Title

HIV testing among clients in high HIV prevalence venues: disparities between older and younger adults

Journal

AIDS Care, 27(2)

ISSN

0954-0121

Authors

Ford, Chandra L

Lee, Sung-Jae

Wallace, Steven P

et al.

Publication Date

2015-02-01

DOI

10.1080/09540121.2014.963008

Peer reviewed

NIH Public Access
Author Manuscript
AIDS Care. Author manuscript; available in PMC 2016 February 01.

Published in final edited form as:
AIDS Care. 2015 February ; 27(2): 189–197. doi:10.1080/09540121.2014.963008.

HIV testing among clients in high HIV prevalence venues: Disparities between older and younger adults

Chandra L. Ford, PhD, MPH, MLIS[*],
Dept. of Community Health Sciences, Box 951772; University of California, Los Angeles (UCLA) Fielding School of Public Health, 650 Charles E. Young Dr. South, Los Angeles, CA 90095-1772.

Sung-Jae Lee, PhD,
Center for Community Health, Department of Psychiatry & Biobehavioral Science, David Geffen School of Medicine, UCLA, Box 957051, Los Angeles, CA 90095-7051. Ph: 310-794-0357, sjlee@mednet.ucla.edu

Steven P. Wallace, PhD,
Box 957143, 21-275A UCLA Center for Health Policy Research, 10960 Wilshire Blvd STE 1550, Los Angeles, CA, 90095. Ph: 310-794-0910, swallace@ucla.edu

Terry Nakazono, MA,
UCLA Geffen School of Medicine and School of Nursing, Box 957380, 10880 Wilshire Blvd, Ste 509, Los Angeles, CA 90095-7380. Ph: 310-206-0260, tnakazono@sonnet.ucla.edu

Peter A. Newman, PhD, and
Centre for Applied Social Research, University of Toronto Factor-Inwentash Faculty of Social Work/Centre for Applied Social Research, 246 Bloor St West, Toronto, ON M5S 1V4 Canada. Ph: 416-946-8611, p.newman@utoronto.ca

William E. Cunningham, MD, MPH
Department of General Internal Medicine, David Geffen School of Medicine, UCLA, Box 951736, 911 Broxton Plaza STE 101, Los Angeles, CA 90095-1736. Ph: 310-794-3556, wcunningham@mednet.ucla.edu

Abstract

The Centers for Disease Control and Prevention recommends routine human immunodeficiency virus (HIV) testing of every client presenting for services in venues where HIV prevalence is high. Because older adults (age>50 years) have particularly poor prognosis if they receive their diagnosis late in the course of HIV disease, any screening provided to younger adults in these venues should also be provided to older adults. We examined aging-related disparities in recent (past 12 months) and *ever* HIV testing in a probability sample of at-risk adults (*N*=1,238) seeking services in needle exchange sites, sexually transmitted disease clinics and Latino community clinics that provide HIV testing. Using multiple logistic regression with generalized estimating equations, we estimated associations between age category (<50 years vs. >50 years) and each HIV testing outcome. Even after controlling for covariates such as recent injection drug use, older adults had 40% lower odds than younger adults did of having tested in the past 12 months

[*]*Corresponding author* Ph: 310-825-6063, Fax: 310-794-1805, clford@ucla.edu.

(OR=0.6; 95% CI=0.40–0.90) or *ever* (OR=0.6; 95% CI=0.40–0.90). Aging-related disparities in HIV testing exist in these high HIV prevalence venues, and may contribute to known aging-related disparities in late diagnosis of HIV infection and poor long-term prognosis.

Keywords

AIDS serodiagnosis; aging; HIV infections/diagnosis; health services accessibility

Introduction

The Centers for Disease Control and Prevention (CDC) recommends routine human immunodeficiency virus (HIV) testing in all healthcare settings where HIV prevalence exceeds 0.1% (i.e., high prevalence venues) and at least annual testing for anyone with known HIV risk (Branson et al., 2006). To provide routine testing is to screen every client presenting for services. Efforts to routinize HIV testing began nearly a decade ago in response to epidemiologic trends indicating at least 20% of HIV-infected persons are unaware of their HIV-positive status and risk-based screening (i.e., only testing people who report risk behaviors or risk group membership) misses cases of undiagnosed HIV infection among people presumed to have minimal HIV risk (Chen et al., 2012; Duffus et al., 2009; MacKellar et al., 2005). Nationwide HIV testing is available at low cost or free at county and municipal public health venues throughout the nation (Centers for Disease Control and Prevention, 2001; Wortley et al., 1995). Routine testing is an efficient, cost-effective way to identify undiagnosed HIV infections (Bos, van der Meijden, Swart, & Postma, 2002; Paltiel et al., 2005). Ultimately, it improves HIV/AIDS prognosis and simplifies the management of HIV disease (Gardner, McLees, Steiner, Del Rio, & Burman, 2011; Hall, McDavid, Ling, & Sloggett, 2006).

Routine HIV testing may be particularly beneficial for at-risk older adults, a category CDC defines as age ≥ 50 years (Centers for Disease Control and Prevention, American Association of Retired Persons, & American Medical Association, 2009; Tangredi, Danvers, Molony, & Williams, 2008). HIV/acquired immune deficiency syndrome (AIDS) prevalence is increasing rapidly in this age category (Centers for Disease Control and Prevention, 2006), and HIV-infected older adults are disproportionately diagnosed late in the course of HIV disease (Coon, Lipman, & Ory, 2003; Zingmond et al., 2001). Late diagnosis is associated with rapid progression to AIDS and AIDS-related mortality (Kirk & Goetz, 2009; May et al., 2011). The disproportionate burden of late diagnoses among older adults suggests they are not regularly screened for HIV infection. In mainstream population-based studies, only 2% of older adults report receiving an HIV test in the past 12 months as recommended; approximately 16% of sexually active older adults report *ever* testing (Kaiser Family Foundation, 2012; Lindau et al., 2007; Schensul, Levy, & Disch, 2003). Such low levels of testing are inappropriate in needle exchange sites (NES), STD clinics and other high HIV prevalence settings where CDC recommends that all clients routinely receive HIV tests (Branson et al., 2006). If, as some researchers (Coon et al., 2003) suggest, ageism limits older adults‘ access to HIV services, then older clients may be less likely than younger ones to receive HIV services even in high HIV prevalence settings.

This study sought to determine if aging-related disparities in HIV testing exist among clients in high HIV prevalence settings. Drawing on the Behavioral model of Healthcare utilization (Aday & Andersen, 1974; Andersen, 1995; Andersen & Newman, 1973), we conceptualize HIV testing to be influenced by clinical context as well as factors predisposing one to obtain a test (e.g., demographics), enabling access to it (e.g., having a usual source of care) and indicating a need for it (e.g., risk behaviors). Relatively few HIV prevention efforts target older adults, many of whom have low perceived HIV risk (Sankar, Nevedal, Neufeld, Berry, & Luborsky, 2011); therefore, we hypothesized that even in settings where HIV prevalence is high, HIV testing is available and all patients should be screened, relatively fewer older adults than younger ones will have recently or *ever* received HIV tests. Using data from a probability sample of adults recruited from NES, STD clinics and high HIV prevalence Latino public health clinics, we conducted two parallel analyses comparing the odds of recent and lifetime HIV testing among otherwise similar older and younger at-risk adults.

Methods

Population and Setting

This was a cross-sectional analysis of data from L.A. VOICES, a representative sample survey of underserved Los Angeles residents seeking services in high HIV prevalence venues. A detailed description of the L.A. VOICES study design and methods are published elsewhere (Newman et al., 2009). Briefly, we surveyed racially and ethnically diverse adults (*N*=1,302) presenting for services at STD clinics (*n*=12), NES (*n*=8) and Latino community clinics that provide HIV services (*n*=8) (Kinsler et al., 2009). We used multi-stage random sampling to select venues within the three venue-based strata, four-hour visit sessions within each selected venue and clients presenting during each selected four-hour session. Trained research staff collected the data between August 2006 and May 2007 via computer-assisted, face-to-face interviews in English or Spanish during participants' visits. Inclusion criteria were aged >17 years, not employed by the site where recruited, and not known to be HIV-positive at the time of recruitment. All participants provided informed consent and received $20 for participating. The analysis was based on those for whom data on age and HIV testing were complete (*N*=1,238; 95.1% of all L.A. VOICES participants). The institutional review boards of [BLINDED FOR REVIEW] reviewed and approved the study protocol.

Measures

The first dependent variable, *recent HIV testing* (i.e., tested for HIV infection in the past 12 months), reflects the CDC recommendation (Branson et al., 2006) that persons in high-risk categories and others at risk for HIV infection receive HIV testing at least annually. We computed the variable based on the interview date and self-reported date of last HIV test. We coded the variable yes = "1" if the last test occurred within 12 months of the interview and no = "0" if not.

The second dependent variable, ***ever*** *tested for HIV infection*, assessed a respondent's lifetime HIV testing behavior by asking, "Have you ever had a test for HIV?" Response options included yes, no, don't know and refused. We coded responses of yes "1", and no,

"0". Responses of don't know and refused were coded as missing and excluded from the analyses.

The main independent variable, *age category*, was derived from the continuous measure of self-reported age in years. We coded age category "1" if respondents were age >50 years and coded it "0" if they were age <50 years.

Based on the conceptual model, we included eight predisposing, enabling and need factors as covariates.

Predisposing Factors—*Sex* was self-reported as male or female. A single item categorized *race/ethnicity* as Hispanic/Latino, non-Hispanic white, non-Hispanic black or African American, non-Hispanic Asian or Pacific Islander, non-Hispanic American Indian or Alaska Native, "other" race/ethnicity, or as multiple racial/ethnic backgrounds. The latter two categories were named in a follow-up, open-ended item. *Educational attainment* was an ordinal variable with response options of less than high school, high school diploma or General Educational Development (GED), some college, and college degree or higher.

Enabling Factors—Current source of *health insurance*, if any, was assessed from seven items asking whether participants had: MediCal (Medicaid); Medicare; CHAMPUS/ veteran's; private insurance; student insurance; and, any other source of health insurance. We collapsed the variable into three categories of uninsured, public insurance, or private/ employer insurance. *Usual source of health care* was a binary variable coded "1" if participants responded yes to an item asking whether they had a usual source of care, and "0" if they indicated no usual source of care.

Need Factors—To assess *perceived HIV risk*, we adapted an existing eight-item summative scale (Cronbach's $\alpha = 0.59$) (DeHart, 1997) with response options on a Likert-type scale ranging from strongly disagree to strongly agree. Response values were transformed to a standardized 100-point scale in which higher scores reflected higher perceived risk of acquiring HIV. Using two binary variables, we assessed membership in each of two high-risk transmission categories. *Males who have sex with other males (MSM)* was a binary variable assessed by comparing participants' own sex and the reported sex(es) of their sexual partners based on a series of questions about recent and lifetime sexual behaviors. Recent *injection drug use* (IDU) was assessed via one item asking, "How many times did you inject drugs in the last 30 days?" We created a binary variable coded "1" if participants reported any IDU in the past 30 days and coded "0" if they report no IDU in the past 30 days.

Data analysis

We first computed descriptive statistics for all variables, including univariate frequencies, missings, and skewness. Using chi^2 for categorical variables and t-tests for continuous ones, we explored predisposing, enabling and need factors by age category and compared the proportions of older and younger adults who reported recent and ever HIV testing. Using unadjusted and weighted adjusted analyses, we examined associations between age category

and each HIV testing outcome separately. Perceived HIV risk may decrease with age; therefore, we examined potential interaction between age category and perceived HIV risk, but found no significant association. Each adjusted analysis involved multiple logistic regression with generalized estimating equations (GEE) and controlled for the aforementioned covariates (e.g., perceived risk). The GEE statistical technique accounted for the complex survey design and variance clustering at the venue level (Stokes, Davis, & Koch, 2000). Although venue was the stratification variable in the sampling strategy, we also conducted sensitivity analyses to determine if the estimates in our focal relationships change by including venue in the models as a covariate. We conducted the analysis using Stata software version 10 (Stata Corporation, 2007).

Results

Participant characteristics

The sample (*N*=1,238) comprised 1,012 (81.7%) adults aged < 50 years and 226 adults (18.3%) aged >50 years. Table 1 lists selected sample characteristics by age category; the *P* values reflect comparisons between older and younger adults on each variable. Participants ranged in age from 17-85 years (data not shown). Compared to younger adults, greater proportions of older adults were NES clients (51.3% vs. 26.9%), male (64.6% vs. 55.2%), unemployed or retired (69.9% vs. 43.5%), and lacked a high school diploma (39.8% vs. 27.9%). Median household income ranged from $0 - $300,000 for younger adults and $0 - $120,000 for older adults (data not shown). Greater proportions of older adults compared to younger adults had public or private health insurance and a usual source of health care. The distributions of older and younger adults did not vary by race/ethnicity or HIV knowledge. Recent injection drug use was significantly higher among older adults, but perceived HIV risk and MSM sexual contact were higher among younger adults.

Descriptive statistics on HIV testing by age category

Table 2 presents histories of recent and lifetime HIV testing by age category. *P* values from the statistical tests comparing older and younger testers on each variable. Though 66.3% (*n*=821) of the sample had tested for HIV infection at least once in the past 12 months as recommended, nearly one third (31.3%, *n*=317) of younger adults and nearly half (44.3%, *n*=100) of older adults had not (Table 2). Among recent non-testers, greater proportions of older adults than younger adults were female, Latino, STD clinic or Latino clinic clients, employed, uninsured or privately insured, lacking healthcare, and not recently engaged in MSM behavior.

While 83.5% (*n*=1,034) of the sample had *ever* received HIV testing, 15% (*n*=152) of younger adults and 23% of older adults (*n*=52) had *never* done so (Table 2). Among never testers, greater proportions of older vs. younger non-testers were female, Latino, STD clinic clients, employed, uninsured or privately insured, lacked healthcare and did not report MSM behavior. As with recent testers, older and younger *ever* testers had similar levels of HIV knowledge, but older adults had lower perceived risk (mean scores of 2.9 vs. 3.1, *P*=0.0032).

Age category and recent HIV testing

The unadjusted association between age category and recent HIV testing (OR=0.6; 95% CI=0.4–0.95) indicated 40% lower odds of testing for older than for younger clients. In the adjusted models (Table 3), which controlled for demographic factors, having a usual source of care, insurance status, perceived HIV risk and MSM or IDU risk behavior, the relationship remained essentially unchanged. Similar though somewhat less extreme findings (OR=0.7; 95% CI = 0.5–1.0) were observed when venue was included in the models as a covariate (data not shown).

Age category and lifetime HIV testing

The unadjusted association between age category and lifetime HIV testing (OR=0.5; 95% CI=0.3–0.8) indicated a nearly 50% lower odds of testing for older compared to younger clients. In the adjusted models, which controlled for the aforementioned covariates, the odds of *lifetime* HIV testing improved only 8% for older adults (OR=0.6; 95% CI=0.4–0.9). As with recent HIV testing, the odds of *lifetime* testing were 40% lower for older adults than for younger adults, controlling for covariates. The estimate (OR=0.7; 95% CI 0.4–1.1) obtained by including venue in the model was not significant (data not shown).

Discussion

Despite current recommendations that every client in high HIV prevalence settings receive routine HIV testing during her/his visit, substantial proportions of these NES, STD clinic and high HIV prevalence Latino health clinic clients had not done so. As hypothesized, significantly greater proportions of older than younger clients had tested neither recently nor ever. Consistent with the existing literature, older adults had lower perceived HIV risk than younger adults did (Maes & Louis, 2003; Ostermann, Kumar, Pence, & Whetten, 2007). After controlling for risk behaviors and other factors, however, older adults still had 40% lower odds of recent or lifetime HIV testing relative to younger adults. These aging-related disparities offer support for the hypothesis (Coon et al., 2003) that even among at-risk persons older adults may receive fewer HIV services than younger adults do.

The observed HIV testing patterns fall within previously published ranges. In prior research, approximately 27% of older adults in high prevalence venues (Ford, Wallace, Newman, Lee, & Cunningham, 2013), but 40% of those in a lower prevalence population-based survey (Kaiser Family Foundation, 2009) and nearly 80% of those in a nationally representative, mainstream sample (Harawa, Leng, Kim, & Cunningham, 2011) had never tested. Prior qualitative research suggests that what motivates testing (e.g., perceived risk, remembering the beginning of the epidemic) differs for gay men, heterosexual persons and injection drug users (Lekas, Schrimshaw, & Siegel, 2005).

Where individuals sought services partially explains the HIV testing patterns. Among older clients, greater proportion of NES clients than STD clinic or Latino clinic clients reported recent or lifetime HIV testing. Among NES clients, a greater proportion of older adults than younger adults reported recent or lifetime HIV testing. Together with prior research, these findings suggest NES clients may differ from clients of STD and Latino clinics. They may

use the service more often (e.g., to obtain needles frequently) or be less likely to obtain services in formal healthcare settings (Thrasher, Ford, & Nearing, 2005; Turner, Harripersaud, Crawford, Rivera, & Fuller, 2013). NES may be useful venues for delivering HIV services to "hard-to-reach" older adults (Turner et al., 2013; Wood, Kerr, Tyndall, & Montaner, 2008).

As compared to whites, the odds of testing were two times higher for blacks, but 40% lower for Latinos. Blacks test more than members of other groups do, but may do so late in the course of HIV infection (Ford, Daniel, & Miller, 2006; Kaiser Family Foundation, 2009, 2012). That 48.9% of our sample was Latino reflects the demographics of Los Angeles (47.7% Latino) (U.S. Census Bureau, 2011). Though Latinos have disproportionately high rates of HIV/AIDS, we observed relatively low levels of HIV testing among them, especially among older Latinos. Acculturation and access to care are generally associated with HIV testing among Latinos (Kinsler et al., 2009); whether they explain the Latino aging-related disparity requires further research.

A gap between current HIV testing recommendations and practices may exist in these settings. Low perceived risk partially explains testing among older adults; however, the relationship between perceived risk and HIV testing is complicated (Ford et al., 2006; Kowalewski, Henson, & Longshore, 1997). Even older adults with high perceived risk may not be screened by their providers (Emlet, 2006; Lekas et al., 2005). Though our measure of perceived risk did not have high internal reliability (Cronbach's $\alpha = 0.59$), we also assessed risk behaviors. Controlling for perceived and behavioral risk, older adults had lower odds of HIV testing.

Why clients who obtain some services (e.g., clean needles) in these venues do not obtain HIV testing is unclear. Most participants, including nearly 80% of older adults, reported a usual source of care. Yet, HIV testing was suboptimal across age categories, which suggests the venues face difficulties (e.g., limited funding) implementing routine testing. The percentage of people with a usual source of care will increase with implementation of the U.S. Affordable Care Act (ACA) ("Patient Protection and Affordable Care Act," 2010). Improving delivery of HIV testing in diverse settings, and creating linkages between healthcare and aging services may be one way to expand HIV screening under the ACA (Emlet & Poindexter, 2004; Ford, Tilson, Smurzynski, Leone, & Miller, 2008; Linsk, Fowler, & Klein, 2003).

Future research should determine if aging-related disparities in recent HIV testing contribute to aging-related disparities in disease progression and AIDS. Though the findings are not generalizable to countries with policies (e.g., regarding needle exchange) or practices (e.g., regarding access to healthcare) that differ from those of the U.S., aging-related disparities may also exist in other countries.

Policy implications to address the disparities include routinizing HIV testing in high prevalence settings. Routinization reduces the possibility of missing undiagnosed cases of HIV infection and circumvents stigma and low perceived HIV risk among older adults. Currently, the recommendations apply to adults age ≤ 64 years; however, our sample

included persons older than 64. Because routine HIV testing is cost effective and late diagnosis is particularly disadvantageous for older adults, we recommend revising the recommendations to clarify that all clients in high HIV prevalence venues should receive HIV screening regardless of age. Policies are also needed to remove structural barriers (e.g., contradictory state policies) that hamper compliance with the recommendations (Mahajan, Stemple, Shapiro, King, & Cunningham, 2009).

Study limitations include its cross-sectional design, which prevents us from establishing whether the associations are causal. The self-reported HIV testing outcomes may overestimate actual rates of testing (Phillips & Catania, 1995). Recent HIV testing was the best proxy for routine HIV testing in the dataset because it reflects the recommendation that at risk persons undergo HIV testing at least annually; however, our measure does not directly assess opt-out HIV screening during a specified visit. Indicators of specific recent sexual behaviors were not available. As other studies have done, we assumed that clients seeking STD diagnosis had engaged in sexual risk behavior; however, we were unable to distinguish higher from lower risk sexual behaviors. Study strengths include L.A. VOICES' complex, probabilistic sampling strategy, which enhances the generalizability of the findings to adults in similar urban public health settings. Using age 50 to mark the beginning of older adulthood enables comparisons across aging-related studies (Centers for Disease Control and Prevention, 2008; Centers for Disease Control and Prevention et al., 2009).

In conclusion, our findings show that even in venues where HIV prevalence is high and HIV testing is available, many clients--especially, those 50 and older--do not receive HIV testing as recommended. Fully implementing the routine HIV testing recommendations and extending testing to all clients regardless of age could increase HIV testing among older adults and reduce aging-related disparities in late HIV diagnosis.

ACKNOWLEDGEMENTS

This research was supported by a seed grant from the UCLA Center for Healthy Aging in Minority Elders, which is supported by the National Institute on Aging's Resource Centers on Minority Aging Research (P30-AG02-1684), and by funding from the National Institute on Mental Health (R01MH69087) awarded to Cunningham (PI) and Newman (Co-PI). Dr. Cunningham received partial support for his time from the National Institute on Drug Abuse (R01 DA030781), the National Institute of Mental Health (R34 MH089719), National Institute on Minority Health and Human Development UCLA/ Charles R. Drew University Project EXPORT (P20 MD000182), and the National Institute on Aging (P30 AG021684). Dr. Lee's time for this manuscript was supported by the National Institute of Mental Health (5K01MH085503). Additional support came from the California Center for Population Research, which is funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (5R24HD041022). The contents of this paper are the sole responsibility of the authors and do not necessarily represent the official views of these Institutes. The authors acknowledge insightful comments from Jessica Gipson and Deborah Mindry.

REFERENCES

Aday LA, Andersen RM. A framework for the study of access to medical care. Health Services Research. 1974

Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? Journal of Health and Social Behavior. 1995; 36:1–10. doi: http://dx.doi.org/10.2307/2137284. [PubMed: 7738325]

Andersen RM, Newman JF. Societal and individual determinants of medical care utilization in the United States. Milbank Memorial Fund Quarterly. Health and Society. 1973; 51:95–124. doi: http://dx.doi.org/10.2307/3349613.

Bos JM, van der Meijden WI, Swart W, Postma MJ. Routine HIV screening of sexually transmitted disease clinic attenders has favourable cost-effectiveness ratio in low HIV prevalence settings. AIDS. 2002; 16(8):1185–1187. [PubMed: 12004280]

Branson BM, Handsfield HH, Lampe MA, Janssen RS, Taylor AW, Lyss SB. Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings. MMWR-Morbidity and Mortality Weekly Report. 2006; 55(RR14):1–17. [PubMed: 16410759]

Centers for Disease Control and Prevention. The HIV Counseling and Testing in Publicly Funded Sites Annual Report, 1997 and 1998. 2001

Centers for Disease Control and Prevention. Epidemiology of HIV/AIDS--United States, 1981-2005. Retrieved April. 2006; 1:2012. http://www.cdc.gov/mmwr/index2006.htm.

Centers for Disease Control and Prevention. [April 1, 2012] HIV/AIDS among persons aged 50 and older. 2008. from Centers for Disease Control and Prevention http://www.cdc.gov/hiv/topics/over50/resources/factsheets/over50.htm

Centers for Disease Control and Prevention, American Association of Retired Persons, & American Medical Association. Promoting Preventive Services for Adults 50-64: Community and Clinical Partnerships. N. A. o. C. D. Directors; Atlanta, GA: 2009. www.cdc.gov/aging

Chen M, Rhodes PH, Hall IH, Kilmarx PH, Branson BM, Valleroy LA. Prevalence of undiagnosed HIV infection among persons aged >/=13 years--National HIV Surveillance System, United States, 2005-2008. MMWR Morb Mortal Wkly Rep. 2012; 61(Suppl):57–64. doi: su6102a10 [pii]. [PubMed: 22695465]

Coon DW, Lipman PD, Ory MG. Designing effective HIV/AIDS social and behavioral interventions for the population of those age 50 and older. J Acquir Immune Defic Syndr. 2003; 33(Supp):S194–S205. [PubMed: 12853869]

DeHart, D. D. a. B.; John, C. Trying to practice safer sex: Development of the sexual risks scale. Journal of Sex Research. 1997; 34(1):11–25. doi: http://dx.doi.org/10.1080/00224499709551860.

Duffus WA, Weis K, Kettinger L, Stephens T, Albrecht H, Gibson JJ. Risk-based HIV testing in South Carolina health care settings failed to identify the majority of infected individuals. AIDS Patient Care STDS. 2009; 23(5):339–345. PMC2856497. doi: 10.1089/apc.2008.0193 [doi]. [PubMed: 19320598]

Emlet CA. “You're awfully old to have this disease”: Experiences of stigma and ageism in adults 50 years and older living with HIV/AIDS. Gerontologist. 2006; 46(6):781–790. doi: http://dx.doi.org/10.1093/geront/46.6.781. [PubMed: 17169933]

Emlet CA, Poindexter CC. Unserved, unseen, and unheard: integrating programs for HIV-infected and HIV-affected older adults. Health Soc Work. 2004; 29(2):86–96. [PubMed: 15156841]

Ford CL, Daniel M, Miller WC. High rates of HIV testing despite low perceived HIV risk among African-American sexually transmitted disease patients. J Natl Med Assoc. 2006; 98(6):841–844. [PubMed: 16775904]

Ford CL, Tilson EC, Smurzynski M, Leone PA, Miller WC. Confidentiality concerns, perceived staff rudeness, and other HIV testing barriers. Journal of Equity in Health. 2008; 1(1):7–21.

Ford CL, Wallace SP, Newman PA, Lee S-J, Cunningham WE. Belief in AIDS-related conspiracy theories and mistrust in the government: Relationship with HIV testing among at-risk older adults. The Gerontologist. 2013; 53(6):973–984. [PubMed: 23362210]

Gardner EM, McLees MP, Steiner JF, Del Rio C, Burman WJ. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clin Infect Dis. 2011; 52(6):793–800. PMC3106261. doi: ciq243 [pii] 10.1093/cid/ciq243 [doi]. [PubMed: 21367734]

Hall HI, McDavid K, Ling Q, Sloggett A. Determinants of progression to AIDS or death after HIV diagnosis, United States, 1996 to 2001. Ann Epidemiol. 2006; 16(11):824–833. doi: S1047-2797(06)00035-4 [pii] 10.1016/j.annepidem.2006.01.009 [doi]. [PubMed: 17067817]

Harawa NT, Leng M, Kim J, Cunningham WE. Racial/ethnic and gender differences among older adults in nonmonogamous partnerships, time spent single, and human immunodeficiency virus testing. Sexually Transmitted Diseases. 2011; 38(12):1110–1117. doi: 10.1097/OLQ.0b013e31822e614b [doi]. [PubMed: 22082721]

Kaiser Family Foundation. Views and Experiences with HIV Testing in the United States (Report No. 7926). Menlo Park, CA.: 2009.

Kaiser Family Foundation. HIV Testing in the United States. Menlo Park, CA.: 2012.

Kinsler JJ, Lee S-J, Sayles JN, Newman PA, Diamant A, Cunningham WE. The impact of acculturation on utilization of HIV prevention services and access to care among an at-risk hispanic population. Journal of Health Care for the Poor and Underserved. 2009; 20:996–1011. doi: http://dx.doi.org/10.1353/hpu.0.0204. [PubMed: 20168013]

Kirk JB, Goetz MB. Human immunodeficiency virus in an aging population, a complication of success. Journal of the American Geriatric Society. 2009; 57(11):2129–2138. doi: 10.1111/j.1532-5415.2009.02494.x [doi].

Kowalewski MR, Henson KD, Longshore D. Rethinking perceived risk and health behavior: a critical review of HIV prevention research. Health Educ Behav. 1997; 24(3):313–325. [PubMed: 9158976]

Lekas HM, Schrimshaw EW, Siegel K. Pathways to HIV testing among adults aged fifty and older with HIV/AIDS. AIDS Care. 2005; 17(6):674–687. doi: http://dx.doi.org/10.1080/09540120412331336670. [PubMed: 16036254]

Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muircheartaigh CA, Waite LJ. A study of sexuality and health among older adults in the United States. New England Journal of Medicine. 2007; 357(8):762–774. doi: 10.1056/NEJMoa067423 [doi]. [PubMed: 17715410]

Linsk NL, Fowler JP, Klein SJ. HIV/AIDS prevention and care services and services for the aging: bridging the gap between service systems to assist older people. Journal of Acquired Immune Deficiency Syndromes. 2003; 33(Suppl 2):S243–250. doi: http://dx.doi.org/10.1097/00126334-200306012-00025. [PubMed: 12853877]

MacKellar DA, Valleroy LA, Secura GM, Behel S, Bingham T, Celentano DD. Unrecognized HIV infection, risk behaviors, and perceptions of risk among young men who have sex with men: opportunities for advancing HIV prevention in the third decade of HIV/AIDS. J Acquir Immune Defic Syndr. 2005; 38(5):603–614. [PubMed: 15793373]

Maes CA, Louis M. Knowledge of AIDS, perceived risk of AIDS, and at-risk sexual behaviors among older adults. J Am Acad Nurse Pract. 2003; 15(11):509–516. [PubMed: 14685988]

Mahajan AP, Stemple L, Shapiro MF, King JB, Cunningham WE. Consistency of state statutes with the Centers for Disease Control and Prevention HIV testing recommendations for health care settings. Ann Intern Med. 2009; 150(4):263–269. PMC2874823. [PubMed: 19221378]

May M, Gompels M, Delpech V, Porter K, Post F, Johnson M. Impact of late diagnosis and treatment on life expectancy in people with HIV-1: UK Collaborative HIV Cohort (UK CHIC) Study. BMJ. 2011; 343:d6016. [PubMed: 21990260]

Newman PA, Lee SJ, Duan N, Rudy E, Nakazono TK, Boscardin J. Preventive HIV vaccine acceptability and behavioral risk compensation among a random sample of high-risk adults in Los Angeles (LA VOICES). Health Serv Res. 2009; 44(6):2167–2179. doi: HESR1039 [pii] 10.1111/j.1475-6773.2009.01039.x [doi]. [PubMed: 19780857]

Ostermann J, Kumar V, Pence BW, Whetten K. Trends in HIV testing and differences between planned and actual testing in the United States, 2000-2005. Arch Intern Med. 2007; 167(19):2128–2135. doi: 167/19/2128 [pii] 10.1001/archinte.167.19.2128 [doi]. [PubMed: 17954809]

Paltiel AD, Weinstein MC, Kimmel AD, Seage GR 3rd, Losina E, Zhang H. Expanded screening for HIV in the United States--an analysis of cost-effectiveness. N Engl J Med. 2005; 352(6):586–595. [PubMed: 15703423]

Patient Protection and Affordable Care Act. U. S. Congress (Ed.). 2010; 42

Phillips KA, Catania JA. Consistency in self-reports of HIV testing: longitudinal findings from the National AIDS Behavioral Surveys. Public Health Reports. 1995; 110(6):749–753. [PubMed: 8570830]

Sankar A, Nevedal A, Neufeld S, Berry R, Luborsky M. What do we know about older adults and HIV? A review of social and behavioral literature. AIDS Care. 2011; 23(10):1187–1207. PMC3199226. doi: 10.1080/09540121.2011.564115 [doi]. [PubMed: 21939401]

Schensul JJ, Levy JA, Disch WB. Individual, contextual, and social network factors affecting exposure to HIV/AIDS risk among older residents living in low-income senior housing complexes. Journal of Acquired Immune Deficiency Syndromes. 2003; 33(Suppl 2):S138–152. doi: http://dx.doi.org/10.1097/00126334-200306012-00011. [PubMed: 12853863]

Stata Corporation. Stata for Windows (Version 10/SE). StataCorp LP.; College Station, TX: 2007.

Stokes, ME.; Davis, CS.; Koch, GG. Generalized Estimating Equations Categorical Data Analysis Using the SAS® System. SAS Institute; Cary, NC: 2000. p. 254

Tangredi LA, Danvers K, Molony SL, Williams A. New CDC recommendations for HIV testing in older adults. The Nurse Practitioner. 2008; 33(6):37–44. [PubMed: 18528202]

Thrasher AD, Ford CL, Nearing KD. Social and policy consequences of routine HIV testing [editorial]. New England Journal of Medicine. 2005; 352(20):2137–2139. [PubMed: 15906435]

Turner AK, Harripersaud K, Crawford ND, Rivera AV, Fuller CM. Differences in HIV risk behavior of injection drug users in New York City by health care setting. AIDS Care. 2013; 25(10):1321–1329. doi: 10.1080/09540121.2013.772275 [doi]. [PubMed: 23451991]

U.S. Census Bureau. State and county quick facts. Los Angeles, CA: 2011. 2010. Retrieved from http://factfinder.census.gov

Wood E, Kerr T, Tyndall MW, Montaner JS. A review of barriers and facilitators of HIV treatment among injection drug users. Aids. 2008; 22(11):1247–1256. doi: 10.1097/QAD.0b013e3282fbd1ed [doi] 00002030-200807110-00001 [pii]. [PubMed: 18580603]

Wortley PM, Chu SY, Diaz T, Ward JW, Doyle B, Davidson AJ. HIV testing patterns: where, why, and when were persons with AIDS tested for HIV? AIDS. 1995; 9(5):487–492. [PubMed: 7639974]

Zingmond DS, Wenger NS, Crystal S, Joyce GF, Liu H, Sambamoorthi U. Circumstances at HIV diagnosis and progression of disease in older HIV-infected Americans. American Journal of Public Health. 2001; 91(7):1117–1120. doi: http://dx.doi.org/10.2105/AJPH.91.7.1117. [PubMed: 11441741]

Table 1

Unweighted Characteristics of Younger and Older Adults Seeking Services at Needle Exchange Sites, STD Clinics, and Latino Community-based Clinics (*N*=1,238)[a]

	Age < 50 years (n=1,012)		Age ≥ 50 years (n=226)		Total[c]		*p*
Venue, *n* (%)							<0.0001
STD[b] clinic	400	(39.5)	27	(12.0)	427	(34.5)	
Needle exchange site	272	(26.9)	116	(51.3)	388	(31.3)	
Latino clinic	340	(33.6)	83	(36.7)	423	(34.2)	
Sex, *n* (%)							0.0102
Female	453	(44.8)	80	(35.4)	533	(43.1)	
Male	559	(55.2)	146	(64.6)	705	(57.0)	
Race/ethnicity, *n* (%)							0.4771
Hispanic/Latino	501	(49.5)	104	(46.0)	605	(48.9)	
White	186	(18.4)	41	(18.1)	227	(18.3)	
Black	208	(20.6)	57	(25.2)	265	(21.4)	
Other	117	(11.6)	24	(10.6)	141	(11.4)	
Educational attainment, *n* (%)							0.0026
<HS[b]	282	(27.9)	90	(39.8)	372	(30.1)	
HS degree or GED[b]	289	(28.6)	62	(27.4)	351	(28.4)	
Some college	312	(30.8)	54	(23.9)	366	(29.6)	
Bachelors degree or higher	129	(12.8)	20	(8.8)	149	(12.0)	
Employment status, *n* (%)							<0.0001
Currently unemployed or retired	440	(43.5)	158	(69.9)	598	(48.3)	
Currently employed	572	(56.5)	68	(30.1)	640	(51.7)	
Monthly income in $, mean (s.d.)[b]	2,246	(10,582)	1,882	(8,141)	2,180	(10,177)	0.5687
Insurance status, *n* (%)							0.0014
Uninsured	526	(52.3)	106	(46.9)	632	(51.3)	
Public insurance	258	(25.7)	84	(37.2)	342	(27.8)	
Private insurance	222	(22.1)	36	(15.9)	258	(20.9)	
Usual source of care, *n* (%)							<0.0001

	Age < 50 years (n=1,012)		Age ≥ 50 years (n=226)		Total[c]		*p*
No	340	(33.6)	44	(19.5)	384	(31.0)	
Yes	672	(66.4)	182	(80.5)	854	(69.0)	
Where usual source of care, *n* (%)							0.0867
Private doctor	181	(22.1)	46	(22.8)	227	(22.3)	
Community clinic	477	(58.3)	107	(53.0)	584	(57.3)	
Hospital clinic	106	(13.0)	34	(16.8)	140	(13.7)	
ER[b]	44	(5.4)	8	(4.0)	52	(5.1)	
Other	10	(1.2)	7	(3.5)	17	(1.7)	
HIV knowledge, mean (s.d.)[b]	0.59	(0.1)	0.58	(0.1)	0.59	(0.14)	0.2811
Perceived risk, mean (s.d.)[b]	3.06	(0.8)	2.92	(0.8)	3.04	(0.8)	0.0173
MSM[b] status, *n* (%)	179	(17.7)	22	(9.7)	201	(16.2)	0.0034
IDU[b] in past 30 days, *n* (%)	234	(23.1)	86	(38.1)	320	(25.9)	<0.0001

[a] Data are rounded and exclude missings; therefore, they may not sum to 100%. Data were missing for the following variables as indicated: monthly income (*n*=13), insurance status (*n*=6), where usual source of care (*n*=218), HIV knowledge (*n*=19), perceived HIV risk (*n*=1)

[b] STD=sexually transmitted disease; HS=high school; GED=general education development; ER=emergency room; MSM=men having sex with men; IDU=injection drug use

[c] Column frequency and percent totals

Table 2

HIV Tested in the Past 12 Months and *Ever* HIV Tested by Age Category (<50 vs. ≥ 50 years) (*N*=1,238)[a]

	HIV Tested past 12 months, *n*=821		***p***	***Ever* HIV Tested, *n*=1,034**		***p***
	<50 yrs	**>50 yrs**		**<50 yrs**	**>50 yrs**	
Overall	695	126		860	174	
Sex, *n* (%)			0.0009			0.0011
Female	303 (43.6)	35 (27.8)		382 (44.4)	54 (31.0)	
Male	392 (56.4)	91 (72.2)		478 (55.6)	120 (69.0)	
Race, *n* (%)			0.0356			0.0893
Latino	308 (44.3)	39 (31.0)		397 (46.2)	66 (37.9)	
White	129 (18.6)	26 (20.6)		172 (20.0)	35 (20.1)	
Black	173 (24.9)	43 (34.1)		190 (22.1)	53 (30.5)	
Other	85 (12.2)	18 (14.3)		101 (11.7)	20 (11.5)	
Venue, *n* (%)			<0.0001			<0.0001
STD[b] clinic	332 (47.8)	21 (16.7)		373 (43.4)	22 (12.6)	
Needle exchange site	191 (27.5)	84 (66.7)		249 (29.0)	107 (61.5)	
Latino clinic	172 (24.8)	21 (16.7)		238 (27.7)	45 (25.9)	
Employment status, *n* (%)			<0.0001			<0.0001
Unemployed or retired	301 (43.3)	91 (72.2)		374 (43.5)	127 (73.0)	
Employed	394 (56.7)	35 (27.8)		486 (56.5)	47 (27.0)	
Insurance status, *n* (%)			0.0009			0.0003
Uninsured	355 (51.4)	50 (39.7)		438 (51.2)	75 (43.1)	
Public	178 (25.8)	53 (42.1)		230 (26.9)	73 (42.0)	
Private	158 (22.9)	23 (18.3)		187 (21.9)	26 (14.9)	
Have usual source of care, *n* (%)			0.0087			<0.0001
No	237 (34.1)	28 (22.2)		297 (34.5)	33 (19.0)	
Yes	458 (65.9)	98 (77.8)		563 (65.5)	141 (81.0)	
Where usual source of care, *n* (%)			0.0008			0.0179
Private doctor	132 (23.66)	26 (23.2)		156 (22.58)	36 (22.9)	
Community clinic	310 (55.56)	47 (42.0)		390 (56.44)	74 (47.1)	

	HIV Tested past 12 months, *n*=821		*p*	*Ever* HIV Tested, *n*=1,034		*p*
	<50 yrs	**>50 yrs**		**<50 yrs**	**>50 yrs**	
Hospital clinic	75 (13.44)	26 (23.2)		94 (13.60)	32 (20.4)	
ER[b]	33 (5.91)	6 (5.4)		41 (5.93)	8 (5.1)	
Other place	8 (1.4)	7 (6.3)		10 (1.5)	7 (4.5)	
HIV knowledge, range 0-1 (s.d.)[b]	0.59 (0.1)	0.59 (0.1)	0.8581	0.59 (0.1)	0.59 (0.1)	0.9135
Perceived risk, mean (s.d.)[b]	3.13 (0.8)	2.97 (0.9)	0.0387	3.10 (0.8)	2.89 (0.9)	0.0032
Risk Category						
MSM[b] status	147 (21.2)	15 (11.9)	0.0164	172 (20.0)	19 (10.9)	0.0049
IDU[b] in past 30 days	163 (23.5)	62 (49.2)	<0.0001	216 (25.1)	79 (45.4)	<0.0001
Monthly income ($), mean (s.d.)[b]	2,369 (12,471)	1,379 (2,021)	0.0520	2,251 (11,259)	1,986 (9,258)	0.7420

[a]Values may not sum to 100% due to missing observations on each of the following variables: usual source of care (recent HIV tested, 151 missings; ever HIV tested, 186 missings), insurance status (recent HIV tested, 4 missings) HIV knowledge (recent HIV tested, 10 missings; ever HIV tested, 18 missings), perceived HIV risk (past 12 months, 1 missing; ever tested, 1 missing), and monthly income (past 12 months, 8 missings).

[b]STD=sexually transmitted disease; ER=emergency room; MSM=men having sex with men; IDU=injection drug use

Table 3

Adjusted Logistic Regression Model of Tested for HIV Infection in the Past 12 Months (*N*=1,231)

	AOR	95% CI	*p*
Age category (≥50)	0.6	[0.4 - 0.9]	0.013
Sex (male)	0.9	[0.6 - 1.3]	0.592
Race/ethnicity			
Black	2.0	[1.1 - 3.7]	0.021
Hispanic	0.6	[0.4 - 1.0]	0.056
Other race/ethnicity	1.1	[0.6 - 2.1]	0.850
Educational attainment (ref [b]=college degree or higher)			
<HS[b]	0.5	[0.2 - 0.8]	0.011
HS[b] degree or GED[b]	0.5	[0.3 - 0.9]	0.029
Some college education	0.7	[0.4 - 1.3]	0.265
Have usual source of care	1.1	[0.7 - 1.8]	0.661
Insurance status (ref[b]=private)			
Public insurance	1.2	[0.8 - 2.0]	0.374
No insurance	1.1	[0.7 - 1.8]	0.691
Perceived HIV risk	1.5	[1.2 - 1.8]	0.000
MSM[b] status	1.6	[1.0 - 2.5]	0.031
Injection drug use in past 30 days	1.3	[0.8 - 2.1]	0.272

[a] AOR=adjusted odds ratio; CI=confidence level

[b] ref=referent; HS=high school; GED=general education development; MSM=men having sex with men