



# Factors Affecting Clinician Educator Encouragement of Routine HIV Testing Among Trainees

Gail V. Berkenblit, MD, PhD<sup>1</sup>, James M. Sosman, MD<sup>2</sup>, Michael Bass, PhD<sup>3</sup>, Hirut T. Gebrekristos, PhD<sup>4</sup>, Joseph Cofrancesco Jr MD, MPH<sup>1</sup>, Lynn E. Sullivan, MD<sup>5</sup>, Robert L. Cook, MD, MPH<sup>6</sup>, Marcia Edison, PhD, MBA<sup>3</sup>, Phillip G. Bashook, EdD<sup>3</sup>, and P. Todd Korthuis, MD, MPH<sup>7</sup>

<sup>1</sup>Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD, USA; <sup>2</sup>Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison, WI, USA; <sup>3</sup>Department of Medical Education, University of Illinois College of Medicine, Chicago, IL, USA; <sup>4</sup>Department of Epidemiology, Tulane School of Public Health and Tropical Medicine, New Orleans, LA, USA; <sup>5</sup>Department of Internal Medicine, Yale University School of Medicine, New Haven, CT, USA; <sup>6</sup>Departments of Epidemiology and Medicine, University of Florida, Gainesville, FL, USA; <sup>7</sup>Departments of Medicine and Public Health & Preventive Medicine, Oregon Health and Science University, Portland, OR, USA.

**BACKGROUND:** Adoption of CDC recommendations for routine, voluntary HIV screening of all Americans age 13–64 years has been slow. One method to increase adherence to clinical practice guidelines is through medical school and residency training.

**OBJECTIVE:** To explore the attitudes, barriers, and behaviors of clinician educators (CEs) regarding advocating routine HIV testing to their trainees.

**DESIGN/PARTICIPANTS:** We analyzed CE responses to a 2009 survey of Society of General Internal Medicine members from community, VA, and university-affiliated clinics regarding HIV testing practices.

**MAIN MEASURES:** Clinician educators were asked about their outpatient practices, knowledge and attitudes regarding the revised CDC recommendations and whether they encouraged trainees to perform routine HIV testing. Associations between HIV testing knowledge and attitudes and encouraging trainees to perform routine HIV testing were estimated using bivariate and multivariable logistic regression.

**RESULTS:** Of 515 respondents, 367 (71.3%) indicated they supervised trainees in an outpatient general internal medicine clinic. These CEs demonstrated sub-optimal knowledge of CDC guidelines and over a third reported continued risk-based testing. Among CEs, 196 (53.4%) reported that they encourage trainees to perform routine HIV testing. Higher knowledge scores (aOR 5.10 (2.16, 12.0)) and more positive attitudes toward testing (aOR 8.83 (4.21, 18.5)) were independently associated with encouraging trainees to screen for HIV. Reasons for not encouraging trainees to screen included perceived low local prevalence (37.2%), competing teaching priorities (34.6%), and a busy clinic environment (34.0%).

**CONCLUSIONS:** Clinician educators have a special role in the dissemination of the CDC recommendations as they impact the knowledge and attitudes of newly

practicing physicians. Despite awareness of CDC recommendations, many CEs do not recommend universal HIV testing to trainees. Interventions that improve faculty knowledge of HIV testing recommendations and address barriers in resident clinics may enhance adoption of routine HIV testing.

**KEY WORDS:** HIV; screening; clinician educator; residency training.

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## INTRODUCTION

Earlier diagnosis of HIV coupled with access to antiretroviral treatment and preventive care has been shown to reduce morbidity and mortality and decrease transmission.<sup>1–4</sup> To promote earlier diagnosis of HIV, the Centers for Disease Control and Prevention (CDC) released revised guidelines for HIV testing.<sup>5</sup> Key provisions of the revised CDC guidelines include routine testing of all patients from ages 13–64, without regard to risk; all patients should be tested at least once and those at high risk tested annually; separate written consent for testing should not be required; and these recommendations apply to all health care settings unless local HIV prevalence is shown to be less than 0.1%. These recommendations for expanded testing, were first released in 2006 and adopted by the American College of Physicians in January, 2009 in part based on recognition that targeted HIV testing has failed to identify many patients with HIV or to reduce transmission rates.<sup>6</sup> But overall adoption of routine HIV testing remains low<sup>7</sup> and it is estimated that 21% of people living with HIV still remain undiagnosed.<sup>8</sup> Although an additional 11 million Americans have been tested since 2006, approximately 100 million adolescents and adults are unaware of their HIV status.<sup>9</sup>

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Interventions to increase rates of routine HIV testing have been investigated in a variety of settings. Opt-out testing, electronic reminders, and performance by non-physician staff have been shown to be effective; however, interventions directed at practicing physicians have only increased testing rates to 20–30% of patients seen in these practices, likely due to a combination of provider, patient, and systems barriers.<sup>10–13</sup>

One method to increase levels of guideline adherence by physicians is to encourage adoption during residency training.<sup>14,15</sup> While half of all program directors report that teaching outpatient-based HIV curricula is a priority,<sup>16</sup> it is not known how this training is accomplished or how much emphasis is placed on HIV screening. In a multicenter study of residents, over 80% reported offering HIV testing to high risk patients, but only 15% said they offered it to those at perceived low risk.<sup>17</sup> A study of New York City residency programs found only a third of residents were aware of the CDC recommendations or practiced routine testing.<sup>18</sup> The lack of testing in resident clinics, even those in high risk areas, suggests that emphasis during training is inadequate. The purpose of this study was to examine the knowledge, attitudes and teaching behaviors of clinician educators (CEs) regarding routine HIV testing.

## METHODS

### Study Design and Participants

We conducted a cross-sectional internet-based survey in 2009 of active and full members of the Society of General Internal Medicine (SGIM), a national group of academic general internists dedicated to clinical practice, research and education.<sup>7</sup> A source list of 2008 SGIM members who had completed internal medicine residency training was generated and an introductory email with a link to SurveyMonkey was sent with up to three reminders between March and May, 2009. Survey respondents were eligible to win one of three \$500 gift certificates to an online bookstore.

Respondents were included in the initial analysis if they were practicing or supervising trainees in an outpatient setting at least one half day per week. Following data collection, respondent demographics were compared with those of non-respondents using the SGIM membership administrative database to assess for non-responder bias.

A planned subgroup analysis of those who reported having a clinician educator role was performed and is the subject of this paper. Clinician educators were defined as those who reported supervising trainees (students, residents, fellows) in an outpatient primary care setting at least one half day per week. One other subgroup analysis of provider rapid HIV testing behaviors is reported elsewhere.<sup>19</sup> This study was reviewed and approved by the Institutional

Review Board at Oregon Health and Science University and Johns Hopkins School of Medicine.

### Survey Development and Measures

Survey domains included provider demographic and practice characteristics; knowledge, beliefs, and behaviors regarding the 2006 revised CDC HIV testing recommendations; and barriers and facilitators to implementing routine HIV testing. Survey items were adapted from the CDC guidelines SGIM member focus group findings of general internists' attitudes, beliefs, and perceived barriers to HIV testing in general medical practices<sup>20</sup> and previous literature about provider barriers to HIV testing.<sup>21</sup> The survey instrument was piloted and modifications made based on feedback from potentially eligible participants.

Participant characteristics were obtained including: gender (male/female), race/ethnicity (White, Asian, Other), years since completion of training (< 10, 10–19, ≥ 20 years), estimated percent minority patients in practice (0–30%, 31–60%, >61%), estimated HIV prevalence (<0.1, 0.1–0.9, ≥1%), and practice setting (university, non-university, or VA affiliated). Non-university settings included both private practice and community-based clinics. Because state law has been cited as a barrier to testing, respondents were categorized as practicing in states with laws consistent, neutral, or inconsistent with CDC guidelines on consent for testing, pre- and posttest counseling, and method of offering screening.<sup>22</sup> To assess promotion of CDC guidelines, CEs were asked, “Do you encourage clinical trainees (students, residents, and fellows) that you supervise to perform routine HIV testing of all patients, regardless of risk? (yes/no).” Measures of HIV testing knowledge included report of awareness of CDC recommendations (yes/no) and responses to five questions (true/false). Survey items to assess knowledge were based on the major areas of revisions to the CDC guidelines regarding screening, rescreening, and counseling of adults and adolescents. These included recommended age range for testing, testing regardless of risk, annual testing for high risk patients, elimination of written consent requirements, and resumption of risk based testing when local prevalence <0.1%. We used responses to these items to develop a composite knowledge score (0, 1, or ≥2 incorrect responses). Optimal knowledge of CDC guidelines was defined as zero incorrect responses.

Respondents were asked about their beliefs regarding routine HIV testing, including whether it would improve public health in their community (yes/no), benefit their patients (yes/no) or decrease their ability to meet their patients' other medical needs (yes/no). A global rating of the importance of performing routine HIV testing during a visit was measured on a 5-point scale (1=not important to 5=essential). Responses were dichotomized as essential or very important vs. less than very important. HIV testing

behaviors were assessed by self-report of percentage of their own patients who had ever been HIV tested, dichotomized as  $\geq 25\%$  vs.  $< 25\%$ . The 25% level was chosen as it represented the top tertile of self-reported HIV testing.

Barriers to encouraging HIV testing to trainees were identified by asking respondents who did not encourage testing to identify all potential reasons including: low local HIV prevalence, more important teaching issues, too busy, unaware of recommendations, disagree with recommendations, evidence for recommendations insufficient, lack of support services for testing, concerns about confidentiality, or other barriers (non-mutually exclusive).

## Data Collection and Analysis

Descriptive frequencies were generated for HIV testing knowledge, beliefs, testing behaviors, and barriers to encouraging trainee HIV testing using univariate statistics appropriate to the distribution of the variable. Bivariate analyses using t-tests and chi-squared tests were used to compare individual characteristics, practice characteristics and knowledge beliefs and behaviors between those who encourage testing and those who do not. The association of CE characteristics with encouraging testing was assessed using multivariable logistic regression. Covariates were included in multivariable models if they were associated with dependent variables in bivariate analysis ( $p < 0.2$ ). Because attitude scores were collinear with each other, agreement with a single attitude statement, that routine testing would benefit patients, was included in the multivariate model. SAS (SAS Institute Inc, Cary, North Carolina) was used to complete all statistical analyses.

## RESULTS

### Characteristics of Clinician Educators Encouraging Trainees to Test

Of 1,592 SGIM members contacted, 515 (32.4%) responded. Respondents were comparable to non-respondents 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%,  $p = 0.026$ ), assistant professors (50.7% vs. 40.8%,  $p = 0.001$ ) and clinician researchers (37.1% vs. 30.8%,  $p = 0.013$ ) than non-respondents.<sup>7</sup> Of 515 respondents, 367 (71.3%) were CEs (our analytic sample). One hundred ninety-six CEs (53.4%) reported that they encourage trainees to perform routine HIV testing. Clinician educators who encouraged testing were comparable in gender and race to those who did not promote testing and showed a trend toward being  $< 10$  years since completing training (Table 1). Those who encouraged

trainees to test were more likely to practice in clinics with a higher percentage of minority patients and report a greater estimated local HIV prevalence. In contrast, CEs practicing in Veterans Affairs clinics at the time of the survey were less likely to encourage testing.

Table 2 reports CE knowledge of CDC recommendations, beliefs, and HIV testing practices overall and among those who encourage or do not encourage trainees to test. Nearly all CEs reported being aware of the CDC HIV testing recommendations and correctly identified recommendations regarding appropriate age range, testing regardless of risk, and annual testing for those at high risk; whereas, fewer CEs knew that CDC recommendations included elimination of written consent or that routine testing was not recommended if local prevalence was under 0.1%. Overall, 56% of CEs demonstrated optimal knowledge of all five recommendations. CEs who encouraged testing among trainees reported greater awareness of CDC recommendations and were also more likely to have greater knowledge of CDC recommendations. Over 70% of CEs endorsed beliefs that routine HIV testing will benefit their patients and public health and most did not feel it would decrease their ability to meet other patient care needs. Clinician educators who encourage testing among trainees had more favorable attitudes toward routine HIV testing and were more likely to rate it as very important or essential.

In practice, 192 (54.9%) of CEs reported increasing their testing rates since the introduction of revised CDC testing recommendations; however, many still reported continued reliance on risk-based HIV testing strategies (36.7%). Those who encouraged trainees to test were more likely to report that they performed testing regardless of risk compared to those who did not encourage and also reported higher percentages of patients screened in their own clinics (Table 2).

Table 3 reports multivariable associations between CE characteristics and encouraging trainees to perform routine HIV testing. Among demographic and practice settings, only practice in a VA clinic compared to a university-based clinic practice was independently associated with being less likely to recommend routine HIV testing to their trainees (aOR 0.32, CI 0.13, 0.84). Optimal knowledge versus a knowledge score of  $\geq 2$  incorrect answers independently increased odds of encouraging resident testing (aOR 5.10, CI 2.16, 12.0) as did endorsement of benefit to patients (aOR 8.83, CI 4.21, 18.5).

### Barriers to Recommending Routine HIV Testing to Trainees

CEs that did not encourage trainees to perform routine HIV testing were asked to identify their reasons (Table 4). The most common response selected was perception of low local prevalence, followed by more important teaching issues and clinic environment being too busy. However,

**Table 1. Individual and Practice Characteristics: Comparison of CEs Who Encourage Trainees to Perform Routine HIV Testing and Those Who Do Not**

Characteristic	Overall*	Encourage Trainees to Test*	Doesn't Encourage*	P value
<b>Individual Characteristics</b>				
Gender (n=335)				
Male	158 (47.2%)	85 (53.8%)	73 (46.2%)	0.182
Female	177 (52.8%)	108 (61.0%)	69 (39.0%)	
Race (n=335)				
White	255 (76.1%)	144 (56.5%)	111 (43.5%)	0.108
Asian	43 (12.8%)	22 (51.2%)	21 (48.8%)	
African American/Hispanic	37 (11.0%)	27 (73.0%)	10 (27.0%)	
Years since completed training (n=335)				
<10 years	133 (39.7%)	87 (65.4%)	46 (34.6%)	0.058
10–19 years	123 (36.7%)	63 (51.2%)	60 (48.8%)	
>20 years	79 (23.6%)	43 (54.4%)	36 (45.6%)	
<b>Practice Characteristics</b>				
State laws inconsistent with CDC (n=335)	116 (34.6%)	72 (37.3%)	44 (30.9%)	0.384
Estimate % minority patients (n=352)				
0–30%	132 (37.5%)	58 (43.9%)	74 (56.1%)	<0.001
31–60%	113 (32.1%)	63 (55.8%)	50 (44.3%)	
≥61%	107 (30.4%)	75 (70.1%)	32 (29.9%)	
Estimate of local HIV prevalence (n=326)				<0.001
<0.1%	79 (24.2%)	31 (39.2%)	48 (60.8%)	
0.1%–1%	147 (45.1%)	75 (51.0%)	72 (49.0%)	
>1%	100 (30.7%)	73 (73.0%)	27 (27.0%)	
Practice Setting (n=335)				
University Affiliated	200 (59.7%)	121 (60.5%)	79 (39.5%)	0.014
Non-university Affiliated	96 (28.7%)	58 (60.4%)	38 (39.6%)	
VA	39 (11.6%)	14 (35.9%)	25 (64.1%)	

\*Percents based on respondent "n" for item in 1<sup>st</sup> column, which vary due to missing data

congruent with the knowledge and attitudes findings above, lack of familiarity with the recommendations, disagreement with the recommendations, and perception of insufficient evidence supporting the recommendations were also commonly cited reasons for not encouraging trainees to perform routine HIV testing.

## CONCLUSIONS

Clinician educators have a special role in the dissemination of the CDC HIV testing recommendations in that they impact

the knowledge and attitudes of newly practicing physicians. Despite awareness of the CDC recommendations for routine HIV testing in primary care settings, many CEs do not recommend this practice to their residents. Our findings suggest that greater knowledge of HIV screening recommendations and belief that HIV testing benefits patients might increase CE's encouraging trainees to offer HIV testing.

While simple distribution of practice guidelines has been shown to be ineffective in implementing change,<sup>14</sup> educational detailing, opinion leader influence, audit and feedback have all been shown to be effective in post-graduate education.<sup>23,24</sup>

In resident ambulatory clinics, faculty role modeling remains

**Table 2. Knowledge, Attitudes, and Testing Practices: Comparison of CEs who Encourage Trainees to Perform Routine HIV Testing and Those Who Do Not**

Characteristic	Overall*	Encourage Trainees to Test *	Doesn't Encourage*	P value
Aware of CDC recommendations (n=344)	88.1%	95.4%	78.8%	<0.001
Knowledge of Specific Recommendations:				
Appropriate age range (n=352)	89.8%	97.4%	80.1%	<0.001
Annual test for high risk (n=345)	86.4%	90.3%	77.6%	0.001
Elimination of written consent (n=349)	75.9%	82.1%	66.7%	0.003
Testing regardless of risk (n=349)	93.1%	97.4%	85.9%	<0.001
Risk based testing if prevalence <1:1000 (n=342)	67.3%	68.9%	60.9%	0.048
Attitudes toward CDC recommendations				
Routine Testing will...				
Improve public health (n=350)	71.6%	94.4%	59.7%	<0.001
Benefit patients (n=349)	79.1%	91.3%	46.4%	<0.001
Not decrease ability to meet other needs (n=350)	74.6%	84.2%	62.3%	<0.001
Importance of HIV screening rated very important/essential (n=345)	41.5%	59.1%	19.1%	<0.001
Testing Practices				
Report testing regardless of risk	63.3%	91.3%	27.5%	<0.001
>25% of patients screened (n=345)	37.4%	52.6%	21.9%	<0.001

\*Percentages based on respondent "n" for item in 1st column, which vary due to missing data

**Table 3. Multivariate Associations between CE Characteristics and Encouraging Trainees to Perform Routine HIV Testing**

	Encourage Trainees to Perform Routine HIV Screening aOR (95% CI)*
Gender	
Male	1.0 (ref)
Female	0.83 (0.43, 1.59)
Yrs since completion of training	
< 10	1.0 (ref)
10-19	0.65 (0.32, 1.31)
≥ 20	0.89 (0.37, 2.14)
Percent minority patients	
0-30%	1.0 (ref)
31-60%	0.96 (0.36, 2.57)
≥ 61%	1.31 (0.47, 3.70)
Estimated HIV prevalence	
< 0.1%	1.0 (ref)
0.1- 0.9%	0.91 (0.39, 2.08)
≥1%	1.40 (0.55, 3.60)
Practice Setting	
University Affiliated	1.0 (ref)
Non-university Affiliated	0.90 (0.42, 1.93)
VA Affiliated	0.32 (0.13, 0.84)
Knowledge Score	
0 wrong	1.0 (ref)
1 wrong	0.57 (0.29, 1.12)
≥2 wrong	0.20 (0.08, 0.46)
Attitude toward Testing	
No benefit to patients	1.0 (ref)
Benefits patients	8.83 (4.21, 18.5)
Percentage of Patients Screened	
≤ 25%	1.0 (ref)
> 25%	5.01 (1.90, 13.1)

\*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, practice setting, knowledge score, belief in benefit to patient and percentage of patient's screened. CI=confidence interval

a primary teaching method and residents have been shown to mirror their preceptors in prescribing practices and preventive care.<sup>25,26</sup> Educational detailing by faculty and opinion leaders championing preventive health improve resident adherence to guidelines.<sup>14,27</sup> Thus encouraging promotion by CEs may increase adoption of routine HIV testing.

More than one-third of CEs continue to rely on assessment of risk behaviors as an indication for HIV testing despite the fact that this approach has been shown to miss over 50% of HIV-infected individuals.<sup>28</sup> Among those who do not encourage trainees to offer routine HIV testing regardless of risk, perception of low local prevalence was the highest cited rationale. This perception frequently underestimates local prevalence: in a national survey of program directors, only a minority of program directors indicated that their residents train in a geographic area with too low a prevalence to warrant training in HIV.<sup>16</sup> The development of refined and easily accessible local prevalence data may help physicians and educators better assess their local needs. An effort to provide such surveillance data is currently being built using data from local and state health departments (<http://aidsvu.org>), and it remains to be seen if that can impact testing rates.

Competing priorities, especially in a busy clinic environment, were also identified as a major barrier to encouraging

HIV testing. Similarly, a survey of residents in New York City reported lack of time as the biggest barrier to routine testing.<sup>18</sup> Interventions that make HIV testing as streamlined as possible within the flow of clinic work are likely to improve adoption.<sup>29</sup> In both community health centers and VA primary care clinics, taking the testing out of the physician's purview was successful in increasing HIV testing rates, but requires other staffing and adjustments to clinic flow.<sup>10,30</sup> In the VA, clinical reminders integrated into the electronic medical record have been successful cues to busy physicians.<sup>12</sup> It is not yet known what interventions might be most successful in resident continuity clinics, though many clinics participating in both VA interventions were resident training sites.

Our study should be interpreted in light of several potential limitations. First, the overall survey response was somewhat low, but comparable to other provider surveys and response rates in this range have not been shown to be associated with increased responder bias.<sup>31-33</sup> In our survey, respondents did not differ from non-responders in demographic characteristics.<sup>7</sup> Furthermore, the majority of respondents were involved in supervision of trainees, allowing the current analysis. Second, the CEs surveyed were all members of SGIM who supervised trainees in outpatient primary care clinics and thus may not represent the teaching behaviors of all internal medicine CEs; however, they do represent a broad spectrum of university-based, community, and VA practice nationwide. It should be noted that this survey occurred just prior to a series of initiatives to increase HIV testing at the VA and this may explain the lower rates of CE encouragement in the VA.<sup>34</sup> Third, estimates of percent of minority patients, local HIV prevalence, and percentage of patient panel screened were all self-reported and could not readily be verified. However, it seems likely that faculty would more likely overestimate (than underestimate) how many patients they recommend for testing, potentially biasing our results toward the null hypothesis. Finally, it was beyond the scope of this study to determine whether encouragement of testing by CEs translated into increased HIV testing by residents.

Clinic preceptors are in a unique position to couple teaching with the influence of an opinion leader and

**Table 4. Reported Barriers to Recommending Routine HIV Testing to Trainees (n=156)**

Reason for Not Recommending HIV Screening to Trainees	N (%)
Low Local HIV Prevalence	58 (37.2%)
More important teaching issues	54 (34.6%)
Too busy	53 (34.0%)
Unaware of recommendations	29 (18.6%)
Disagree with recommendations	28 (17.9%)
Evidence insufficient	25 (16.0%)
Lack Support Services	23 (14.7%)
Concerns about confidentiality	8 (5.1%)
Other	37 (23.7%)

practical reinforcement. The current study suggests potential interventions that could increase adoption of routine HIV testing among general internists. Educational interventions directed at improving CE knowledge of HIV testing recommendations as well as highlighting the benefits of HIV testing for their patients may broadly increase dissemination of routine HIV screening among their trainees.

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**Corresponding Author:** Gail V. Berkenblit, MD, PhD; Department of Medicine, Johns Hopkins University School of Medicine, 601 North Caroline St., Baltimore, MD 21287, USA (e-mail: gberken@jhmi.edu).

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