, NY	RCT Analyze efficiency of recruitment strategies for enrollment to HIV rapid self-testing trial	HIV-negative MSM and TGW engaged in unprotected anal sex Recruitment over 3 years: March 2014–2017	<i>N/n</i> = 216/55 (NYC sample 18–29 years) Age: median range 40–49 years Gender (total sample): Male 92% Transgender female 8% Race/ethnicity (total sample): American Indian/Alaskan Native 2% Asian 2% Black/African American 42% Multi-Race 16% White 38%	(NYC) Highest yield among 18–29-year-old and black participants for eligibility pre-screening and attendance at first visit found through social media, community information tables, and word of mouth referrals.
Jenness et al. (2011) ¹ [26] New York, NY	Cross-sectional study Investigate the impact of recruitment bias by comparing weighted and unweighted prevalence estimates of HIV risk and seroprevalence in a venue-based sample of MSM ² in 21 US metropolitan cities.	Adults (≥ 18 years) with male gender, NYC residence, and English/Spanish comprehension. Twelve – 15 monthly recruitment events over 5 months.	<i>N/n</i> = 479/219 (18–29 years) Age: median range 30–39 years Gender: male 100% Race/ethnicity (total sample): Black 26% Hispanic 35% White 32% Other 7%	No significant difference in adjusted versus unadjusted HIV prevalence when including all age groups. 18–29-year old cohort: Weighted HIV prevalence (55.4, 95th CI = 43.9, 67.0) was higher than unweighted response (17.5, 95th CI = 13.7, 21.2). venue-based sampling (VBS) recruitment bias included venue volume and attendance frequency.
Jones et al. (2017) [27] Massachusetts New Jersey New York, NY	RCT Evaluate Facebook advertising for recruitment of young African American women to a 12-episode soap opera video series aimed at HIV risk reduction.	HIV-negative women, history of heterosexual encounters during the past 3 months. Recruitment over 205 days: October 22, 2015–July 13, 2016	<i>N</i> = 1435 Age: 18–29 years Gender: female 100% Race/ethnicity: Black 71% Latina 20% White 8%; Asian < 1%; Middle Eastern < 1%; Other < 1%; Native American 1%	Among 940 screened via Facebook ads, 50.1% (<i>n</i> = 477) were high risk, and of those at risk, 154 were randomized into the RCT. Facebook viable option to extend geographic reach and recruit high-risk women; comparable with field-based recruitment approaches.

Table 1 (continued)

Author/year/ location	Study design/purpose	Inclusion criteria/ recruitment timeline	Sample characteristics	Primary results/conclusions
Parsons et al. (2013) ¹ [11] New York, NY	RCT Compare Internet versus field-based recruitment in two, New York City-based samples of MSM.	MSM Recruitment over 6 months: July 2009–January 2010	<i>N/n</i> = 3096/1424 (18–29 years) Age: median range 30–39 years Gender: male 100% Race/ethnicity (total sample): White 55% Black 13% Latino 17% Other 15%	Screening response (18–29-year-old cohort): Field based: (<i>n</i> = 1099, 45.8%) Internet: (<i>n</i> = 325, 46.8%)
Yuan et al. (2014) ¹ [28] US Based	Cross-sectional study To describe methods for a recruitment approach using existing online social media venues and other Internet resources.	HIV-positive individuals Recruitment over 3 months: May–August 2013	<i>N/n</i> = 1904/246 (18–29 years) Age: median range 40–49.9 years Gender (1398 respondents from total sample): Male 94% Female 6% Race/ethnicity (1404 respondents from total sample): White/Caucasian 71% Black/African American 9% Hispanic/Latino 13% Other 7%	18–29-year-old cohort represented 85.8% of Facebook use. Facebook most commonly used online recruitment platform across all demographics.

RCT randomized controlled trial, *YMSM* young men who have sex with men, *HIV* human immunodeficiency virus, *NR* not reported

N/n=total sample/subsample of 18–29 year olds

¹ Sample is embedded within a larger population. Only data for 18–29-year-old participants is included

² Men who have sex with men

Study Design Five of the seven studies were randomized clinical trials [11, 23–25, 27], and two described recruitment for cross-sectional studies [26, 28]. New York City was a geographic location for participant recruitment, either as an exclusive site [11, 26] or as part of a recruitment strategy for one or more sites [25, 27]. Other geographic recruitment locations were Chicago [23], Los Angeles [24], or exclusive to online social media sites [28].

Characteristics In total, 4239 individuals were enrolled in HIV prevention or ARV studies. HIV-seropositive status was an inclusion criterion for one of the seven studies [28]. Other studies recruited HIV-seronegative participants [23–25, 27] or both HIV-negative and -positive participants. Three studies limited their samples to men who have sex with men and/or transgender women [11, 23, 26] and one study was limited to female participants only [27]. Recruitment results varied with race/ethnicity. Two studies reported majority Black/African American samples [25, 27], one reported a majority Hispanic/Latino sample [26], and three a majority White

sample [11, 23, 28]. Researchers of one study did not report on race/ethnicity [24].

Methods of Participant Outreach These varied across studies. A summary of recruitment methods and associated advantages and disadvantages is presented in Table 2. In total, six studies used venue-based sampling at specific locations from lesbian, gay, bisexual, and transgender (LGBT) community centers [23] and drop-in centers for homeless youth [24] to bars, clubs [11, 25, 26], and shopping venues [27]. Online recruitment ranged from email invitation [23] to advertising on specific websites such as Facebook, Twitter, Craigslist, and dating-specific websites [11, 25–28]. Common resources identified across studies were recruitment personnel and field staff. One study also employed HIV test counselors [23].

Two studies reported participant compensation [24, 27]. One study gave participants \$20 for completing a baseline survey and \$5 for attendance at each of four

Table 2 Summary of recruitment methods and associated advantages and disadvantages

Author/ Year	Recruitment Strategies	Resources Needed/ Compensation	Consent Process	Response Rate(s)/Timeline	Advantages	Disadvantages
Du Bois et al. (2012) [23]	Three-stage process: field-based & online strategies <u>Field-based</u> 1) Face-to-face paper/pencil screener administered at LGBT community centers <u>Online</u> 2) Email invitation sent to interested participants with study website access 3) Internet-based RCT enrollment	HIV test Counselors Recruitment coordinator Participant compensation not described	Online	<u>Field-based</u> Paper screening = 56% <u>Online</u> Email invitation = 62% Internet-based RCT enrollment = 48% <u>Recruitment</u> <u>timeline</u> May 2009–2010	Counselor/client rapport may have facilitated in-person recruitment. Initiating recruitment with face-to-face screening may mitigate high attrition rates seen in studies with exclusive online recruitment. ¹	Study participation was limited to individuals accessing community centers.
Garvey et al. (2018) [24]	<u>Field-based</u> Screening at drop-in centers for homeless youth Advertising at drop-in centers.	Field supervisors and staff \$20 for baseline survey; \$5 per session attended; \$15 for attending all four- sessions; \$30 for three- month follow-up survey	Offline (face-to face)	AWARE (%) sessions attended: One-session: 21% Two-sessions: 27% Three sessions: 4% Four sessions: 48% 3-month follow-up visit: 91% <u>Recruitment</u> <u>timeline</u> Not reported: four, 16- week cycles	Rapport between field staff and participants. Telephone strategies most successful with calls during targeted/set times (i.e., 11 a.m. to 4 p.m).	Participation limited to individuals accessing drop-in centers. Mailings and public records not typically helpful for reaching target sample.
Iribarren et al. (2018) [25]	<u>Field-based</u> Single events (i.e. bars, clubs), word of mouth referrals, flyers, palm cards, information tables. <u>Online</u> Social media including Craigslist, Facebook, Twitter link, and apps (i.e. Adam4Adam, Grindr, Growlr, Hornet, Scruff, Jack'd).	Primary recruiter and five part-time staff members Participant compensation not described	Offline (face-to- face) & Online	Study Eligibility by Recruitment Strategy (NYC cohort only) <u>Field-based</u> In-person/one-time event: 6% Referral: 24% Community information table: 3% Printed materials/radio: 21% <u>Online</u> Social Media: 20% Adam4Adam: 39% <u>Recruitment</u> <u>timeline</u> March 2014 – March 2017	<u>Field-based</u> Face-to-face strategies build rapport/ communication <u>Online/Social Media</u> Immediate and simultaneous sharing of study information; apply filters to target populations; privacy; remote access; no fees for basic services.	<u>Field-based</u> Labor intensive <u>Online/Social Media</u> Difficult to build rapport; potential for study profiles to be banned; costs with upgrading applications; unable to determine if user already contacted with some applications, (i.e., Craigslist)
Jenness et al. (2011) [26]	<u>Field-based</u> Seven categories of venues:* bars, dance clubs, parks, community-based organizations (CBOs),	Field staff; mobile van Participant compensation not described	Offline (face-to face)	<u>Recruitment Venue</u> Bars: 59% Dance clubs: 8% Parks: 8% CBOs: 6% House balls: 6%	Targeted recruitment at specific locations. Rapport between staff and participants.	Labor intensive; variation in venue volume and attendance

Table 2 (continued)

Author/ Year	Recruitment Strategies	Resources Needed/ Compensation	Consent Process	Response Rate(s)/Timeline	Advantages	Disadvantages
	house ball events, sex strolls/ environments, and gay pride or related events. * included if at least 75% of the population at venue adult MSM			Sex strolls: 7% Gay pride events: 7% <u>Venue Attendance</u> Once daily: 19% > Once weekly: 30% Once weekly: 18% > Once monthly: 13% Once monthly: 5% < Once monthly: 16% <u>Recruitment timeline</u> Specific dates not reported; 12 to 15 recruitment events each month over five months		
Jones et al. (2017) [27]	<u>Field-based</u> Bus stops, shopping venues, community organizations, mobile van <u>Online</u> Facebook, Instagram	Recruitment/ project staff; mobile van <u>Incentives</u> Field-based screening: \$5.00; Online screening: \$0; Full study: \$100	Offline (face-to-face) and Online	<u>Field-based</u> : 45% <u>Social media</u> : 32% <u>Recruitment timeline</u> October 22, 2015 – July 13, 2016	<u>Field-based</u> precision in testing venues <u>Online/Social Media</u> Efficient, greater geographic reach.	<u>Field-based</u> Cost; scheduling, environmental factors. <u>Online/Social media</u> Extensive reach limits precision
Parsons et al. (2013) [11]	<u>Field-based</u> Bars, nightclub <u>Online</u> Dating sites, Craigs List, Facebook	<u>Field-based</u> Recruitment staff; 230 field recruitment shifts sent out (2 staff members per average three-hour shift) Palm Pilot Z22 to survey MSM <u>Online</u> 102 one-person shifts lasting average of 2.5 h to post recruitment messages. Participant compensation not described	Offline (face-to-face) and Online	Potential Participants Approached (N = 3096) <u>Eligible contacts</u> (p < 0.05) Field-based: 26% Online: 32% <u>Reached by phone</u> (p < 0.001) Field-based: 68% Online: 52% <u>Scheduled (as % reached via phone)</u> Field-based: 28% Online: 24% <u>Completed baseline (% of eligible contacts)</u> Field-based: 10% Online: 7% <u>Recruitment timeline</u> July 2009–January 2010	<u>Field-based</u> In-person: Ability to do more focused recruiting. Greater number of participants recruited. <u>Online/Social Media</u> Inexpensive, less total person hours (274); greater success in reaching substance-using participants	<u>Field-based</u> In-person: Expensive in terms of total person-hours required (1292 h) <u>Online/Social Media</u> Less targeted recruitment and smaller number of participants recruited
Yuan et al. (2014) [28]	<u>Online</u> Facebook, twitter, LinkedIn, Craigslist, Tumblr including paid	One research assistant; 20% full-time effort;	Online	Facebook: 86% Listserv: 3% Word-of-mouth: 6%	Ability to access difficult-to-reach populations facing	Duplicate responses; wide reach limited specificity to HIV populations of color.

Table 2 (continued)

Author/ Year	Recruitment Strategies	Resources Needed/ Compensation	Consent Process	Response Rate(s)/Timeline	Advantages	Disadvantages
	advertisements, fan page, personal messages, and postings in groups.	\$5000 US dollars. Non-financial incentives described (i.e. facts added to survey)		Twitter: 1% Other (LinkedIn, Craigslist, Tumblr): 5% <u>Recruitment timeline</u> May–August 2013		stigma and other barriers.

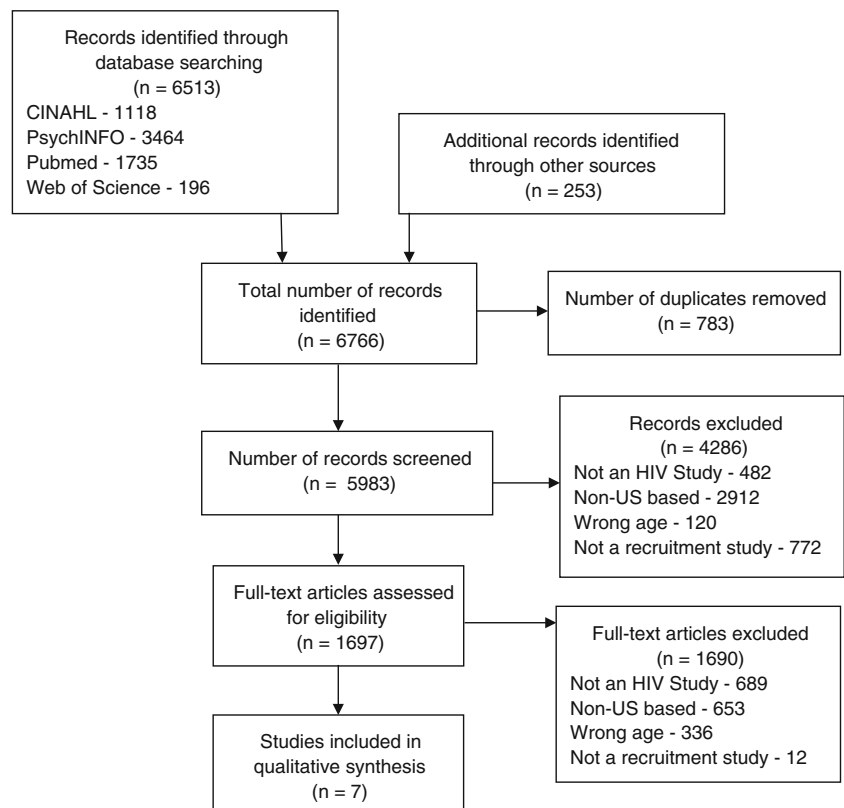
¹ Pequegnat W, Rosser B, Bowen A et al. Conducting internet based HIV/STD prevention survey research: considerations in design and evaluation. *AIDS Behav.* 2007;11(4):505–21

subsequent sessions [24]. If a participant attended all four sessions, they were given \$15 and \$30 for completion of a 3-month follow-up survey. Another study gave \$5 for participants recruited in-person, nothing for online recruitment, and \$100 for full study participation [27]. Across studies, the consent process was face-to-face [24, 26], online [23, 28], or both [11, 25, 27] depending on mode of recruitment.

Recruitment Timelines Recruitment timelines ranged from 4-months for an online approach [28] to 3-years with a hybrid strategy combining both online and field-based

methods [25]. Recruitment response rates for field-based venues ranged from 6% at house ball events to 59% when recruiting participants from bars [26]. One study examined the impact of race/ethnicity on recruitment and found no significant differences in field-based primary screening or Internet-based enrollment [23]. However racial and ethnic differences were observed with initial Internet-based screening; Black and Latino YMSM were less likely to complete online screening compared with White YMSM [23]. In terms of eligibility prescreening and attendance at the first study visit, there is evidence to provide support for recruitment of 18 -to 29 year olds

Fig. 1 Flow diagram of reasons for study exclusion



and Black participants through social media, community information tables, and word of mouth referrals [25]. In order to determine if venue-based sampling (VBS) results in recruitment bias, one study compared weighted and unweighted prevalence estimates of HIV risk and seroprevalence in a sample of MSM [26]. Among 18- to 29-year-old participants, weighted HIV prevalence was higher than the unweighted response.

Advantages and Disadvantages Overall, online and social media-based recruitment ranged from a response rate of 1% on Twitter to 86% on Facebook [28]. While online recruitment methods yielded higher response rates than field-based methods, advantages and disadvantages were identified for each. For field-based recruitment, the ability to target specific venues [11, 26] and develop rapport between research staff and potential participants [23–26] were seen as advantages. Disadvantages were associated with smaller sample sizes [23, 24] and increased recruitment costs and person-hours needed in the field [11, 25, 26]. Advantages of online recruitment were decreased to negligible recruitment costs and the ability to access difficult-to-reach populations [11, 25, 28]. Disadvantages were the inability to target recruitment as easily as venue-based sampling [11, 27], difficulty in building rapport with study participants [25], and costs associated with certain online applications [25].

Discussion

This scoping review is among the first to examine the extent and range of recruitment approaches and related outcomes of US AYA ages (18–29 years) into HIV-related behavioral research studies during the past decade. Our results highlight a body evidence that is largely in development, offering a starting point for initiation of recruitment guidelines tailored to age, sex, gender, race/ethnicity, context, and HIV risk(s) and status. We highlight important considerations for behavioral scientists planning recruitment strategies targeting US AYA ages (18–29 years). These include characteristics of participants recruited via online and field-based recruitment approaches, associated timelines, advantages, disadvantages, and resources needed for the implementation of each strategy.

Our comprehensive review of nearly 1700 unique studies resulted in seven studies that provided detailed information on recruitment practices. While these studies provide invaluable information about how AYA are recruited into HIV-related behavioral research projects, they include seven out of nearly 1700 published studies. Interestingly, only one of these seven studies described

a recruitment approach exclusive to AYA with HIV-seropositive status as part of an antiretroviral treatment adherence intervention [28]; the other six studies included HIV-seronegative or mixed samples. This finding is not surprising given that few effective treatment interventions exist for Black/African American and Latino/Hispanic HIV + AYA [29]. Additionally, we did not identify studies directed to recruitment for outbreak response, an important pillar of controlling the HIV epidemic [30]. Sample sizes among the seven included studies are larger than what has been previously published with HIV-infected and at-risk AYA in HIV-related behavioral research. More commonly, behavioral interventions with this cohort are small pilots and or not powered sufficiently [29, 31–33].

Geographic locations of the studies included in this scoping review were Chicago, IL, New York, NY, New Jersey, Massachusetts, and Los Angeles, CA, despite the south having a disproportionately high number of new HIV cases. For example, Louisiana, Florida, and Georgia are the three hardest hit US states with over 20 HIV cases per 100,000 [34] but are not represented among these seven studies. Distinct geographic contextual factors and barriers may offer some explanation for this finding including stigma, poverty, racial and funding inequalities, and HIV provider perceptions [35].

Among contributions of this scoping review is the delineation of online, field based, and hybrid recruitment approaches to reach AYA participants. Five of the seven studies used a recruitment approach [11, 23, 25, 27, 28] with an online component. Each of these studies however used distinct implementation procedures, as there is no gold standard. Among online platforms used by researchers for recruitment in this review, four of the five studies included Facebook [11, 25, 27, 28] and this is consistent with national trends for frequent Facebook use [36, 37]. Other online platforms were Craigslist, Twitter, Instagram, LinkedIn, Tumblr, and dating sites such as Adam4Adam, Grindr, Growlr, Hornet, Scruff, Jack'd, daddyhunt.com, Gay.com, and Squirt.org. Although survey data shows YouTube to be the most widely visited online platform, with 91% usage among 18–29 year olds [37], YouTube was not part of these online recruitment strategies. The proliferation of technology has allowed for implementation of online recruitment approaches, supporting the advancement of HIV/AIDS research; these strategies capitalize on use of existing platforms well-known and frequently visited by potential participants [38]. However, to date, there is little guidance on how to best implement these approaches in HIV/AIDS research [38].

Disadvantages of online recruitment methods for HIV research are well-described and entail ethical challenges such as privacy and data storage issues, risk for misinformation, and

need for validity protocols [39, 40]. Despite these challenges, online recruitment is efficient, at least in terms of time. Among studies reviewed, relatively large samples were recruited during a short time period (i.e., a few months). Using exclusive field-based recruitment approaches, these sample sizes might have required years to achieve. Yet this shortened time frame for study recruitment also poses disadvantages, as it minimizes the impact of historical factors on the research question [41] but also may not allow for adaptations to recruitment criteria if samples accrue too rapidly.

An important consideration for researchers considering online recruitment approaches is related to procedures for obtaining informed consent, as consenting participants online offers additional challenges and complexities. The five studies using online recruitment strategies obtained participant informed consent with online study procedures [11, 23, 25, 27, 28]. Yet study authors did not describe any type of validation procedures or protocols. The informed consent process requires that research participants fully understand the risks and benefits of participation as well as their rights as research subjects. Assessing this without interpersonal interaction can be challenging, although many researchers have developed short quizzes that are included as part of the informed consent process [42]. As online research becomes more common, it is likely that researchers will develop novel methods to ensure that the online informed consent process is valid and participant comprehension adequate. In one study of predominantly Black and African American adults at risk for HIV and with an education level of high school or less, comprehension of obtaining online informed consent using a tablet kiosk was directly examined; researchers' demonstrated acceptability and a high rate of comprehension [43].

Studies using a field-based or in-person recruitment approach, either exclusively or as part of a hybrid recruitment strategy [11, 23, 25, 27], reached out to participants in physical locations such as nightlife locations [11, 26], LGBT or singles events [25, 26], and community service organizations [23, 24, 26, 27]. This recruitment approach allows for exposure to the venues in which participants interact with each other, and these physical venues can provide essential contextual information related to the research question being studied. While more costly, field-based recruitment allows for targeting participants that meet specific criteria, as participant characteristics are likely to vary by venue [44]. For example, findings from the Parsons (2013) study directly comparing Internet and field-based approaches for recruitment of MSM at risk for HIV demonstrated that participants recruited in the field were more likely to be Black and African American MSM 30–39 years of age; characteristics of the Internet-based cohort were white and older MSM [11].

Other considerations for behavioral scientists planning a field-based/in-person recruitment approach is the potential for a longer recruitment timeline. Two of seven studies were exclusive to field-based/in-person recruitment [24, 26]. These timelines were longer (12–15 months) in comparison to the one study with an exclusive online recruitment approach (4 months) [28]. One advantage of a longer recruitment timeline is to allow for eligibility criteria to be adjusted in response to characteristics of the accruing sample. In the past, this time was necessary to allow for data entry, cleaning, and analysis; however, current research protocols using electronic or online data collection may be able to adjust eligibility criteria more rapidly.

In addition to recruitment timelines, we report recruitment resources used for the various approaches in this scoping review, both representing important components of research planning for grant applications, study protocols, and budgets. Compensation of research participants in HIV research has received increased attention recently [45, 46], and what are considered ethical standards in this area may ultimately reach a consensus. In this present review, compensation varied among the seven studies with incentives ranging from none [11, 23, 25, 26], to non-financial [28] and financial incentives [24, 27]. Among the two studies providing financial incentives, the dollar amount was \$65 [24] and \$100 dollars [27] for completing all study activities.

Of note, Research Match (<https://www.researchmatch.org/>) was not described as a resource among studies in this review. Additionally, although six of the seven studies were affiliated with an academic institution, institutional support such as consultation with Clinical Science Translation and Implementation (CTSI) or Clinical Translation Sciences Awards (CTSA) center was not reported. Given the availability of resources and pooled researcher expertise associated with these and other funded academic centers, initiatives directed to enhance greater investigator alliance, and generation of institutional recruitment policies and procedures is likely to enhance participant accrual [10].

Limitations

In addition to the small sample of included studies described above, this review has a number of other limitations. These were large studies, ranging from 200 to 3096 participants, and thus represent the types of study that receive substantial external funding and use sophisticated analytic methods. It is entirely possible that smaller studies, and even evaluations of service projects, employ different recruitment methods, or employ these methods in different ways, potentially revealing additional strengths and weaknesses of their recruitment

strategies. These studies were also published prior to the outbreak of COVID-19, a pandemic with enormous impact on scientific research, essentially banning in-person contact with potential research subjects and shutting down many of the venues most commonly used to recruit HIV positive AYA into behavioral research studies.

Findings of this scoping review yielded valuable information on implementing online and field-based recruitment strategies among HIV-infected and at-risk AYA ages 18 - 29 years to HIV-related behavioral research studies, including the types of recruitment, venues in which recruitment takes place, and the advantages and disadvantages of these strategies. The majority of included studies used online recruitment as part of a hybrid strategy, and combined field-based/in-person and online methods. It should again be noted, however, that only seven studies meeting our inclusion criteria were ultimately identified. This reflects a contradiction that is also the reason for this review: recruitment strategies are a key component of behavioral HIV research but are rarely the focus of analysis and dissemination of study findings.

Ending the HIV epidemic by 2030 is a highly ambitious goal. An important step towards this goal is recruiting HIV-infected and at-risk AYA into the behavioral interventions and programs needed for HIV prevention, diagnosis, treatment, and outbreak response. While online recruitment and informed consent is a highly promising approach to increase reach and representation in HIV-related behavioral research studies, validation protocols and procedures are essential to ensure the ethical conduct of research with a vulnerable population. Behavioral scientists need to remain mindful that online recruitment approaches are not a replacement for field-based/in person strategies, as each has distinct advantages, limitations, and research capacity [47]. Irrespective of approach, recruitment procedures need be reflective of input from the target population (AYA) to increase the efficiency, reach, validity, and scientific yield of HIV prevention research [48]. Moreover, greater collaboration and resource sharing among researchers, academic and clinical institutions, and community partners will ultimately provide the needed infrastructure for development of tailored, evidence-based recruitment models and approaches leading to health equity for AYA.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

Appendix 1. CDC Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention. Age Range 13–34 years old

HIV Prevention

Boyer, C. B., Barrett, D. C., Peterman, T. A., & Bolan, G. (1997). Sexually transmitted disease (STD) and HIV risk in heterosexual adults attending a public STD clinic: Evaluation of a randomized controlled behavioral risk-reduction intervention trial. *AIDS, 11*, 359–367.

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HIV Diagnosis

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HIV Treatment

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health for young men who have sex with men and transgender women with HIV. *AIDS Patient Care and STDs*, 32, 450–458.

Outbreak Response

Rotheram-Borus, M. J., Swendeman, D., Comulada, S., Weiss, R. E., Lee, M., & Lightfoot, M. (2004). Prevention for substance-using HIV-positive young people: Telephone and in-person delivery. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 37, S68–S77.

Appendix 2

Table 3 Search strategy

Database	Date of search	Search terms	Limits	Results
PubMed	3/10/2020	(((“Clinical Studies as Topic”[Mesh]) OR (“Patient Selection”[Mesh]) OR (“Research Subjects”[Mesh] OR Research subjects)) AND HIV AND (enrol* OR barrier* OR participat* OR willing* OR recruit* OR wtp OR “willingness to participate” OR “decision making” OR retention OR consent OR attrition) AND (2018: 2020[pdat])) OR (((“Clinical Studies as Topic”[Mesh]) OR (“Research Subjects”[Mesh] OR Research subjects)) AND HIV AND (enrol* OR barrier* OR participat* OR willing* OR recruit* OR wtp OR “willingness to participate” OR “decision making” OR retention OR consent OR attrition) AND ((y_10[Filter]) AND (adolescent[Filter] OR adult[Filter])))	2008–2020 (Note: Pubmed was searched using 2 methods OR'd for comprehensiveness: 1. using last 2 years WITH NO FILTERS FOR AGE 2. limited to Pub Date = LAST 10 YEARS AND AGE FILTERS up to age 44.)	1735
CINAHL	3/11/2020	(enroll* OR barrier* OR participat* OR willing* OR recruit* OR wtp OR “willingness to participate” OR “decision making” OR retention OR consent OR attrition)) AND (MH “Human Immunodeficiency Virus”) OR aids OR hiv OR (MH “HIV Infections+”) AND (MH “Clinical Trials+”) OR (MH “Research Subjects+”)	limited to Publication Type “clinical trials” and narrower terms Limiters - Published Date: 2008–2020. Narrow by Subject Age: - adult: 19–44 years OR Narrow by Subject Age: - adolescent: 13–18 years	1118
PsycINFO	3/10/2020	1 exp. hiv/ (42494) 2 exp. experimental subjects/ or experimental recruitment/ (4333) 3 (enroll* or barrier* or participat* or willing* or recruit* or wtp or “willingness to participate” or “decision making”).mp. [mp = title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh] (583499) 4 hiv infections.mp. (19832)	Limited by publication year 2010–2020 Limited to age groups: adolescence < age 13 to 17 yrs > OR 320 young adulthood < age 18 to 29 yrs >)	3464

Table 3 (continued)

Database	Date of search	Search terms	Limits	Results
		5 2 or 3 (585480) 6 1 or 4 (46250) 7 5 and 6 (12390) 8 limit 7 to ((200 adolescence < age 13 to 17 yrs > or 320 young adulthood < age 18 to 29 yrs >) and yr = “2010 -Current”)		
Web of Science	3/20/20	TOPIC: (“Clinical trial*” OR “clinical stud*” OR “Patient Selection” OR “Research Subject”) AND TOPIC: (hiv OR “human immunodeficiency”) AND TOPIC: (attitude* OR enrol* OR barrier* OR participat* OR willing* OR recruit* OR wtp OR “willingness to participate”) AND TOPIC: (young adult OR adolesc*)	Limited to publication years 2008–2018 No age limits (age terms “young Adults or adolesc*” added to search terms)	196
Other		Test search and redundant imports		253
Total				6766

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