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Recent HIV Testing Prevalence, Determinants, and Disparities Among US Older Adult Respondents to the Behavioral Risk Factor Surveillance System

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Abstract

Background—Although routine human immune deficiency virus (HIV) testing during health care visits is recommended for most adults, many older adults (i.e., ages 50–64 years) do not receive it. This study identified factors associated with HIV testing in the past 12 months (i.e., recent HIV testing) among US adults in the 3 categories of older adulthood (50–54, 55–59, and 60–64 years) for which routine HIV testing is recommended.

Method—This was a cross-sectional analysis of data from US older adult respondents to the 2010 Behavioral Risk Factor Surveillance System. We calculated prevalence (proportions) of HIV testing by age category and race/ethnicity. Using multiple logistic regression, we identified predisposing, enabling, and need factors associated with recent HIV testing within and across age categories, by race/ethnicity and controlling for covariates.

Results—HIV testing prevalence was low (<5%), varied by race/ethnicity, and decreased with age. Within and across age categories, the odds of testing were highest among blacks (odds ratio [OR], 3.47; 95% confidence interval [CI], 2.82–4.25) and higher among Latinos (OR, 2.06; 95% CI, 1.50–2.84) and the oldest and youngest categories of American Indians/Alaska Natives (OR,

2.48; 95% CI, 1.11–5.55; OR, 2.98; 95% CI, 1.49–5.95) than among whites. Those reporting a recent doctor visit (OR, 2.32; 95% CI, 1.92–2.74) or HIV risk behaviors (OR, 3.50; 95% CI, 2.67–4.59) had higher odds of HIV testing.

Conclusion—Regardless of risk, the oldest older adults, whites, and older women may forego HIV testing. Doctor visits may facilitate HIV testing. Additional research is needed to understand why eligible older adults seen by providers may not be screened for HIV infection.

Background

An estimated 14% to 20% of US residents living with human immunodeficiency virus and acquired immune deficiency syndrome (HIV/AIDS) are unaware of their HIV positive status because they have not received an HIV test recently[1,2] The US Preventive Services Task Force (USPSTF) recommends at least 1 lifetime HIV test for adults younger than 65 years and repeated tests for persons who have known risk behaviors and for those in residential or clinical settings where HIV prevalence is 1% or greater. Based on evidence of the cost-effectiveness of universal screening (for instance, among blood donors and pregnant women), the Centers for Disease Control and Prevention (CDC) further recommends that in "all health-care settings, screening for HIV infection should be performed routinely for all patients aged 13–64 years. Health-care providers should initiate screening unless prevalence of undiagnosed HIV infection in their patients has been documented to be <0.1%."[3,4] Routine HIV testing is the best strategy for early detection of HIV infection, especially among populations otherwise unlikely to obtain an HIV test.

Early detection may be especially important for older adults among whom HIV prevalence is increasing. Older adults are disproportionately diagnosed late in the course of HIV disease, often after they have already developed some other condition. Late diagnosis is associated with rapid progression to AIDS,[5–7] and it exacerbates the management of both HIV disease and the comorbid conditions that are common during older adulthood (e.g., hypertension).[8] The disproportionate burden of late diagnosis among older adults suggests that many have not been tested for HIV infection recently or routinely, although the recommendations apply to people aged 50 to 64 years. HIV testing and the determinants of testing among older adults are poorly understood.[1,9] It is also unclear if, given racial/ethnic disparities in HIV/AIDS prevalence and diagnosis, racial/ethnic differences in testing or the determinants of testing also exist.[10]

The purposes of this study were to (1) estimate the prevalence of recent HIV testing among US older adults; (2) determine the extent to which HIV testing varies by age category; (3) identify predisposing, enabling, and need factors associated with recent HIV testing; and, (4) clarify racial/ethnic differences in the prevalence and determinants of recent HIV testing in this age category. Guided by Andersen's[11] health care utilization model, we identified factors associated with obtaining an HIV test in the past 12 months. Although older adults experience HIV risk and the consequences of late diagnosis can be dire for them, risk and testing behaviors change with age, and the cut points used to define older adulthood vary across studies (e.g., 50 vs. 65 years)[3,12]; therefore, we examined the three 5-year age categories of older adulthood (50–54, 55–59, and 60–64 years) for which CDC's routine

HIV testing recommendations are relevant.[13] We calculated the proportions of 2010 BRFSS older adult respondents overall and in each 5-year age increment who obtained an HIV test in the past 12 months, examined factors associated with recent HIV testing within and across the 3 age categories, and compared racial/ethnic groups relative to their testing proportions and determinants.

The study used data from a nationally representative, probability sample, the Behavioral Risk Factor Surveillance System (BRFSS), which is the nation's most comprehensive system for monitoring health behaviors, chronic diseases, health care utilization, and other factors influencing the health of the general population. For 30 years, CDC has conducted this telephone survey annually in every US state, the District of Columbia, and 3 US territories.[14] State health departments administer it to a sample of its residents. Behavioral Risk Factor Surveillance System samples are representative of the US population and each state's population.

Materials and Methods

Conceptual Model

Our conceptual model (Fig. 1) adapts the Healthcare Utilization Model[11] widely used to examine patient behaviors, including HIV testing, in health care settings. As other studies[15] have done, we truncated the model to focus on a behavioral (not disease) outcome, recent HIV testing, as predicted by predisposing, enabling, and need factors. Predisposing factors are personal attributes such as demographic characteristics that may incline one toward or against HIV testing. Enabling factors represent an individual's means to obtain testing (e.g., insurance); they may facilitate or impede access to it. Need factors indicate whether HIV testing is warranted.

Design

This was a cross-sectional, secondary analysis of publicly available 2010 BRFSS data from all US states and the District of Columbia. The BRFSS randomly sampled US households with landline telephones. Details on BRFSS's sampling strategy, design, and data collection are published elsewhere.[14]

Sample

There were 149,392 BRFSS respondents aged 50 to 64 years in 2010; our sample (n = 143,247) includes all those with complete data on the study variables.

Data Collection and Measures

Measures—The dependent variable, *recent HIV testing*, indicated whether or not a respondent had an HIV test in the past 12 months. We calculated it based on responses to an item asking if respondents had ever tested for HIV and if so, the month and year of the last HIV test.

The main independent variable was *age category*, which we assessed from an item that asked respondents their age in years. We recoded the variable into three 5-year increments (50–54,

55–59, and 60–64 years). Based on our conceptual model, we accounted for 6 predisposing factors: *race/ethnicity* (Hispanic, non-Hispanic white, non-Hispanic black, non-Hispanic Asian/Native Hawaiian/Other Pacific Islander, Non-Hispanic American Indian (AI)/Alaska Native (AN), and non-Hispanic "other"), *sex* (male, female), *marital status* (divorced/ separated/never married widowed or married/living together), *employment status* (unemployed, employed or retired), *educational attainment* (less than high school, high school diploma, at least some college), and *total annual household income* from all sources (<$20,000 vs. $20,000). Enabling factors included medical costs that kept one from seeing a doctor in the past 12 months (yes/no), insurance status (insured not insured), and having a usual source of care (yes/no). Additionally one item assessed whether respondents saw a doctor in the past 12 months for routine care. We coded it "1" if they had and "0" if not. HIV tests can be obtained outside doctors' offices; however, the recommendations target providers; therefore, we treated this variable as a potential modifier, although research based on the Healthcare Utilization Model typically considers it an indicator of health care utilization. A subjective need factor indicated whether respondents engaged in HIV risk behaviors (intravenous drug use, sexually transmitted diseases, exchanging sex for drugs or money, anal sex without a condom) in the past 12 months (yes/no).

Statistical Analysis

In the preliminary analysis, we obtained univariate and bivariate statistics. Risk behaviors tend to decrease with age; therefore, we assessed potential interaction between age and HIV risk behaviors. The corresponding *P* values were not significant. Because life expectancy varies by race/ethnicity, we also assessed potential interaction between race and age, and between age and the enabling factors. Only the race by age interactions were significant and, therefore, retained in the analysis. We assessed potential confounding by the covariates in our conceptual model.

The main analysis involved multiple logistic regression to identify predisposing, enabling, and need factors associated with recent HIV testing. We used a forward model-building process. To the baseline model, which included race/ethnicity, age, and race by age interaction terms, we sequentially added the predisposing (model 2), enabling (model 3), and need (model 4) factors. To account for unequal probability of selection, nonresponse, and non-coverage, weights were applied using the SVY suite of commands in STATA version 10.[16] As a sensitivity analysis, we linked CDC data on state-level HIV prevalence to each observation, restricted the sample (n = 129,917) to residents of states (n = 43) where 2010 HIV prevalence was greater than 0.1%, and replicated the analysis.

Results

Table 1 presents sample characteristics by recent HIV testing behavior and age category. Overall, half of the sample was female, and three-fourths reported having white race (not shown). Few respondents lacked health insurance (12.81%) or a usual source of care (11.33%); indeed, approximately 70% of respondents had recent doctor visits, and this increased steadily with age, although medical costs kept 13.83% of respondents from seeing a doctor in the past 12 months (not shown). Fewer than 2% of the sample reported risk

behaviors, and this proportion decreased with age. On average, nearly 4% of the sample had tested for HIV in the past 12 months; the proportion of testers decreased slightly with age. Most tests were obtained at a private doctor, health maintenance organization, or clinic, and this did not vary by age category.

Across and within age categories, greater proportions of those with versus without recent doctor visits (5.29% vs. 2.07% of 50- to 54-year-olds, 4.15% vs. 2.41% of 55- to 59-year-olds, and 3.36 vs. 1.37% of 60- to 64-year-olds) had tested (not shown). By race/ethnicity, the adjusted prevalence of HIV testing was highest among blacks and higher among Latinos than whites across age categories (not shown).

The multivariable models included interaction terms for the relationship between race/ethnicity and age category. Table 2 presents the age category–stratified adjusted odds ratios (ORs) for the baseline model, which included race/ethnicity, age, and appropriate interactions, and the models generated by sequentially adding predisposing (model 2), enabling (model 3), and need (model 4) factors. Across age categories, the odds of HIV testing were highest among blacks (Table 2, model 4). In the youngest age category, blacks, AI/ANs, Hispanics and persons reporting other race/ethnicity had higher odds of HIV testing than whites did. In the middle age category, blacks and Hispanics had higher odds of HIV testing than did other groups. In the oldest age category, blacks, AIs/ANs, and Hispanics had higher odds of HIV testing than did whites. Across the 3 age categories, the odds of testing decreased for blacks with the addition of the predisposing, enabling, and need covariates (Table 2, models 2–4), respectively; the most substantial decrease occurred with the addition of predisposing factors. Similar though less extreme patterns occurred among AIs/ANs and persons of other race/ethnicity. For Latinos, however, the estimates changed little with the addition of predisposing and enabling factors; they increased most with the addition of need factors.

Table 3 presents the overall results of the multivariable analyses. Predictors of HIV testing included being a man, being divorced or widowed, being unemployed but not retired, low-income status, having seen a doctor for routine care in the past 12 months, and recent risk behavior.

In the subanalysis among higher prevalence states, HIV prevalence ranged from 0.10% to 2.70% (not shown). With respect to age category and race/ethnicity, the estimates were nearly identical to those in the main analysis (not shown).

Discussion

This study estimated recent HIV testing prevalence; identified predisposing, enabling, and need factors associated with having tested in the past 12 months; and explored racial/ethnic differences in recent testing in a nationally representative sample of adults who meet the age criteria for routine HIV testing. The sample-specific prevalence of recent testing was extremely low (<5%). Overall, immutable predisposing factors (race/ethnicity, age, sex), as well as recent doctor visits (an enabling factor) and reported risk behaviors (a need factor) were associated with testing. Because the recommendations target clinical settings, the

findings on doctor visits are noteworthy. Those with recent doctor visits had nearly 2.5 times the odds of testing as those without them; however, fewer than 5% of those with a recent visit had tested. This suggests that older adults either receive care primarily in very low prevalence settings or fail to receive routine opt-out HIV testing when they obtain care in higher-prevalence settings.

Recent HIV testing decreased with age category, but the predictors of testing remained the same across age categories. These factors are known to influence HIV testing among adults in general; therefore, interventions targeting older adults can draw from the more established evidence, which is primarily based on younger adults.[17,18]

Our overall estimates of recent testing are similar to estimates of lifetime HIV testing in the National Health and Nutrition Examination Survey, a nationally representative annual health survey of approximately 5000 persons.[19,20] Although the National Health and Nutrition Examination Survey sample primarily consists of younger adults, the comparability of the findings adds support for our assertion that HIV testing levels are low in some segments of the population. That so few testers (<7%) in our study reported any risk behaviors suggests that their tests were administered as part of preventive care, rather than suspected exposure. Older adults tend to underestimate their HIV risk, and few respondents who reported risk behaviors actually tested. Therefore, screening may facilitate detection of undiagnosed HIV among those who are unaware of their risks.[21] Our findings suggest that the oldest older adults (i.e., ages 60–64 years), as well as women, married persons, and persons other than blacks, AIs/ANs, and Hispanics may also forego HIV testing.

Racial/ethnic differences (Table 2). In general, except for Asian, Hawaiian, or other Pacific Islanders, nonwhites had higher odds of testing than whites did. The greatest difference was between blacks and whites; blacks had roughly 4 times the odds of testing. Nonracial/nonethnic factors may contribute to the disparities. Predisposing factors predicted testing among blacks and to a lesser degree, AIs/ANs and persons of other race/ethnicity. The black/white differences decreased between 12% and 26% when predisposing factors were added to the models (Table 2, model 2). Among Latinos, however, the odds of testing increased after adding predisposing factors; enabling and need factors also predicted testing among Latinos (Table 2, models 2–4). Conceivably, both nativity and targeted outreach, which we were unable to examine in this study, may explain this finding. Fewer immigrants than US-born persons have a usual source of care (an enabling factor). Nearly half the US Latino population is foreign-born,[22] and a greater percentage of Latinos than persons of all races/ethnicities (38.3% vs. 17.3%) are uninsured. Many Latinos who receive HIV testing may do so through targeted public health efforts such as CDC's expanded testing initiative, which provides resources to "reach a broader array of at-risk populations, including African American and Hispanic men and women."[23] Although HIV/AIDS incidence is low among AIs/ANs, it may not be decreasing in this population to the extent it is in others.[2,24] Therefore, the observed levels of testing in these groups, though greater than those for whites, may not address their disproportionate HIV/AIDS burdens.

Overall, seeing a doctor in the past year, an enabling factor, was positively associated with recent HIV testing (Table 3); however, even among those who had seen a doctor, the

proportion tested remained low. As prior research shows, this pattern exists in the general population and among high-risk older adults (e.g., patients with or at risk for sexually transmitted disease).[15] The findings suggest limited adherence to CDC's recommendations, which specify that screening (i.e., routinized opt-out testing of all patients) should occur in most health care settings. Persons who reported risk behaviors had higher odds of testing, which is consistent with USPSTF's risk-based guidelines; however, risk-based testing would miss undiagnosed HIV infections in the approximately 95% of this sample who reported no risk behaviors. Providers can play an important role in diagnosing HIV among older adults[25] who seek care in settings where routine testing is appropriate.[18] Harawa and colleagues[26] found that fewer than 3% of older adults in a nationally representative heterosexual sample had ever been offered an HIV test by their provider. Routinized HIV testing may not always be extended to older adults; however, additional research is needed to test this hypothesis directly. It may be both that providers do not offer HIV tests to older adults (i.e., noncompliance with CDC's recommendations)[27] and that older adults opt out of HIV testing.[28] To achieve the nation's goal of increasing to 90% the proportion of HIV-infected persons who know their status,[29] future research must address barriers to full implementation of the current HIV testing recommendations. Adopting clinical quality assurance processes for providers and educating patients as well as providers may bolster expanded screening in this age group.

Older married couples had lower odds of testing, which reflects the evidence more broadly: people perceive their casual relationships as riskier than their primary ones. Future research should clarify how individual, dyad and partner characteristics (e.g., partner's age) drive the testing behaviors of older adults in relationships.

Limitations and Strengths

As with other nationally representative, non–HIV/AIDS-related health surveys, BRFSS assessed few HIV-specific risk factors. HIV testing was self-reported, which may overestimate actual testing behavior. The global measure of HIV risk did not distinguish degrees of risk (e.g., injection drug use vs. unprotected vaginal intercourse). HIV/AIDS remains stigmatized among older adults[18]; therefore, respondents may have underreported risk behaviors. Although states may have differed in how they administered the survey, the sample is nationally representative.

Implications for Research, Practice, and Policy

Additional research is needed to understand the relatively low levels of HIV testing among black and Latino older adults given the overall high rates of HIV in these racial/ethnic minority populations. Low perceived risk, especially among women, may partially explain the patterns. It is possible some test infrequently or at later stages of HIV disease, which contributes to poorer HIV/AIDS prognosis. Providers are uniquely suited to promote HIV testing among older adults because members of this age group are receptive to prevention messages delivered by providers.[28,30] We recommend that providers talk directly with their older patients during their clinical visits to promote HIV prevention, assess risk, and provide HIV screening. Training providers to do so effectively is a critical next step.

Inconsistency between the USPSTF's guidelines, which emphasize risk-based testing in settings where HIV prevalence is 1.0% or greater, and CDC's recommendations, which emphasize universal screening (i.e., routine HIV testing) in settings where the prevalence of undiagnosed HIV is only 0.1% or greater, may generate uncertainty for providers regarding whom they should test and how often they should test them. The Affordable Care Act requires most new insurers to cover the cost of HIV screening as a preventive service for which patients cannot be charged co-payments or other fees[31]; therefore, it may facilitate widespread implementation of routine HIV testing. Nevertheless, these and other findings suggest that access to health care does not inherently produce optimal levels of HIV testing. Routinely screening older patients during preventive care visits in eligible settings can ensure their inclusion in the nation's ongoing HIV prevention efforts.

Acknowledgments

References

1. Chen M, Rhodes PH, Hall IH, et al. 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.

2. Centers for Disease Control and Prevention. [Accessed December 26, 2014] HIV in the United States: At A Glance. 2014. web pageAvailable at: http://www.cdc.gov/hiv/pdf/statistics_basics_ataglance_factsheet.pdf

3. Branson BM, Handsfield HH, Lampe MA, et al. Revised Recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. MMWR Recomm Rep. 2006; 55:1–17. [PubMed: 16988643]

4. Moyer VA. U.S. Preventive Services Task Force. Screening for HIV: U.S Preventive Services Task Force recommendation statement. Ann Intern Med. 2013; 159:51–60. [PubMed: 23698354]

5. Centers for Disease Control and Prevention (CDC). Late HIV testing—34 states, 1996–2005. MMWR Morb Mortal Wkly Rep. 2009; 58:661–665. Available at: http://www.cdc.gov/mmwr/index2009.html. [PubMed: 19553901]

6. Zingmond DS, Wenger NS, Crystal S, et al. Circumstances at HIV diagnosis and progression of disease in older HIV-infected Americans. Am J Public Health. 2001; 91:1117–1120. [PubMed: 11441741]

7. Kaiser Family Foundation. HIV Testing in the United States. Menlo Park, CA: The Henry J. Kaiser Family Foundation; 2012.

8. May M, Gompels M, Delpech V, et al. 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]

9. Brooks JT, Buchacz K, Gebo KA, et al. HIV infection and older Americans: The public health perspective. Am J Public Health. 2012; 102:1516–1526. [PubMed: 22698038]

10. Linley L, Prejean J, An Q, et al. Racial/ethnic disparities in HIV diagnoses among persons aged 50 years and older in 37 US States, 2005–2008. Am J Public Health. 2012; 102:1527–1534. [PubMed: 22698035]

11. Andersen RM. Revisiting the behavioral model and access to medical care: Does it matter? J Health Soc Behav. 1995; 36:1–10. [PubMed: 7738325]

12. Tangredi LA, Danvers K, Molony SL, et al. New CDC recommendations for HIV testing in older adults. Nurse Pract. 2008; 33:37–44. [PubMed: 18528202]

13. 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. Atlanta, GA: National Association of Chronic Disease Directors; 2009.

14. Centers for Disease Control and Prevention Public Health Surveillance and Informatics Program Office. [Accessed January 27, 2015] BRFSS 2010 Survey Data and Documentation. Behavioral Risk Factor Surveillance System. 2010. Report. Available at: http://www.cdc.gov/brfss/annual_data/annual_2010.htm

15. Ford CL, Lee SJ, Wallace SP, et al. HIV testing among clients in high HIV prevalence venues: Disparities between older and younger adults. AIDS Care. 2015; 27:189–197. [PubMed: 25303208]

16. Version 10/SE. College Station, TX: StataCorp LP; 2007. Statafor Windows. computer program

17. 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(suppl 2):S194–S205. [PubMed: 12853869]

18. 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; 46:781–790. [PubMed: 17169933]

19. van Handel, M.; Branson, BM. Annual Meeting of the Society for Epidemiologic Research. Seattle, WA: 2014. The consequences of methodology changes to national surveys on monitoring HIV testing trends in the United States.

20. Centers for Disease Control and Prevention. [Accessed April 21, 2015] About the National Health and Nutrition Examination Survey. 2014. web pageAvailable at: http://www.cdc.gov/nchs/nhanes/about_nhanes.htm

21. Duffus WA, Weis K, Kettinger L, et al. Risk-based HIV testing in South Carolina health care settings failed to identify the majority of infected individuals. AIDS Patient Care STDS. 2009; 23:339–345. PMC2856497. [PubMed: 19320598]

22. Krogstad, JM.; Lopez, MH. Hispanic Nativity Shift: US Births Drive Population Growth as Immigration Stalls. Washington, D.C.: Pew Research Center; 2014.

23. Centers for Disease Control and Prevention. [Accessed December 26, 2014] CDC Fact Sheet: Expanded Testing Program Overview. 2013. Available at: http://www.cdc.gov/hiv/policies/eti.html

24. Centers for Disease Control and Prevention. Diagnoses of HIV infection among adults aged 50 years and older in the United States and dependent areas, 2007–2010. HIV Surveillance Supplemental Report. 2013; 18 Available at: http://www.cdc.gov/hiv/topics/surveillance/resources/reports/#supplemental.

25. 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. J Acquir Immune Defic Syndr. 2003; 33(suppl 2):S243–S250. [PubMed: 12853877]

26. Harawa NT, Leng M, Kim J, et al. Racial/ethnic and gender differences among older adults in nonmonogamous partnerships, time spent single, and human immunodeficiency virus testing. Sex Transm Dis. 2011; 38:1110–1117. [PubMed: 22082721]

27. Lindau ST, Schumm LP, Laumann EO, et al. A study of sexuality and health among older adults in the United States. N Engl J Med. 2007; 357:762–774. [PubMed: 17715410]

28. Lekas HM, Schrimshaw EW, Siegel K. Pathways to HIV testing among adults aged fifty and older with HIV/AIDS. AIDS Care. 2005; 17:674–687. [PubMed: 16036254]

29. White House Office of National AIDS Policy. National HIV/AIDS Strategy for the United States. Washington, DC: The White House; 2010.

30. Burke RC, Sepkowitz KA, Bernstein KT, et al. Why don't physicians test for HIV? A review of the US literature. AIDS. 2007; 21:1617–1624. [PubMed: 17630557]
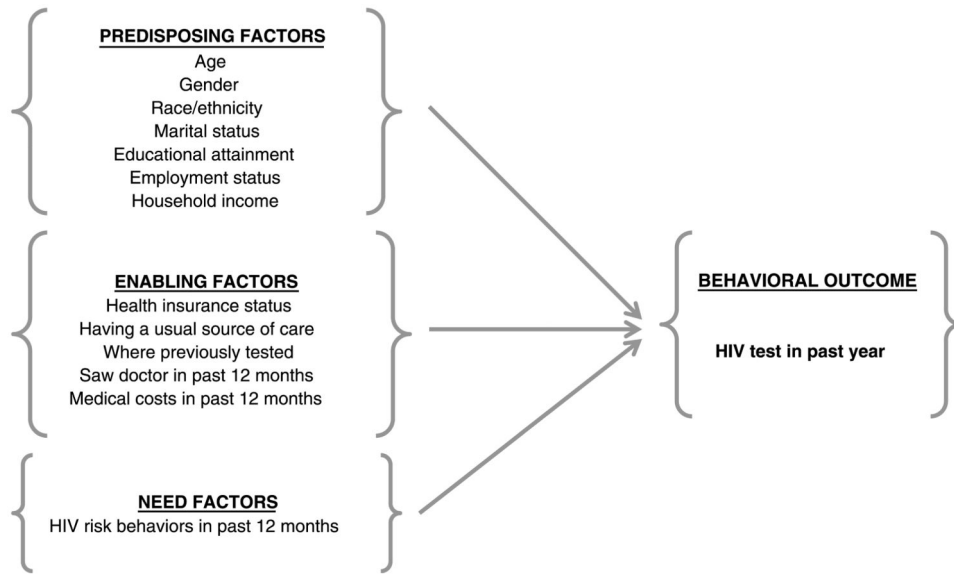
31. U.S. Department of Health and Human Services. [Accessed April 21, 2015] The Affordable Care Act and HIV/AIDS. 2015. web pageAvailable at: https://www.aids.gov/federal-resources/policies/health-care-reform/#ensuring

Figure 1.
Conceptual model. HIV testing among adults aged 50 to 64 years in the BRFSS.

Table 1

Weighted Sample Characteristics by Recent HIV Testing Behavior and by Age Category, BRFSS 2010 (n = 143,247)

| | HIV testing in past 12 mo | | | | | | | |
| | Tested | | | | Not Tested | | | |
Characteristics	50–54 y (n = 1864)	55–59 y (n = 1578)	60–64 y (n = 1275)	Total (n = 4717)	50–54 y (n = 43,054)	55–59 y (n = 47,123)	60–64 y (n = 48,353)	Total (n = 138,530)
Female, %	42.07	36.27	33.10	38.35	51.38	52.85	51.01	51.71
Race/Ethnicity, %								
White	51.02	52.26	61.96	53.81	75.22	76.15	78.85	76.54
Black	27.99	30.86	19.52	26.97	8.79	9.02	8.57	0.88
Asian	0.18	1.13	1.29	1.49	2.96	2.73	0.23	0.27
AI/AN	2.34	1.38	2.72	2.14	1.01	1.09	1.03	1.04
Other	3.33	1.98	1.82	2.59	1.76	2.13	1.94	1.92
Hispanic	13.52	12.39	12.69	0.13	10.25	8.88	0.73	9.00
Marital status, %								
Divorced/Separated/Never married	44.34	44.52	31.57	41.56	23.19	22.35	20.67	22.21
Widowed	5.09	6.10	10.77	6.65	2.37	4.05	6.79	4.14
Married/Cohabiting	50.57	49.38	57.66	51.80	74.44	73.60	72.53	73.64
Employment status, %								
Unemployed	45.25	42.62	43.06	43.99	36.16	36.41	32.15	35.08
Employed	50.89	47.04	27.90	44.63	60.77	53.58	36.40	51.62
Retired	3.86	10.34	29.04	11.38	3.07	10.02	31.44	13.30
Education, %								
<High school	11.97	10.00	10.95	11.16	7.94	7.72	7.82	7.84
High school diploma	26.53	23.77	20.54	24.38	27.21	26.17	25.45	26.40
Some college	61.49	66.22	68.51	64.46	64.85	66.11	66.73	65.77
Income <$20,000, %	26.93	26.00	21.77	25.50	12.25	13.42	13.51	12.96
Have health insurance, %	86.10	86.13	88.75	86.70	86.22	87.84	88.53	87.37
Have usual source of care, %	89.14	89.58	93.93	90.34	86.54	89.16	91.39	88.71
Saw doctor in past year, %	85.42	82.41	89.67	85.48	68.90	72.81	77.60	72.57
Prohibitive medical costs in past 12 months, %	18.22	17.04	12.46	16.59	15.17	13.87	11.31	13.67

HIV testing in past 12 mo

Characteristics	Tested				Not Tested			
	50–54 y (n = 1864)	55–59 y (n = 1578)	60–64 y (n = 1275)	Total (n = 4717)	50–54 y (n = 43,054)	55–59 y (n = 47,123)	60–64 y (n = 48,353)	Total (n = 138,530)
HIV risk behaviors in past 12 months, %	6.77	5.92	2.55	5.58	1.47	1.14	0.75	1.16
Location of recent HIV test [*], %								
Private doc/health maintenance organization	62.92	55.68	58.93	59.89	—	—	—	—
Hospital	19.77	27.36	28.27	23.91	—	—	—	—
Other	17.31	16.96	12.79	16.20	—	—	—	—

[*] Includes respondents whose last test occurred more than a year before the interview; therefore, the proportions in the overall sample and recent HIV test category may differ.

Table 2

Adjusted ORs of Recent HIV Testing by Race/Ethnicity and Age Category (n = 137,936)[*]

	Base Model, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)	Model 4, OR (95% CI)
Age category 50–54 y				
White (referent)	1.00	1.00	1.00	1.00
Black	4.69 (3.89–5.66)[†]	3.93 (3.22–4.80)[†]	3.61 (2.95–4.41)	3.56 (2.91–4.36)[†]
Asian/Pacific Islander	0.89 (0.48–1.68)	0.94 (0.50–1.77)	0.97 (0.50–1.86)	1.01 (0.53–1.94)
AI/AN	3.41 (1.46–7.96)[‡]	2.63 (1.19–5.83)	2.54 (1.17–5.50)[‡]	2.47 (1.09–5.58)[§]
Other race	2.79 (1.65–4.73)[†]	2.27 (1.31–3.93)	2.20 (1.29–3.84)[‡]	2.23 (1.28–3.87)[‡]
Latino/Hispanic	1.94 (1.42–2.67)[†]	1.93 (1.40. 2.65)[†]	1.97 (1.43–2.72)[†]	2.06 (1.50–2.83)[†]
Age category 55–59 y				
White (referent)	1.00	1.00	1.00	1.00
Black	4.99 (4.08–6.09)[†]	4.37 (3.55–5.38)[†]	4.04 (3.27–4.99)[†]	4.03 (3.26–4.99)[†]
Asian Pacific Islander	0.61 (0.25–1.49)	0.64 (0.26–1.60)	0.62 (0.25–1.56)	0.68 (0.27–1.70)
AI/AN	1.84 (0.96–3.54)	1.62 (0.83–3.15)	1.60 (0.83–3.12)	1.38 (0.71–2.69)
Other race	1.35 (0.89–2.05)	1.13 (0.75–1.72)	1.09 (0.71–1.66)	1.13 (0.73–1.73)
Latino/Hispanic	2.03 (1.40–2.94)[†]	1.99 (1.37–2.89)[†]	2.03 (1.39–2.99)[†]	2.17 (1.49–3.17)[†]
Age category 60–64 y				
White (referent)	1.00	1.00	1.00	1.00
Black	2.90 (2.27–3.70)[†]	2.55 (1.99–3.27)[†]	2.44 (1.90–3.13)[†]	2.46 (1.91–3.16)[†]
Asian Pacific Islander	0.71 (0.19–2.69)	0.72 (0.19–2.71)	0.76 (0.20–2.85)	0.78 (0.21–2.98)[‡]
AI/AN	3.36 (1.76–6.41)[†]	2.80 (1.45–5.41)[‡]	2.65 (1.32–5.32)[†]	2.99 (1.50–5.97)
Other race	1.19 (0.69–2.08)	1.03 (0.58–1.82)	1.00 (0.56–1.79)	0.98 (0.56–1.79)
Latino/Hispanic	2.21 (1.50–3.27)[†]	2.22 (1.48–3.32)[†]	2.35 (1.57–3.52)[†]	2.44 (1.62–3.66)[†]

CI indicates confidence interval.

[*] Base model includes race/ethnicity, age, and age by race interaction terms; model 2 includes base model plus predisposing factors (sex, marital status, education, income); model 3 includes model 2 plus enabling factors (seeing doctor in past 12 months, not seeing doctor because of costs in past 12 months, health insurance, usual source of care); and model 4 includes model 3 plus need factors (HIV risk–related behaviors).

[†] $P < 0.001$.

[‡] $P < 0.01$.

[§] $P < 0.05$.

Table 3

Multivariable Logistic Regression Reporting Adjusted ORs of Recent HIV Testing Among Older Adults in BRFSS 2010 (n = 137,936[*])

	Adjusted OR (Final Model)	95% CI	P
Predisposing factors			
Sex			
Female	1.00		
Male	2.14	1.92–2.39	<0.001
Marital status			
Married/Living together	1.00		
Divorced/Separated/Never	2.13	1.89–2.41	<0.001
Widowed	2.43	1.92–3.08	<0.001
Employment status			
Employed	1.00		
Unemployed	1.26	1.11–1.43	0.001
Retired	1.00	0.83–1.20	0.992
Education			
>HS	1.00		
<HS	0.77	0.61–0.96	0.020
HS	0.74	0.65–0.84	<0.001
Income			
Household income $20,000	1.00		
Household income <$20,000	1.48	1.25–1.74	<0.001
Enabling factors			
Saw MD past year			
No	1.00		
Yes	2.35	1.99–2.77	<0.001
Did not see doctor because of medical costs			
No	1.00		
Yes	1.05	0.89–1.25	0.552
Health insurance status			
No	1.00		
Yes	1.20	0.97–1.49	0.099
Have a usual source of care			
No	1.00		
Yes	1.13	0.91–1.40	0.284
Need factors			
HIV risk behaviors past year [†]			
No	1.00		
Yes	3.42	2.61–4.49	<0.001

CI indicates confidence interval; HS, high school.

[*] Model adjusts for age, race/ethnicity, and an interaction between race and age.

†In the past year, respondent used intravenous drugs, had treatment of a sexually transmitted or venereal disease, was given or received money or drugs in exchange for sex, and/or had anal sex without a condom.