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General Internists' Beliefs, Behaviors, and Perceived Barriers to Routine HIV Screening in Primary Care

P. Todd Korthuis, **Gail V. Berkenblit**, **Lynn E. Sullivan**, **Joseph Cofrancesco Jr.**, **Robert L. Cook**, **Michael Bass**, **Philip G. Bashook**, **Marcia Edison**, **Steve M. Asch**, and **James M. Sosman**

P. Todd Korthuis is with the Departments of Medicine and Public Health and Preventive Medicine, Oregon Health and Science University, Portland, OR. Gail V. Berkenblit and Joseph Cofranciso are with the Department of Medicine. Johns Hopkins University School of Medicine. Baltimore, MD. Lynn E. Sullivan is with the Department of Internal Medicine, Yale University School of Medicine, New Haven, CT. Robert L. Cook is with the Departments of Epidemiology and Medicine, University of Florida, Gainesville. Michael Bass, Philip G. Bashook, and Marcia Edison are with the Department of Medical Education, University of Illinois College of Medicine, Chicago. Steve M. Asch is with the VA Greater Los Angeles Healthcare System, David Geffen School of Medicine at UCLA, Los Angeles. James M. Sosman is with the Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison

Abstract

The Centers for Disease Control and Prevention (CDC) recommends routine HIV screening in primary care but little is known about general internists' views of this practice. We conducted a national, cross-sectional, Internet-based survey of 446 general internists in 2009 regarding their HIV screening behaviors, beliefs, and perceived barriers to routine HIV screening in outpatient internal medicine practices. Internists' awareness of revised CDC guidelines was high (88%), but only 52% had increased HIV testing, 61% offered HIV screening regardless of risk, and a median 2% (range 0-67%) of their patients were tested in the past month. Internists practicing in perceived higher risk communities reported greater HIV screening. Consent requirements were a barrier to screening, particularly for VA providers and those practicing in states with HIV consent statutes inconsistent with CDC guidelines. Interventions that promote HIV screening regardless of risk and streamlined consent requirements will likely increase adoption of routine HIV screening in general medicine practices.

In September 2006 the Centers for Disease Control and Prevention (CDC) revised guidelines for HIV screening (Branson et al., 2006) recommending routine “opt-out” HIV testing in healthcare settings for all patients aged 13-64 years, rather than testing only those with perceived risk factors. The CDC further recommended streamlined counseling and testing procedures without separate written consent. The revised recommendations recognize that targeted HIV testing and existing prevention programs in the U.S. have failed to change HIV incidence over the past 10 years. In addition, HIV has become in many situations a manageable disease, with better outcomes when diagnosed and treated early (Kitahata et al., 2009). Finally, persons who know they are HIV infected are likely to reduce risky behaviors and decrease transmission of HIV (Marks, Crepaz, Senterfitt, & Janssen, 2005). More than 20% of HIV-infected Americans, however, are unaware that they are HIV-

Address correspondence to Dr. P. Todd Korthuis, Oregon Health and Science University, 3181 SW Sam Jackson Park Rd., Mail Code L-475, Portland, OR 97239-3098; konhuis@ohsu.edu.

infected (Campsmith, Rhodes, Hall, & Green, 2009; Glynn & Rhodes, 2005). It is therefore imperative to expand and modify testing strategies to identify undiagnosed HIV infection.

Reports of expanded HIV testing in high risk populations in a number of settings suggest that routine HIV screening is feasible and increases HIV testing compared with risk-based screening, including relatively high prevalence inpatient units, emergency departments (Brown et al., 2007; Walensky et al., 2008), sexually transmitted disease (STD) clinics (Stanley, Fraser, & Cox, 2003), and correctional settings (Macgowan et al., 2009). Systemic interventions to promote routine HIV screening in community health centers (Cunningham et al., 2009; Myers, Modica, Dufour, Bernstein, & McNamara, 2009; Weis et al., 2009) and Veteran's Administration (VA) primary care clinics (Anaya et al., 2008; Goetz et al., 2008) may increase routine HIV testing among primary care patients. Only a minority of primary care patients in these studies were tested, however. Many questions remain regarding optimal strategies for implementing CDC-recommended HIV screening guidelines in primary care settings. In addition, little is known about primary care providers' attitudes and behaviors regarding routine HIV testing.

Both provider and health care system characteristics could influence uptake of routine HIV testing. For example, many states have statutes proscribing written and detailed HIV consent and counseling requirements that are inconsistent with revised CDC guidelines (Mahajan, Stemple, Shapiro, King, & Cunningham, 2009). Likewise, primary care providers' adoption of routine HIV screening may be influenced by their perceptions of local HIV prevalence, personal, and practice characteristics. In a systematic review, physicians identified insufficient time, burdensome consent processes, and lack of patient acceptance as key barriers to implementing HIV testing (Burke et al., 2007). In 2006, the Society of General Internal Medicine (SGIM) received a grant from the CDC to assess the implementation of routine HIV screening among outpatient general internists. As teachers of general internal medicine, SGIM members are influential in dissemination of evidence-based practices in primary care.

The purpose of this study was to assess general internists' HIV testing behaviors since publication of revised CDC screening guidelines, beliefs about CDC screening guidelines, and perceived barriers and facilitators for the adoption of CDC screening guidelines in outpatient internal medicine practices. We hypothesized that routine HIV screening has not yet been widely adopted by general internists and that, key provider characteristics (e.g. internists' perception of high community HIV prevalence) and practice characteristics (e.g. state statutes consistent with CDC HIV screening guidelines) would be associated with increased HIV screening behaviors and favorable beliefs about routine HIV screening.

Methods

Study Design and Participants

We conducted a cross-sectional internet-based survey from March through May 2009 of general internists who were active and full members of the Society of General Internal Medicine (SGIM) in 2008. SGIM is the largest U.S. professional organization exclusively devoted to general internal medicine practice and education. The SGIM membership list was used to identify all members with MD or DO degrees who had completed internal medicine residency training. SGIM administrative personnel compiled a confidential list of e-mail addresses for these members for survey distribution. Investigators were blinded to member personal identifying information. This study was reviewed and approved by the institutional review board at Oregon Health and Science University. Subject consent was implied by survey participation. Respondents were eligible to be randomly selected to receive one of three $500 gift certificates to an online bookstore upon study completion. Survey

respondents were eligible for inclusion in this analysis if they reported currently practicing or supervising trainees in an outpatient primary care setting at least one half day per week. Following data collection, respondent race/ethnicity; gender; full-time vs. part-time status, academic rank; VA affiliation; region, and teaching, administrative, or research roles were compared with those of nonrespondents using the SGIM membership administrative database. Our target population of interest was general internists practicing or supervising trainees in an outpatient general internal medicine clinic.

Survey Development and Measures

Survey domains included provider HIV testing behaviors, beliefs regarding the 2006 revised CDC HIV testing recommendations, barriers and facilitators to implementing routine HIV testing, and provider demographic and practice characteristics. Specific measures are described in the following paragraphs. Survey items were adapted from previous literature about provider barriers to HIV testing (Burke et al., 2007) and SGIM member focus group findings of general internists' attitudes, beliefs, and perceived barriers to HIV testing in general medical practices (Bashook, Edison, Sullivan, Bass, & Sosman, 2008). Survey items were pilot-tested among potentially eligible participants and modified accordingly.

Four measures of HIV testing behaviors included self-report of (a) increased HIV testing since CDC HIV testing recommendations were revised, September 2006 (increased/not increased), (b) HIV testing regardless of risk behaviors (yes/no), (c) reporting that at least 25% of their practice had ever had an HIV test (yes/no), and (d) percentage of patients seen in the last 30 days for whom HIV testing was performed (number of HIV tests performed/ number of unique patients seen in last 30 days × 100).

Four measures of HIV testing beliefs included self report that offering HIV testing to all persons aged 13-64 regardless of risk will (a) improve public health in their community (yes/no), (b) benefit their patients (yes/no), and (c) decrease their ability to meet their patients' other medical needs (yes/no). Subjects were also asked to rate how important it is to perform routine HIV screening during a typical patient visit in their practice on a 5-point scale (1 = not important to 5=essential). Responses were dichotomized as very important or essential versus less than very important.

Measures of potential barriers and facilities for implementing HIV screening included 9 patient-level barriers (e.g., patient reluctance/refusal), 17 structural/clinic barriers (e.g., lack of reimbursement; informed consent requirements), and 6 facilitators (e.g., better reimbursement for counseling time) adapted from the medical literature and formative focus group data (Bashook et al., 2008; Burke et al., 2007).

We considered participant characteristics as potential independent variables and covariates including respondent gender (male/female), race/ethnicity (White, Asian, other), region (Northeast, Midwest, South, West), years since completion of training (< 10, 10-19, ≥ 20 years), whether or not they supervised trainees—medical students, physician residents, or physician fellows—in an outpatient setting (yes/no), estimated percentage of minority patients in practice (divided into tertiles of 0% to 30%, 31% to 60%, and ≥ 61%), estimated percentage of uninsured in practice (divided into tertiles of ≤ 5%, 6% to 20%, and ≥ 21%), estimated HIV prevalence (<0.1 to correspond with prevalence below which CDC does not recommend routine HIV testing, and 0.1-0.9, 1.0-4.9, and ≥ 5% to correspond with low-, medium-, and high-prevalence populations, respectively [Chou, Huffman, Fu, Smits, & Korthuis, 2005]), and practice setting (university, community, or VA based). Respondents were asked the state in which they practice and classified as practicing in states with HIV counseling and consent statutes consistent, neutral, or inconsistent with revised CDC guidelines based on a previous review of state HIV testing statutes (Mahajan et al., 2009).

Data Collection

Surveys were collected March through May 2009. An introductory e-mail with a Web link to SurveyMonkey was sent to targeted SGIM members. For those who did not respond within 1 week, a reminder e-mail was sent 1, 2, and 3 weeks after the initial introductory e-mail. Participants were allowed to log on to complete the survey for up to 1 month after the final e-mail was sent. Anonymous survey responses were then downloaded from the SurveyMonkey Web site for analysis following survey closure.

Data Analysis

The analytic sample for this study consisted of general internists who reported practicing or supervising trainees in an outpatient general internal medicine clinic setting. We report descriptive frequencies of HIV testing behaviors, beliefs, and barriers or facilitators of HIV screening using descriptive statistics appropriate to the distribution of the variable. Associations between hypothesized internists' demographic and practice characteristics and HIV screening behaviors and beliefs were estimated using bivariate and multivariate logistic regression, with the exception of percentage of patients receiving HIV screening in the past 30 days, which was estimated as a continuous variable using multivariate linear regression. We also developed separate multivariate logistic regression models in order to assess potential associations between state HIV consent and counseling statutes and provider identification of consent or counseling issues as barriers to adoption of HIV screening. Covariates were included in multivariate models if they were associated with dependent variables in bivariate analysis ($p < 0.2$) or of *a priori* importance. Using this approach, most covariates were associated with nearly all dependent variables, so we used the same covariates in all models for clarity of presentation. Stata/IC version 11.0 (StataCorp, College Station, Texas) was used to complete all statistical analyses.

Results

Participants

Introductory survey e-mails were initially sent to 1,615 active full members, of which 12 e-mail addresses were inactive and 11 had opted out of receiving any Survey Monkey surveys. Of 1,592 SGIM members we attempted to contact, 515 (32.4%) responded. Respondents were comparable to nonrespondents in race/ethnicity, full-time status, VA affiliation, region, and teaching and administrative roles, but more likely to be female (48.8% vs. 42.9%, $p = .026$), assistant professors (50.7% vs. 40.8%, $p = .001$) and clinician researchers (37.1% vs. 30.8%, $p = .013$) than nonrespondents. Four hundred forty-six respondents (87% of respondents; 28% of SGIM members we attempted to contact) indicated they practiced or supervised trainees in an outpatient general internal medicine clinic (our analytic sample).

General internist characteristics are reported in Table 1. The majority were female (52.7%), of White race/ethnicity (77.7%) and supervised trainees in an outpatient primary care setting (84.0%). They were highly experienced as a group, reporting a median of 12 (range 1-41) years since completion of training. They cared for a median 40% (range 0-100%) minority race/ethnicity patients, and a median 10% uninsured (range 0-100%) patients and had seen a median of 60 (range 0-800) unique patients in the preceding 30 days. Seventy-five percent estimated their local community HIV prevalence to be ≥ 0.1% (the CDC threshold above which routine screening is recommended [Branson et al., 2006]). Thirty-five percent practiced in states with HIV consent statutes that were inconsistent with CDC consent guidelines (see Table 1).

HIV Testing Behaviors

Though 375 of 424 respondents with complete awareness item data (88%) reported they were aware of the revised CDC testing guidelines, respondents reported testing only a median 2% (range 0-67%) of the patients they had seen in the previous 30 days (Table 2). Fifty-two percent reported they had increased routine HIV testing since revised CDC guidelines were published; 61% reported that they offered routine HIV screening regardless of HIV risk behaviors, and 37% reported at least 25% of patients in their practice had ever had an HIV test. These data confirm our hypothesis that routine HIV screening has not yet been widely adopted by general internists. In multivariate analysis, estimating one's community HIV prevalence as ≥ 5% was associated with two out of four HIV testing behaviors, including reporting that at least 25% of patients had ever been HIV tested, and that a greater percent of patients had received HIV testing in the last 30 days (see Table 2). Practicing in community-based settings and caring for ≥ 61% minority race/ethnicity patients was associated with reporting that ≥ 25% of patients had ever been HIV tested and that a greater percentage of patients had received HIV testing in the last 30 days. Female internists were more likely to report having increased HIV screening since publication of revised CDC HIV screening guidelines and that at least 25% of their patients had ever been HIV tested. Compared with university-based providers, VA providers had decreased odds of having increased HIV testing since publication of CDC guidelines and offering testing regardless of risk (see Table 2).

HIV Testing Beliefs

Table 3 reports general internists' beliefs regarding routine HIV screening in outpatient internal medicine practices. Seventy-eight percent of respondents believed that routine HIV screening would improve public health in their communities, 72.2% believed it would benefit their patients, 24.5% believed HIV screening would decrease their ability to meet their patients' other medical needs, and 41.2% believed it was very important or essential to perform routine HIV screening during a typical patient visit in their practice. In multivariate analysis, estimating one's community HIV prevalence as ≥ 5% was associated with endorsing two out of four favorable HIV testing beliefs, including the belief that adopting routine HIV screening will benefit patients, and that it is very important or essential to offer HIV screening during a typical patient visit. VA providers were more likely than university providers to believe that HIV screening would decrease their ability to meet their patients' other medical needs but more likely to believe it was very important or essential to perform routine HIV screening during a typical patient visit in their practice (see Table 3).

Barriers and Facilitators of Adopting Routine HIV Screening

Table 4 presents internists' perceived barriers to adopting routine HIV screening in their outpatient practices and factors that might facilitate adoption of routine HIV screening. The leading barriers to adopting routine HIV screening were competing priorities at the time of visit (79%), lack of time (63.9%), perceived patient reluctance/refusal (63.9%), and informed consent requirements (48.9%); a few internists identified HIV testing reimbursement as a barrier (16.5%). The top potential facilitators for adopting routine HIV screening included receiving better reimbursement for counseling time (56.1%), having literature about HIV screening to give to patients (52.6%), and having information about state and local consent requirements (43.1%).

General internists varied in identifying informed consent requirements as a barrier to adopting routine HIV screening depending on whether they practiced in a state with statutes that were consistent (39.0%), neutral (45.1%) or inconsistent (62.2%) with CDC guidelines ($p < .001$ for variable). In multivariate logistic regression, internists practicing in states with consent statutes that were inconsistent with revised CDC HIV screening guidelines versus

consistent (adjustment odds ration [AOR] 2.82, 95% confidence interval [CI]; 1.66, 4.80) and practicing in VA- vs. university-based settings (AOR: 5.61, 95% CI: 2.56, 12.3) were more likely to report HIV consent requirements as a barrier to adopting HIV screening after adjusting for estimated HIV prevalence.

General internists identified HIV pretest counseling as a barrier to adoption of routine HIV screening similarly whether they practiced in states with statutes that were consistent (31.8%), neutral (38.7%), or inconsistent (40.0%) with CDC guidelines ($p = .528$ for variable). In multivariate logistic regression analysis, internists practicing in VA- versus university-based settings (AOR: 3.22, 95% CI: 1.71, 6.06) were more likely to report HIV pretest counseling requirements as a barrier, but not those practicing in states with HIV counseling statutes that were inconsistent vs. consistent with revised CDC HIV screening guidelines (AOR: 1.14, 95% CI: 0.58, 2.26), after adjusting for estimated HIV prevalence.

State consent or counseling statutes were not associated with self-reported HIV screening behaviors or beliefs.

Discussion

The revised CDC HIV screening guidelines strive to routinize HIV screening to improve care for those with HIV and reduce transmission (Branson et al., 2006). Although awareness of CDC recommendations was high in the current study, the reported proportion of patients ever receiving HIV screening, or screened by general internists in the previous 30 days was low. Nearly 3 years after revised CDC HIV screening guidelines were published, only half of general internists report having increased their HIV screening practices despite recent endorsement of routine HIV screening by the American College of Physicians (Qaseem, Snow, Shekelle, Hopkins, & Owens, 2009).

Our findings of low HIV screening rates among outpatient general internal medicine practices confirm our hypothesis that adoption of routine screening remains low and are consistent with other studies. In a study of community health centers, only 3% of patients were tested in the year prior to the intervention, but that number rose to 19% after implementing a rapid screening protocol (Myers et al., 2009). Similarly, less than 5% of outpatients receive HIV screening in VA facilities (Valdiserri, Nazi, Mclnnes, Ross, & Kinsinger, 2010; Valdiserri et al., 2008). A multifaceted systems intervention to promote HIV screening in select VA facilities, however, resulted in a sustainable increase in HIV screening rates from 5% to greater than 10% (Goetz et al., 2008; Goetz et al., 2009). Taken together, these findings suggest the need for interventions to increase the uptake of routine HIV screening among general internists.

General internists' HIV screening behaviors and beliefs in the current study remain largely based on perceived risk of HIV in their practices, with 39% of internists reporting they target HIV testing based on HIV risk factors. Perception of increased local HIV prevalence in their communities was associated with greater HIV screening and more favorable beliefs regarding routine HIV screening, confirming our hypothesis that perception of high local prevalence would be associated with testing behaviors and beliefs. Likewise, internists caring for a greater proportion of minority race/ethnicity patients were more likely to report that more than a quarter of their patients had ever been HIV tested but did not differ from internists caring for a low proportion of minority race/ethnicity patients in other testing behaviors or beliefs. Prior to the change in CDC guidelines, one survey of primary care providers reported only 8% of internists offered routine HIV screening “regardless of apparent risk” and those caring for a greater percentage of non-White patients were more likely to report universal screening (Montano et al., 2008). Blacks/African Americans,

Latinos/Hispanics, Native Americans/Alaska Natives, and Asian/Pacific Islanders all have a higher proportion of undiagnosed HIV infection compared with Whites, as well as younger age groups (vs. older) and men contracting HIV through heterosexual sex (vs. men who have sex with men) (Campsmith et al., 2009), meriting additional culturally appropriate HIV screening campaigns in these populations. While screening for HIV in higher risk populations may increase yield and cost effectiveness (Chou et al., 2005; Paltiel et al., 2005), though, provider reliance on previous risk based screening strategies misses at least 20% of HIV infections (Campsmith et al., 2009). Expansion of routine HIV screening regardless of perceived HIV risk has increased engagement in HIV treatment and has been associated with decreases in community viral load and HIV transmission (Castel et al., 2010; Das-Douglas et al., 2010). Initiatives that encourage general internists to offer HIV screening regardless of perceived risk would likely contribute to declines in community viral load and HIV transmission.

Female general internists were more likely to report having increased HIV screening since publication of revised CDC HIV screening guidelines and to having ever tested at least 25% of their patients. This is consistent with increased performance of other clinical preventive services by female compared with male providers (Flocke & Gilchrist, 2005). Internists' experience and the percentage of their patients who were uninsured were not associated with any HIV testing behaviors or beliefs.

The majority of general internists in the current study endorse the benefits of HIV screening both on the level of the individual patient and as a public health measure. Gaps were observed, however, between the percentage of expressing favorable beliefs about routine HIV screening and increased screening behaviors. Likewise, the majority of internists reported that they offered HIV testing regardless of risk yet reported the proportion of their patients being HIV tested in the past 30 days was low. Potential explanations for this apparent disconnect might be high rates of patient refusal related to suboptimal discussion of HIV testing or that providers may be performing screening only during certain low frequency office encounters (e.g. new patient evaluations). The current study suggests important barriers to adopting routine HIV screening that likely contribute to this belief-behavior gap and raises new hypotheses for future research.

Leading perceived barriers to adopting routine HIV screening included competing priorities at the time of visit, lack of time, and perceived patient reluctance or refusal of HIV screening. Utilizing support staff for routine HIV screening may free internists to use limited encounter times to address other issues. For example, Anaya et al. demonstrated that nurse-initiated HIV screening doubled HIV screening rates compared with screening offered by the provider during VA primary care clinic visits (Anaya et al., 2008). Although internists in the current study cited perceived patient reluctance or refusal as a barrier to screening, recent studies demonstrate high rates of acceptance by patients. In community health care settings, 67% of patients accepted routine screening (Myers et al., 2009). Likewise, focus group data from a VA setting found patients to be supportive of routine HIV screening (Bokhour, Solomon, Knapp, Asch, & Gifford, 2009), and in a recent survey 73% of veterans accessing their electronic medical records indicated they would be “very likely” to accept an HIV test, if offered (Valdiserri et al., 2010). General internists may be lagging behind the general population in their perception of the acceptability of routine HIV screening.

Informed consent requirements were identified as an important barrier to adopting routine HIV screening, as in previous studies (Burke et al., 2007). One third of surveyed general internists practiced in states with HIV consent statutes that are inconsistent with CDC recommendations for “opt-out” voluntary screening. These internists were more likely to identify consent requirements as a barrier to HIV screening compared with those practicing

in states with HIV screening statutes consistent with CDC guidelines. Thirty-four states have changed their laws regarding HIV screening to be consistent with CDC guidelines. Several states with high HIV prevalence, however, still retain written consent requirements. The elimination of written consent has been shown to increase both screening rates and the number of positive tests (Das-Douglas, Zetola, Klausner, & Colfax, 2008). In addition, physician knowledge of their state and local laws may be deficient. Internists in the current study identified the need for information about state and local consent requirements as a potential facilitator for adopting routine HIV screening. The perception of counseling requirements as a barrier did not vary by state and may reflect uncertainty about CDC guidelines and state statutes on counseling. Internists identified having literature about HIV screening as a key facilitator. Availability of standardized patient materials may enhance testing rates.

Although few internists identified lack of reimbursement as a barrier to implementation, improving reimbursement for counseling time was identified as the leading facilitator for increasing adoption of routine HIV testing. This is consistent with prior studies that suggest improving reimbursement could increase adoption of routine HIV testing in primary care (Burke et al., 2007), but further suggests potential uncertainty about CDC guidelines and state counseling statutes.

VA general internists in the current study were less likely than their university-based counterparts to report increased HIV screening and screening regardless of risk. They were also more likely to identify informed consent requirements as a barrier to adopting routine HIV screening. This suggests that VA policies requiring written informed consent may adversely impact VA internists' views regarding the feasibility of routine HIV screening in that setting. Recent systems-based initiatives have increased HIV screening rates in select VAs (Goetz et al., 2008), but only 9% of veterans accessing their electronic medical records reported they had been offered HIV screening during the past month compared with 83% who had been offered cholesterol screening (Valdiserri et al., 2010). In August 2009, the VA changed its policies to eliminate written HIV consent and scripted pretest and post-test counseling. Our findings suggest this will likely favorably impact screening uptake. Other evidence-based systems interventions demonstrated to improve uptake of HIV screening (Anaya et al., 2008; Goetz et al., 2008) should be broadly adopted throughout the VA health care system.

Our study findings should be interpreted in light of several potential limitations. First, our response rate was relatively low but comparable to other physician surveys (Asch, Connor, Hamilton, & Fox, 2000). Respondent characteristics were generally similar to nonrespondents. Respondents were more likely to be female and have fewer years since completing training; however, both of these variables were associated with a greater percentage of patients ever having been HIV tested. Thus, our study may overestimate SGIM physician member screening behaviors. Second, the general internists surveyed were all members of the SGIM who practiced or supervised trainees in outpatient primary care clinics and thus may not represent the beliefs and behaviors of all general internists; however, they do represent a broad spectrum of university-based, community, and VA practice nationwide. SGIM is a national organization of academic general internists, whose members are likely to be more aware of new evidence-based practices such as routine HIV screening, and influence broader community practices by training internal medicine residents who practice throughout the United States. Finally, HIV screening behaviors were self-reported and may underestimate or overestimate actual HIV screening practices. We consequently included four indicators of HIV screening behaviors in the survey, which were congruent and thus provide some validation of study findings.

In conclusion, the current study finds that general internists' self-reported HIV screening behaviors lag behind their generally favorable beliefs regarding the potential benefits of routine HIV screening. Provider, systems, and policy interventions that promote HIV screening regardless of risk and streamline consent requirements will likely increase adoption of universal routine HIV screening in outpatient general internal medicine practices. Modifying state statutes regarding written informed consent for HIV screening, in particular, may further reduce barriers to implementing routine HIV screening in primary care.

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Table 1
General Internist Characteristics (n=446)*

	n (%)
Gender	
Male	193 (47.3)
Female	215 (52.7)
Race/Ethnicity	
White	317 (77.7)
Asian	48 (11.8)
Other	43 (10.5)
Years since completion of training	
< 10 years	151 (37.0)
10-19 years	153 (37.5)
>= 20 years	104 (25.5)
Supervise Trainees	
No	67 (16.0)
Yes	352 (84.0)
Percent minority patients	
0-30%	155 (38.0)
31-60%	132 (32.4)
≥ 61%	121 (30.6)
Percent uninsured patients	
≤ 5%	188 (46.1)
6-20%	91 (22.3)
≥ 21%	129 (31.6)
Estimated HIV prevalence	
< 0.1%	104 (24.8)
0.1- 0.9%	181 (43.2)
1.0-4.9%	115 (27.6)
>=5%	19 (4.5)
Practice Setting	
University-based	237 (58.1)
Community-based	118 (28.9)
VA-based	53 (13.0)
State Consent Statutes	
Consistent with CDC	120 (29.4)
Neutral with CDC	144 (35.3)
Inconsistent with CDC	144 (35.3)
State Counseling Statutes	
Consistent with CDC	63 (15.4)
Neutral with CDC	238 (58.3)
Inconsistent with CDC	107 (26.2)

*Total n for some characteristics do not sum to 446 due to missing data

Table 2

Internists' HIV Testing Behaviors and Multivariate Characteristics Associated with Behaviors.

	Increased Testing aOR (95% CI)* (n=430)¶	Test regardless of risk aOR (95% CI)* (n=417)	≥ 25% Patient ever HIV tested aOR (95% CI)* (n=420)	% Patients HIV tested in last 30d β coef (95% CI)†(n=417)
Overall	52.3%	61.1%	37.4%	2% (range 0-66.6%)
Gender				
Male	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
Female	1.61 (1.02, 2.53)	1.22 (0.77, 1.94)	1.80 (1.11, 2.92)	0.97 (-0.94, 2.88)
Yrs since completion of training				
< 10	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
10-19	0.53 (0.32, 0.87)	0.73 (0.45, 1.21)	0.66 (0.40, 1.09)	-0.63 (-2.70, 1.43)
≥ 20	0.95 (0.53, 1.69)	0.98 (0.54, 1.76)	0.40 (0.21, 0.77)	-2.18 (-4.61, 0.24)
Percent minority patients				
0-30%	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
31-60%	1.56 (0.92, 2.65)	0.86 (0.50, 1.47)	2.45 (1.37, 4.36)	0.23 (-1.99, 2.45)
≥ 61%	1.21 (0.65, 2.26)	1.18 (0.62, 2.25)	1.99 (1.03, 3.83)	3.12 (0.51, 5.73)
Percent uninsured patients				
≤ 5%	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
6-20%	0.88 (0.52, 1.51)	0.70 (0.40, 1.22)	0.88 (0.48, 1.60)	-0.60 (-2.33, 2.21)
≥ 21%	1.75 (1.00, 2.68)	1.09 (0.62, 1.92)	1.00 (0.57, 1.77)	1.53 (-0.80. 3.86)
Estimated HIV prevalence				
<0.1%	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
0.1-0.9%	1,57 (0.92, 2.69)	1.34 (0.78, 2.31)	1.52 (0.83, 2.80)	1.69 (-0.56, 3.94)
1.0-4.9%	2.55 (1.36, 4.78)	1.91 (1.01, 3.58)	2.43 (1.25, 4.73)	3.09 (0.51, 5.68)
>=5%	0.43 (0.14, 1.29)	2.86 (0.73, 11.2)	11.6 (2.83, 47.3)	9.94 (4.73, 15.2)
Practice Setting				
University-based	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
Community-based	0.97 (0.59, 1.60)	0.76 (0.46, 1.27)	1.84 (1.09, 3.12)	2.19 (0.09, 4.29)
VA-based	0.40 (0.20, 0.79)	0.45 (0.23, 0.87)	0.83 (0.40, 1.74)	0.89 (-1.91, 3.68)

Note.

*aOR=adjusted odds ratio from multivariate logistic regression, adjusted for gender, years since completion of training, percent minority and uninsured patients in practice, estimated community HIV prevalence, and practice setting.

†β coef = beta coefficient from multivariate linear regression models, adjusted for gender, years since completion of training, percent minority and uninsured patients in practice, estimated community HIV prevalence, and practice setting.

¶Differing "n" at top of column for dependent variables is due to missing data.

Table 3

Internists' HIV Testing Beliefs and Multivariate Characteristics Associated with Beliefs.

I believe routine HIV testing…	**Will improve public health aOR (95% CI)* (n= 426)¶**	**Will benefit my patients aOR (95%CI)* (n = 425)**	**Will decrease ability to meet other medical needs aOR (95% CI)* (n=425)**	**It very important or essential during a typical visit aOR (95% CI)* (n = 420)**
Overall	333 (78.2%)	307 (72.2%)	104 (24.5%)	173 (41.2%)
Gender				
Male	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
Female	1.53 (0.90, 2.62)	1.41 (0.85, 2.33)	0.79 (0.47, 1.31)	1.73 (1.08, 2.75)
Yrs since completion of training				
<10	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
10-19	0.97 (0.53, 1.78)	0.84 (0.48, 1.46)	1.45 (0.83, 2.52)	0.83 (0.51, 1.37)
≥ 20	0.83 (0.41, 1.57)	0.84 (0.44, 1.59)	0.99 (0.50, 1.93)	1.21 (0.67, 2.19)
Percent minority patients				
0-30%	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
31-60%	0.83 (0.46, 1.51)	0.78 (0.44, 1.40)	1.08 (0.59, 1.97)	1.31 (0.76, 2.26)
≥ 61%	1.26 (0.58, 2.77)	1.28 (0.62, 2.64)	1.27 (0.63, 2.57)	1.61 (0.86, 3.02)
Percent uninsured patients				
≤ 5%	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
6-20%	0.91 (0.49, 1.70)	0.78 (0.44, 1.40)	1.21 (0.65, 2.24)	1.11 (0.63, 1.95)
≥ 21%	1.55 (0.77, 3.11)	1.40 (0.74, 2.65)	0.95 (0.51, 1.77)	1.25 (0.73, 2.15)
Estimated HIV prevalence				
< 0.1%	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
0.1- 0.9%	1.96 (1.10, 3.48)	1.97 (1.14, 3.40)	1.09 (0.59, 2.02)	1.60 (0.90, 2.85)
1.0-4.9%	4.38 (2.01, 9.52)	4.64 (2.25, 9.57)	0.96 (0.47, 1.96)	3.50 (1.83, 6.69)
>=.5%	7.72 (0.94, 63.1)	4.91 (1.02, 23.7)	1.13 (0.32 4.01)	3.74 (1.24, 11.3)
Practice Setting				
University-based	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
Community-based	0.67 (0.37, 1.20)	0.80 (0.46, 1.39)	1.00 (0.56, 1.77)	1.02 (0.61, 1.70)
VA-based	0.82 (0.39, 1.75)	0.98 (0.48, 2.00)	2.39 (1.21, 4.75)	2.48 (1.27, 4.84)

Note.

*aOR=adjusted odds ratio from multivariate logistic regression, adjusted for gender, years since completion of training, percent minority and uninsured patients in practice, estimated community HIV prevalence, and practice setting.

¶Differing "n" at top of column for dependent variables is due to missing data.

Table 4

Barriers and facilitators to adopting routine HIV screening (n = 446).

Barriers to routine HIV screening	***n* (%)**
Other priorities at time of visit	330 (79.0)
Lack of time	267 (63.9)
Patient reluctance/refusal	268 (63.9)
Informed consent requirements	204 (48.9)
Pre-test counseling requirements	158 (37.9)
Rapid HIV testing not available in clinic	153 (36.7)
Testing low-risk established patients	146 (35.0)
Language barrier	132 (31.4)
Lack of high risk behaviors	126 (30.0)
Patient discomfort discussing HIV testing	118 (28.1)
Lack of reimbursement	69 (16.5)
Facilitators of routine HIV screening	
Better reimbursement for counseling time	206 (56.1)
Literature about HIV testing to give to patients	193 (52.6)
Information about state & local consent requirements	158 (43.1)
Staff training in counseling services	107 (29.2)
Training in Risk Reduction counseling	68 (18.5)
Information on where to refer patients with high risk behaviors	46 (12.5)