

Improving HIV Rapid Testing Rates Among STD Clinic Patients: A Randomized Controlled Trial

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Objective: The Centers for Disease Control and Prevention recommends that HIV testing be a standard part of medical care; however, testing is voluntary and some patients decline. We evaluated 2 brief interventions to promote rapid HIV testing among STD clinic patients who initially declined testing. **Method:** Using a randomized controlled trial, patients either viewed an educational digital video disc (DVD) or participated in stage-based behavioral counseling (SBC) provided by a nurse. Sixty clients presenting for care at a STD clinic who initially declined HIV testing at registration and during risk behavior screening participated in the study. **Results:** The primary outcome was whether patients agreed to be tested for HIV. The secondary outcomes included attitudes, knowledge, and stage-of-change regarding HIV testing. Patients receiving both interventions improved their attitudes and knowledge about testing ($ps < .01$). Patients receiving SBC agreed to testing more often (45%) than did patients who viewed the DVD (19%; $p < .05$). **Conclusions:** Brief interventions can increase rapid HIV testing acceptance among patients who are reluctant to be tested; counseling guided by behavioral science theory is more effective than a well-designed information-based intervention.

Keywords: HIV counseling and testing; sexually transmitted disease; HIV; public health; randomized controlled trial

The Centers for Disease Control and Prevention estimated the annual incidence of HIV in the United States at 40,000, with at least one million people now living with HIV ([CDC], 2006c; Glynn & Rhodes, 2005). Moreover, it is estimated that approximately 25% of those who are HIV+ do not know that they are infected (Glynn & Rhodes, 2005), and more than half of new cases are transmitted by individuals who are unaware that they are HIV+ (Marks, Crepaz, & Janssen, 2006). It is also estimated that increasing the number of people who know their HIV status could reduce new HIV infections in the United States by almost one third (Holtgrave & Pinkerton, 2007).

HIV testing is an important public health strategy. Testing can help to identify persons already infected with HIV so that they

enter into care sooner and delay some of the consequences of HIV disease. Equally important, testing alerts infected persons about their infectiousness and motivates many who test positive to adopt safer sex practices (Weinhardt, Carey, Johnson, & Bickham, 1999). Using safer sexual practices, HIV+ people reduce their risk of re-infection with HIV and other STDs (Blackard, Cohen, & Mayer, 2002; Fox et al., 2001) and prevent the unknowing spread of HIV to sexual partners (Marks et al., 2006).

Approaches to maximizing the benefits of testing include increasing the convenience of testing, decreasing barriers to testing, and increasing the number of people who receive their test results. The availability of rapid HIV testing has made testing more efficient and convenient (Hutchinson, Branson, Kim, & Farnham, 2006). The use of rapid tests is especially promising in STD clinics because 23% of all cases of HIV are detected in STD clinics; however, less than half of those who are tested with traditional tests return for their test results (CDC, 2006a). Many people attending STD clinics recognize their risk for HIV and agree to be tested while receiving care (CDC, 2006a). However, some STD clinic patients decline testing. Thus, a public health priority is to identify strategies for motivating reluctant patients to agree to HIV testing.

People report declining HIV testing for many reasons; for example, some have been tested previously and do not see a need for retesting whereas others believe they are not at risk for HIV. Some people recognize that they are at risk but do not want to know the results (CDC, 2003; Simon, Weber, Ford, Cheng, & Kerndt, 1996).

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Others think that rapid testing provides results before they can prepare for the results (Smith et al., 2006) or they are reluctant to be tested because of misgivings about provider sensitivity (Mimiaga, Goldhammer, Belanoff, Tetu, & Mayer, 2007). Thus, reasons for declining testing include both informational deficits and motivational barriers.

Given the value of HIV testing for reducing the incidence of HIV (Janssen et al., 2001), we sought to develop and evaluate two brief, clinic-based interventions to increase the rate of HIV rapid testing among patients seeking care at STD clinics. Both interventions were grounded in behavioral science theory (Fishbein, 2000; Fisher & Fisher, 1992; Prochaska, DiClemente, & Norcross, 1992) and influenced by empirical precedent as well as public health feasibility.

Because some patients who decline testing do so because they lack information about HIV transmission and testing, providing such *information* might increase the willingness of such patients to be tested. An informational intervention is an inexpensive method of intervention delivery, especially if administered in a standardized way using digital video disc (DVD) technology; because STD clinics are under resourced, cost-effective interventions are needed (Cohen, Wu, & Farley, 2005). Indeed, research has documented that video-based interventions can increase *self-reported* testing among low-income women (Apanovitch, McCarthy, & Salovey, 2003; Kalichman & Coley, 1995). However, these studies relied on self-report. Research has not yet evaluated whether a video-based intervention can improve testing *behavior*.

Alternatively, patients who decline testing might need a more tailored, *motivational* intervention. Indeed, theory and research suggest that individuals with different motivational states may require interventions tailored to their readiness-to-change and personal concerns (Prochaska et al., 1992; Prochaska, Redding, Harlow, Rossi, & Velicer, 1994). Thus, for those who are precontemplative, it may be optimal to provide information, use storytelling, or discuss the impact of not being tested on the person's family or community; for those who are contemplative, it may be helpful to address the person's ambivalence by discussing the pros and cons of testing, addressing perceived barriers to testing, or exploring testing in relation to the person's self-image (Coury-Doniger, Levenkron, Knox, Cowell, & Urban, 1999; Coury-Doniger, Levenkron, McGrath, Knox, & Urban, 2000).

This study evaluated the relative efficacy of these two intervention approaches for men and women receiving care in a publicly funded clinic. We predicted that a brief motivational intervention, tailored to the individual circumstances of the patient, would be most efficacious in promoting testing behavior among STD clinic patients who initially declined testing.

Method

Design

We used a randomized controlled trial to evaluate two approaches to increasing rapid HIV-antibody testing. One approach was information focused, using a DVD to provide information about HIV epidemiology and transmission, and the benefits of HIV testing. The second approach involved behavioral counseling delivered by a nurse provider. The primary outcome was whether patients agreed to be tested. Secondary outcomes included knowl-

edge, attitudes, stage-of-change with respect to HIV testing, and patient satisfaction.

Participants

All procedures were approved the Institutional Review Boards of the participating institutions. Data collection began on November 20, 2006, and was completed on March 7, 2007.

Patients attending a publicly funded STD clinic were recruited to participate if they were: (a) unwilling to be tested for HIV during the initial registration and subsequent screening, (b) 18 years of age or older, and (c) able to understand English. Patients were excluded from the study if they (d) received care at the clinic in the past 3 months, (e) were HIV positive, (f) had participated in an HIV vaccine study, (g) had participated in an ongoing study evaluating safer sex interventions, or (h) were unable to participate meaningfully (e.g., due to substance use).

Procedures

At the time of registration, clinic staff informed patients that "in order to provide good medical care, we recommend HIV testing for any clinic patient who has not been tested at the clinic in the past 3 months." The staff member then asked "Do you want to have an HIV test today?" The patient's response was noted on his or her chart. The patient was given a registration number and invited to sit in the waiting room. Next, a research assistant (RA) called patients who were not interested in having an HIV test by registration number from the waiting room into a private exam room. The RA explained that there was a research project taking place in the clinic to improve health services, and asked if the patient would be willing to answer a few questions to determine eligibility. Nested within a series of general health questions (i.e., to mask eligibility criteria), patients were again asked if they would be willing to take an HIV test on that day. For those patients who said no, they were told that all patients at the clinic need to have their blood drawn for syphilis anyway; so, knowing that, they were asked if they would be willing to get an HIV test. Patients who still were not willing to take an HIV test even after learning of the mandatory syphilis blood draw were eligible.

The RA explained that participation involved an initial survey, a routine clinic visit (i.e., intake history, physical exam, STD testing and treatment), a brief health promotion program, and a second brief survey. Regarding the health promotion program, patients were told that they would either talk one-on-one with a nurse, or watch an educational DVD, and the program to which they were assigned would be determined by chance. Finally, they were told that they would receive \$20 as compensation for the extra time that participation required. Interested patients provided written consent and were randomly assigned to one of two intervention conditions: (a) an individual counseling session, or (b) an informational DVD.

The motivational intervention was stage-based behavioral counseling (SBC; Coury-Doniger et al., 1999; 2000), a brief intervention that is grounded in behavioral science theory (Prochaska et al., 1992; 1994). SBC had been used previously but not evaluated. During SBC, nurse counselors used open-ended questions and a nonjudgmental approach to elicit information regarding a patient's life circumstances (e.g., attitudes toward testing). Based on a series

of semistructured questions, patients were staged as (a) precontemplative (i.e., sees no need for an HIV test), (b) contemplative (i.e., sees a need, but has barriers to taking the test), or (c) ready-for-action (i.e., is ready to take an HIV test today). Next, a counseling strategy suited to the patient's stage-of-change was delivered. For example, with a precontemplative patient, a counselor might discuss interrelationships among STDs; with a contemplative patient, in contrast, a counselor might identify barriers to getting an HIV test today. Counselors were well-trained, received regular supervision, and followed a manual.

In the informational intervention, a nurse met briefly with the patient to assess his or her recent risk behavior and stage-of-change for taking an HIV test. The patient then watched an informational DVD that included information about HIV transmission and prevention, the meaning of a positive and negative test result, information about the window period, an explanation of confidential versus anonymous testing, HIV testing procedures, and the benefits of HIV testing. This DVD was modeled on a video that has been shown to increase rates of self-reported HIV testing (Apanovitch et al., 2003).

Both interventions followed a written protocol, and required 15 to 20 minutes to administer. After the intervention, patients were asked if they would be willing to take a rapid HIV test. They were told that, if they agreed to a test, they could get their results before they left the clinic that day. For those who agreed to testing, the study counselor obtained testing consent (as required by state law) and collected blood for the rapid test. All patients completed their clinic visit, which included a history, physical examination, and STD testing and treatment.

Measures

Descriptive Measures (Administered at Pre-Intervention Only)

Demographic and sexual history items. Items adapted from previous studies (Carey et al., 2000; 2004) requested the patient's age, sex, race, ethnicity, level of educational attainment, employment status, annual income, relationship status, number of children, previous and current pregnancies, and sexual orientation. Patients also reported the number of male and female sexual partners (lifetime, and past 3 months), the frequency of anal and vaginal sex with and without a condom (past 3 months), whether they ever traded sex for money or drugs, how many times they had been tested for HIV and the last time they were tested for HIV.

Substance use. For the past 3 months, participants reported the number of drinking days in a typical week, the number of drinks per day on a typical day when they drank, and the most they drank on any one day. The number of drinking days was multiplied by the number of drinks per day, to determine the average number of drinks per week. Participants indicated how often they used marijuana, crack cocaine, and tobacco products.

Depression. The 9-item form of the Center for Epidemiological Studies—Depression scale (CES-D; Radloff, 1977) was used to screen for depression. Items were summed, with a higher score indicating more depressive symptoms. A second indicator, formed by counting the number of items endorsed, was created for descriptive purposes; on this indicator, scores ≥ 4 are suggestive of depression (Santor & Coyne, 1997).

Outcome Measures (Administered at Both Pre- and Postintervention)

HIV testing attitudes. Patients indicated whether they agreed or disagreed with 22 perceived advantages and disadvantages of HIV testing using a 6-point scale. Items were drawn from existing measures (Awad, Sagrestano, Kittleson, & Sarvela, 2004; Boshamer & Bruce, 1999; Schwarcz et al., 1997; Simon et al., 1996). Sample items were "There is no point in finding out if I am HIV positive," and "Getting tested for HIV could help me to protect others." A higher average-item score indicated a more positive attitude toward testing ($\alpha = .70$).

Stage-of-Change. One item assessed participants' stage-of-change (SOC) for testing. Participants indicated whether they: (a) saw no need to get an HIV test (precontemplative), (b) saw a need to get an HIV test, but could not do it today (contemplative), or (c) were ready to be tested (ready-for-action). To assess movement across stages, participants were given a score of 0 if their stage was unchanged from pre- to postassessment, a score of +1 (or +2) if they moved forward one (or two) stages, and a score of -1 (or -2) if they moved backward.

Testing knowledge. Participants responded to eight items adapted from previous research (Carey & Schroder, 2002; Kalichman & Coley, 1995). The percentage of correct items was calculated to create a knowledge of HIV testing score.

Additional Measures (Administered at Postintervention Only)

Reasons for declining testing. Patients who declined testing were asked to check all the reasons (from a list of 14 reasons) that they declined testing. These items were culled from previous studies (CDC, 2003; Schwarcz et al., 1997; Simon et al., 1996).

Patient satisfaction. All patients responded to three items that assessed their satisfaction with the information and/or counseling that they received during their clinic visit.

Results

Sample Characteristics

Two hundred and sixty patients were screened; of those, 97 met study criteria (37%; see Figure 1), and 60 patients agreed to participate. The sample was predominantly male (83%; $n = 50$), single (77%; $n = 46$), and African American (67%; $n = 36$), with a mean age of 31.3 years ($SD = 9.3$). Most were high-school educated ($M = 12.5$ years, $SD = 1.9$), 47% were unemployed ($n = 28$), and 51% reported an income $< \$15,000$ per year. During the past 3 months, patients reported an average of two sexual partners ($M = 21$ lifetime partners), and 9.5 occasions of unprotected sexual intercourse ($SD = 13.0$); 54% of occasions were unprotected. Testing indicated that 17% had a STD at the time of the clinic visit but no one tested positive for HIV.

On average, participants scored 7.1 ($SD = 5.6$) out of 27 on the CES-D; 13 patients (22%) met criteria suggestive of depression. Participants reported consuming an average of 6.4 drinks per week ($SD = 8.3$ drinks). In the past 3 months, 46% ($n = 27$) of patients used marijuana, 5% ($n = 3$) used cocaine, and 58% ($n = 34$) smoked cigarettes.

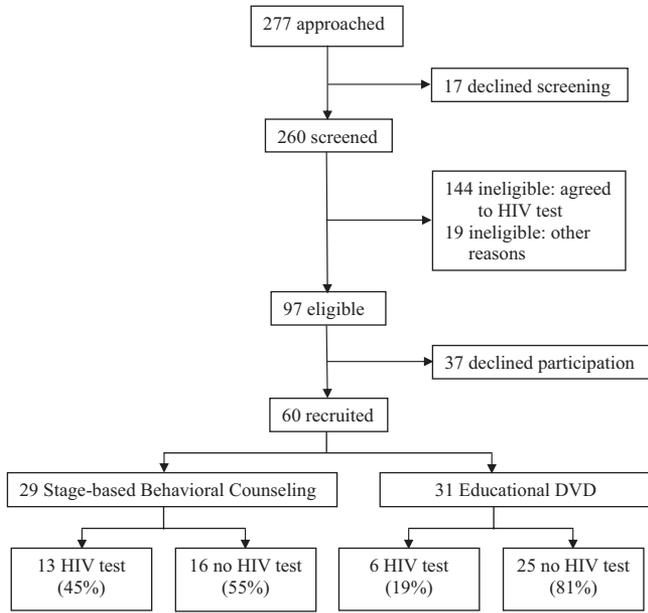


Figure 1. Flow of participants through screening, recruitment, intervention, and HIV testing decision as a function of intervention received

Equivalence of Intervention Groups at Baseline

To determine whether randomization produced equivalent groups, we conducted separate one-way analyses of variances (ANOVAs) and chi-square analyses using baseline data. The groups did not differ on any of the baseline demographic (i.e., gender, race, age, employment, income), sexual behavior, that is, number of sexual partners (past 3 months or lifetime), number of episodes of unprotected sex or proportion of episodes of unprotected sex (past 3 months), reason for clinic visit, or testing (i.e., interest in testing, testing attitudes, testing knowledge, ever having an HIV test, or SOC for testing) variables (all *ps* > .05).

Effects of the Interventions

Next, to determine whether patients' attitudes toward and knowledge about HIV testing improved as a result of the

interventions, we conducted separate 2 (intervention: DVD vs. SBC) × 2 (time: pre- vs. postintervention) repeated measures ANOVAs (See Table 1). The results for both analyses indicated a main effect of time, attitudes: $F(1, 58) = 37.68, p < .001$, effect size (ES) = .80; knowledge: $F(1, 58) = 11.12, p < .01$, ES = .44. Thus, patients in both intervention conditions improved their attitudes toward testing from the pre- to the postintervention time (*Ms* = 3.9 to 4.2 for the SBC condition, and *Ms* = 4.0 to 4.3 for the DVD condition). Patients also improved their testing-related knowledge from pre- to the postintervention (*Ms* = 43% to 50% correct for the SBC condition, and *Ms* = 49% to 57% correct for the DVD condition). The intervention-by-time interaction was not associated with knowledge or attitude scores (*ps* > .10).

All patients declined to be tested at the time of clinic registration, and twice again during the screening interview. Based on self-report at baseline, 67% of patients were precontemplative for testing, 31% were contemplative, and 2% were ready-for-action (i.e., testing). After receiving an intervention, 48% remained precontemplative, 26% were contemplative, and 26% were ready-for-action. A *t* test indicated that patients who received SBC changed more (*M* = .68) than patients who received the DVD (*M* = .20), $t(56) = 2.24, p < .05, ES = .57$.

On the primary outcome, testing behavior, 6 of 31 (19%) patients who received the DVD agreed to be tested whereas 13 of 29 patients (45%) who received SBC agreed to be tested; the difference between conditions was significant, $\chi^2(1, N = 60) = 4.49, p < .05, ES = .57$. Patients who declined testing indicated the reason(s) for their decision (they were allowed to endorse multiple reasons). The most frequently endorsed reasons were: "I don't think I have HIV" (66%), "I already know my HIV status" (49%), "I would be too upset if I found out that I had HIV" (41%), and "I don't like thinking about HIV" (34%).

Overall, patients in both conditions reported high levels of satisfaction with the services that they received at the clinic. On separate 4-point scales, patients in both the SBC and DVD conditions said that they would definitely return to the clinic (*Ms* = 3.7 and 3.8, respectively), that their needs were met (*Ms* = 3.8 and 3.7), and that they were very satisfied with the information and behavioral counseling that they had received (*Ms* = 3.7 and 3.7); these ratings did not differ by condition (all *ps* > .10).

Table 1
HIV Testing-Related Knowledge, Attitudes, and Behavior Before and After Two Brief Interventions

	Knowledge About HIV Testing ^a				Attitudes Toward HIV Testing ^b				Behavior: Agreed to HIV Testing ^c	
	Before (%)		After (%)		Before		After		Yes (n)	Yes (%)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
SBC (<i>n</i> = 29)	43	19	50	21	3.90	0.50	4.16	0.41	13	45
DVD (<i>n</i> = 31)	49	22	57	25	4.05	0.62	4.28	0.56	6	19

Note. *M* = mean; *SD* = standard deviation; SBC = stage-based behavioral counseling; DVD = information-based digital video disc intervention. ^aMain effect for time, $F(1, 58) = 37.68, p < .001$, effect size = .80; the main effect for intervention and the intervention-by-time interaction were both nonsignificant. ^bMain effect for time, $F(1, 58) = 11.12, p < .01$, effect size = .44; the main effect for intervention and the intervention-by-time interaction were both nonsignificant. ^cThe difference between the SBC and DVD conditions was significant, $\chi^2(1, N = 60) = 4.49, p < .05$, effect size = .57.

Discussion

This study evaluated two strategies to promote HIV testing among patients who are at risk for HIV but decline testing. The results indicate that an information-based DVD and behavioral counseling provided by a nurse may increase testing agreement among patients who decline testing. In addition, we found that counseling guided by behavioral science theory is more efficacious than a primarily informational DVD. It is noteworthy that patients enrolled in this study had repeatedly declined HIV testing, even when told that they would need to have blood drawn for mandatory syphilis testing. Thus, the interventions we evaluated were efficacious even among patients who had repeatedly declined testing.

To better understand the mechanisms by which the interventions worked, we assessed attitudes and knowledge about testing, SOC for testing, and patient satisfaction. Our choice of these constructs was guided by theory (Fishbein et al., 2001; Fisher & Fisher, 1992; Prochaska et al., 1992), and the results indicated that patients in both conditions improved on these measures from pre- to postintervention. Because our sample was too small to permit mediational analyses, we cannot draw strong inferences about the mechanisms by which the interventions work. However, the concurrent change on the theoretical antecedents of behavior change provides preliminary evidence that improving knowledge and attitudes facilitates testing among patients who initially decline.

We predicted the differential efficacy of the two interventions. One explanation for the observed differential outcome is that SBC may have been more effective because the behavioral counseling was uniquely *tailored* to each patient's individual circumstances (e.g., patients' attitudes toward their partners and relationships); in contrast, the DVD was *targeted* to the clinic population but not tailored to the individual patient (Webb, Simmons, & Brandon, 2005). In addition, although both interventions allowed patients the opportunity to ask questions of their provider, SBC may have facilitated more interpersonal interaction than the DVD.

The results of this study should be interpreted mindful of its limitations and strengths. One limitation is that our sample was small; therefore, the results should be replicated with larger samples (Evans & Ildstad, 2001). A second limitation is that our sample consisted primarily of African American men; therefore, the results may not generalize to more diverse patient groups or settings. However, it is also important to point out that men of color are disproportionately affected by HIV and other STDs (CDC, 2006b). Thus, our results should generalize well to publicly funded STD clinics. Third, as with any clinical trial, effects of the procedures needed for the research (e.g., assessment process; reimbursement for participation) cannot be separated from the effects of the clinical interventions that we were evaluating. Thus, it is possible that some of the observed effect reflects a sensitization effect that is unique from the counseling effects (cf. Weinhardt, Carey, & Carey, 2000).

Several strengths of this study should also be noted. First, the use of rapid HIV tests (which eliminated a common barrier to testing, viz., the need to return for test results; San Antonio-Gaddy et al., 2006) and the stringent entry criteria (i.e., patients had to refuse HIV testing three times) assured that patients in our trial are among the most challenging to persuade to agree to testing. Because the interventions we evaluated were efficacious with these reluctant patients, it is likely that they will be even more effica-

cious with less reluctant patients. Second, confidence in our findings is enhanced by the use of a randomized controlled design, which allows for strong inferences about causality (Shadish, Cook, & Campbell, 2001). Third, we believe this is the first study to evaluate a provider-delivered behavioral intervention using a previously tested (and efficacious) comparison condition, the most rigorous control for efficacy. Fourth, in addition to self-reported knowledge and attitudes, we also used observed behavior as an outcome. Fifth, the interventions were guided by behavioral science theory, manualized, and implemented with fidelity by well-trained and supervised interventionists. Sixth, the counselors were nurses rather than professional counselors, increasing the likelihood that these interventions will be adopted in public clinics.

Overall, the results of this study indicate that use of a brief, behavioral counseling intervention guided by theory led to a significant increase in testing relative to a carefully prepared, educational DVD among patients who are otherwise unlikely to be tested. Use of behavioral counseling is recommended when patients initially decline testing. In settings where health care providers have neither the skill nor the time to conduct such counseling, use of a culturally sensitive and professional DVD *may* improve testing acceptance. Further research is needed to determine the generalizability of these results to other clinical settings, and to establish the cost effectiveness of such programs.

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