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Original Contribution

A provider participatory implementation model for HIV testing in an ED

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Abstract

Background: The Centers for Disease Control and Prevention recommends routine HIV screening for adults.

Objectives: Community-based participatory research incorporates subjects in the design and conduct of research. We included nurses and physicians in the implementation of HIV rapid test use in the emergency department (ED). We explored the process, facilitators, and barriers.

Methods: We identified clinical champions and trained staff. Physicians obtained consent and ordered HIV testing; nurses performed rapid testing. Testing rates were tracked by electronic medical record. We conducted regular meetings between staff and researchers. Semistructured qualitative interviews with providers were conducted at 3 months.

Results: By week 15, we administered 121 tests. After the eligibility protocol evolved to incorporate ED nursing concerns regarding staffing limitations from a random sampling model to one focused on testing during nonpeak hours, the weekly number of tests increased. Eighteen percent of providers favored nontargeted HIV screening, 27% favored the current model of testing at nonpeak hours, 32% supported diagnostic testing, and 18% favored no testing or "other." Barriers include written consent, electronic documentation, time constraints, and belief that screening is not a core ED duty. Facilitators include ease of test administration, belief that ED patients are at higher risk, and flexibility to tailor screening efforts according to patient volume.

Conclusions: The ED-based HIV testing is feasible within a Veterans Hospital Administration setting. Involvement of nursing in a community-based participatory research implementation model may facilitate staff acceptance of nontargeted HIV screening and be a mechanism to initiate administration of clinical preventive services to ED patients with limited primary care contact.

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1. Introduction

HIV infection and AIDS remain major public health problems in the United States, with more than 1 million individuals infected [1]. During the years that HIV-positive

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patients remain undiagnosed, they may fail to receive effective therapy and unknowingly transmit HIV to others. However, about one fifth of HIV-positive persons in the United States are unaware of their status [2].

In September 2006, the Centers for Disease Control and Prevention (CDC) recommended "opt-out" screening for HIV infection in all health care settings in patients 13 to 64 years of age, regardless of risk factors, where the population prevalence of HIV exceeds 0.1% [3]. The CDC recommendation explicitly mentions missed opportunities in emergency departments (EDs) and other episodic care settings, as US EDs had an estimated testing rate of 3.2 per 1000 ED visits in 1993-2005 [4]. Many undiagnosed HIV-positive persons had recent contact with the health care system and EDs [3,5,6]. In a South Carolina study, persons with late diagnosis of HIV had an average of 4 health care visits without testing per person in the 3 years before diagnosis. Of these visits, 79% were in EDs [7]. The ED may also be a high-yield setting for HIV screening. Research indicates ED populations have a higher HIV prevalence than patients seen in other primary care sites [8,9].

Several studies demonstrate that ED-based HIV testing is feasible. Reported models vary by choice of testing population, from diagnostic testing to risk-factor based testing, to nontargeted opt-in testing, and to nontargeted opt-out testing [10-13]. Still, ED-based HIV testing remains limited; a recent survey of academic EDs found that just 13% even had a policy recommending routine screening, with no data on actual implementation of those policies [14].

Federal health care facilities are often excluded from such practice surveys, in part likely because of their unique regulatory environment. However, the Veterans Health Administration (VHA) may be an ideal setting to overcome some of the known barriers to ED-based HIV screening [15]. Veterans Health Administration is the largest single provider of HIV care in the United States, treating more than 22 000 patients annually nationwide [15,16]. Linkage to care issues are of smaller concern in its integrated health care delivery system. However, in Veterans Integrated Service Network 22, the network that contains the study site, only 30% of patients with risk factors (sexually transmitted infections, hepatitis, or substance abuse) documented within the computerized medical record received HIV testing [17]. HIV testing rates in VHA nationally during fiscal year 2006 were estimated at less than 2% in the outpatient and less than 6% in the inpatient settings [18].

We set out to develop and evaluate a new ED-based HIV testing program based on the principles of community-based participatory research (CBPR) with the ED staff as the community or unit of identity. We developed our model with native resources only—that is, using only existing ED staff—because additional sustainable funding streams for external resources were not available, a common real-world constraint. The ED staff and the research staff were partners throughout the process, with changes to the screening model driven by ED staff input.

We engaged in qualitative program evaluation to evaluate our efforts, looking specifically at facilitators and barriers to implementation of ED-based HIV testing. Additional objectives included measurement of staff attitudes toward ED-based HIV testing.

2. Materials and methods

2.1. Study design

This was a descriptive study of participatory research examining the implementation of nontargeted opt-in HIV rapid testing (RT) in an urban VHA ED. This study was approved by the research committee and institutional review board for our institution and met criteria for exemption from written informed consent.

2.2. Model development

Previous research described a multimodal intervention to increase HIV testing at several VHA outpatient settings that included provider activation, audit feedback, and identification and removal of organizational barriers [17,19,20]. We convened an interdisciplinary group of investigators to develop a nontargeted HIV screening model for the ED. This collaboration included members of the Division of Infectious Diseases, researchers in the VHA HIV/Hepatitis Quality Enhancement Research Initiative center, and clinical champions and administrators from the full-time ED attending physicians and nurses. This group met regularly before and during the implementation of ED-based HIV screening at our study site.

2.3. Study setting and population

The West Los Angeles Veterans Affairs Medical Center is a 500-bed urban teaching hospital that serves area veterans. The approximate annual ED census is 20 000. All physician and nursing staff members who worked in the ED during weekday daytime hours of 8:00 AM to 4:00 PM were trained in the protocol and their respective roles. Although the Oraquick Advance (Bethlehem, PA) is Clinical Laboratory Improvement Amendments–waived, laboratory personnel trained nurses in RT administration and ensured quality control. Patients were eligible for testing if they were 18 to 64 years of age. Patients were excluded if they were employees, had altered mental status, or otherwise could not give informed consent.

2.4. Study protocol/interventions

We initiated provider activation activities before and during the implementation, including academic detailing,

social marketing, and provider education materials, as well as audit feedback activities, where ED-level HIV testing rates were communicated on a weekly basis to ED staff. Academic detailing refers to one-on-one, in-person informal discussions of the rationale for and benefits of nontargeted HIV screening in EDs during frequent visits to the ED by research staff. Social marketing involved identifying hospital-level administrative and ED-level clinician thought leaders who then encouraged HIV testing and made presentations to ED clinical staff. Research staff met weekly to modify audit feedback and social marketing approaches to improve rate of HIV testing (Fig. 1).

The protocol for identifying veterans eligible for screening changed during the study to incorporate ED nursing concerns regarding staff limitations, evolving from a random sampling model toward one focused on nonpeak hours. The screening program was originally conceptualized as using a random sampling model, with patients assigned at triage (during business hours) to receive or not receive HIV RT based on the last digit of the VHA patient ID number. Based on nursing feedback about the heavy burden on triage staff and lack of control over fitting HIV screening into workflow, we initiated an alternative testing protocol focusing on nonpeak hours in week 3. Our ED is generally below saturation in the morning hours. In this iteration, patients presenting to the ED in the beginning hours of the morning nursing shift, from 7:00 AM to 12:00 PM, were identified by the charge nurse as eligible to be offered an HIV test, with an upper limit number of patients tested that day determined primarily by the charge nurse. In addition, all stakeholders agreed to a hard cap of 5 patients tested a day.

Patients identified by nursing staff as eligible were offered HIV screening by a physician; received brief pretest counseling including an explanation of the testing process, risk factors for HIV transmission, and benefits of HIV screening; and completed a written informed consent document as required by VHA. The ED staff nurses assisted the patients in obtaining a cheek swab for Oraquick Advance testing. Results were recorded in the computerized medical record system (CPRS??) by the nurse and communicated to the patient by the physician or nurse. Testing was performed in parallel with provision of standard ED care.

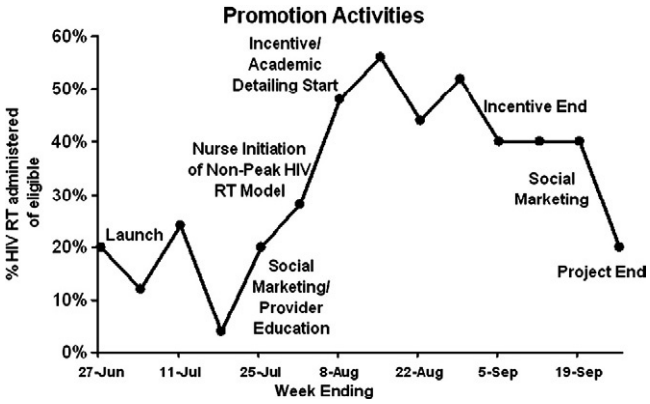

Fig. 1 Chronology of provider activation activities.

Physicians were also free to perform diagnostic rapid HIV testing on any patient (excluding occupational exposure) at any time, with identical pretest counseling, informed consent, point of care testing, and result recording procedures. Procedures were in place for automatic ordering and attainment of confirmatory blood testing for patients with positive RT results before they leave the ED, and linkage to infectious diseases clinic within 72 hours.

2.5. Methods of measurement and primary data analysis

We conducted confidential semistructured interviews with ED physician and nursing staff at 3 months after implementation of ED-based HIV screening with RT, with a focus on attitudes, barriers, and facilitators to implementation of ED-based HIV testing. Research assistants approached all ED day staff during their shifts for interviews, about 10 minutes in length. Research assistants were present in the ED on several dates clustered around the 3-month time point and captured all staff on duty during the time frame.

Trained research assistants who were members of the VHA HIV/Hepatitis Quality Enhancement Research Initiative center, certified by the VHA Research Administration/ Institutional Review Board, and underwent specific protocol and interview administration training before interviewing ED staff administered all the semistructured interviews. Research assistants read each question verbatim and provided additional explanation only if the question was not understood. The survey instruments used included a mix of open- and closed-response answers. Interview responses were deidentified and manually transferred into electronic form. Responses to semistructured questions were further categorized into themes by a single research assistant (see Appendix A for survey instrument).

Nursing staff input HIV RT results to CPRS in real-time. The CPRS data were used to calculate the number of tests administered. To determine total eligible patients to generate a test administration rate, we used a variety of methods, including reviewing last digits of patient ID number in the ED log; data collection sheets filled out by ED staff in real time about whether eligible patients were offered testing and whether they accepted testing; checking the ED log for number of patients presenting during morning hours; and finally, estimating 5 eligible patients per day. Changing between these various data collection methods also evolved iteratively out of the collaborative research process, as the initially conceived data collection sheet methods were felt to compose an overly burdensome research apparatus as perceived by the ED staff community.

3. Results

Over a period of 15 weeks from mid-June 2008 to late September 2008, we performed a total of 121 RTs for HIV in the ED. No patients tested positive.

The main reasons cited why providers do not offer an HIV RT was time constraints (8/22, 36%), followed by ineligibility of patient (illness/capacity to consent/age >65 years). Other reasons include lack of comfort with sensitive topic, lack of knowledge of test availability, and provider's personal assessment of patient's lack of risk. Primary operational barriers included time required for provider to complete separate written informed consent and time required for nurse to document HIV testing in the electronic medical record (both cited by 5/22 staff members; 23%). Eighteen percent (4/22) could not identify any barriers to HIV RT implementation (Fig. 2, Table 1). The following themes emerged as barriers: the belief that screening activities are outside the scope of ED duties or dilute the primary ED mission, time constraints based on unpredictability of ED patient volume/care, and lack of support staff. Representative quotes included, "HIV is an odd thing to do in the ED because in the ED we address things we can treat. HIV cannot be 'treated' in the ED." and "Sometimes if busy, no room for HIV testing. If not busy, perfect. If busy, too time consuming."

Facilitators included ease of HIV test administration, belief that patient population is at high risk for HIV, belief that patient population is less likely to access primary care, and ability to structure HIV RT on nonpeak times. Flexibility to alter screening efforts according to patient census was recommended to sustain HIV RT in the ED. Representative quotes included, "[Rapid testing] offers a quick an easy diagnosis and is more appropriate for the types of patients we see." and "… when changed to [sic] limited time frame, more workable."

The semistructured interviews conducted at 3 months after the implementation of ED-based nontargeted HIV screening showed that (4/22) 18% of nurses and providers favored routine HIV screening as a regular responsibility, (6/22) 27% favored the current model of testing at nonpeak hours, (4/22) 18% favored instituting a method to test for those with risk factors, and (3/22) 14% favored diagnostic testing only. Only (2/22) 9% did not support any form of HIV testing in the ED. Nurses rated a high level of satisfaction with administering HIV RT (4.6 on scale of 1-5) and indicated high levels of satisfaction with both emotional (4.7) and technical HIV RT training components (4.8). No one declined to participate in semistructured interviews.

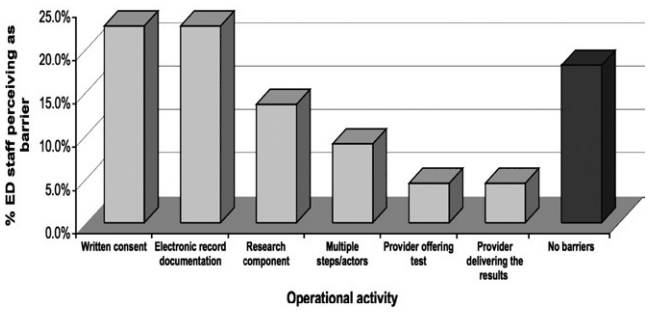

Fig. 2 Operational barriers at 3 months postlaunch.

Table 1 Operational barriers at 3 months postlaunch

	n
Job title	
Attending	4
Resident/intern	4
Registered nurse	10
Licensed vocational nurse	1
Critical care nurse	1
Nursing student	1
Nurse manager	1
Barriers to HIV RT	
Written consent	(5/22) 23%
Electronic record documentation	(5/22) 23%
Research documentation	(3/22) 14%
Multiple steps/actors	(2/22) 9%
Provider offering test	(1/22) 5%
Provider delivering results	(1/22) 5%
No barriers	(4/22) 8%

4. Discussion

Our study of the implementation of nontargeted opt-in HIV screening at an urban VHA ED contributes to the literature in several ways. First, the VHA setting is a new population and cultural/regulatory/operational environment in which to demonstrate the feasibility of ED-based HIV screening. To our knowledge, this represents the first efforts to implement any ED-based HIV screening in the VHA setting. Second, our model uses only native resources. There exists a paucity of data about HIV testing models that focus on accessing native resources; most use entirely parallel resources or a hybrid model of parallel external and native resources [21]. Both of these approaches require additional funding, which may be difficult to find or sustain. Finally, ED staff/stakeholders were heavily involved in the testing model design. According to the Kellogg Foundation, CBPR is a "collaborative process that equitably involves all partners in the research process and recognizes the unique strength that each brings." Additional principles used include building on strengths and resources within the community, collaborative partnership in all phases of research, balance between research and action for mutual benefit, and systems development through a cyclical and iterative process [22].

Our focus on using native resources was one of necessity, as we did not have the luxury of available external resources, a common real-life constraint. Although previous reports of ED-based HIV screening have demonstrated that using dedicated staff for consent, counseling, and testing can capture higher rates of patients, there currently exist few mechanisms for sustained compensation for such activities.

The impact of using a CBPR approach to development and implementation of ED-based HIV screening is mixed. As no HIV-positive patients were identified, there exists a question of whether the CBPR approach somehow produced a bias that selected for a very low risk population. Although we certainly did have no positive tests among the 121 tests performed, this number of total tests performed is far too small to conclude that the true positive rate in the ED population is zero. Given that we found zero positives among 121, the lower 95% confidence limits for the true rate of positive tests remains about 3 of 121 (~2.5%). A CBPR approach may also have led to the unintended outcome of handicapping the potential of this ED-based HIV screening implementation by giving too much power to the ED staff to limit the overall numbers tested per day. Certainly, one could surmise that staff members had competing motivations to manage their workloads. Another potential criticism is that there may have been an a priori violation of CBPR principles here; that is, the community of interest has to fundamentally want the implementation. Usually, CBPR researchers spend a lot of time up front working with the community to identify outcomes goals before developing research protocols and implementation processes. In this case, the goal outcome of implementing ED-based HIV screening was predefined by researchers.

There may be some potential positive effects of using CBPR principles on staff support for HIV testing. Staff attitudes toward nontargeted HIV screening in the ED were generally neutral to positive. This is interesting in light of the high staff resistance to HIV testing in EDs that has been demonstrated elsewhere in cross-sectional studies [23]. Furthermore, although there was no clear majority among our ED staff in terms of preferred HIV testing models, the plurality preferred the current spare capacity model generated out of the CBPR process. Using the CBPR collaborative process may also be especially useful in situations like ours where "outsiders" such as a quality improvement group or infectious diseases department want to implement HIV screening in a setting where they do not have direct leadership, such as an ED.

The dominant identified operational barriers to HIV testing in the ED were the written informed consent process and documentation in the electronic medical record. At the time, the VHA legal regulatory environment required a 3-page written informed consent, an outdated mandate directly opposed by the 2006 CDC recommendations. As of August 2009, this requirement was terminated. Documentation in the electronic medical record is a multistep process different from other previous required VHA ED nursing documentation.

4.1. Limitations

The semistructured interviews for the qualitative evaluation were conducted by research assistants who had also acted as implementation promoters in the provider activation activities described in "Materials and methods." This may have led to a positive bias in the interviews answers, as the process was necessarily not blinded to interviewer identity.

Although development of this ED-based HIV screening model proceeded with an eye toward eventual wider implementation in other VHA and non-VHA EDs, it was specifically developed for a single institution's ED and likely would require some modification for implementation at another site or another system. It may be difficult to generalize the CBPR-type approach, as our site has a very stable nursing staff pool. Furthermore, EDs in general are experiencing rising patient censuses and may have less predictable periods of spare capacity. In addition, the use of spare capacity is likely easier to implement in an integrated system, where billing and direct accounting of time for every service are not required and resource tradeoffs may be able to take place between departments (ED, infectious diseases, social work, etc).

Our research on barriers to HIV RT implementation did not specifically look at impact on ED length of stay or at rates of patients leaving without being seen. Anecdotally, during the study period, the study site transitioned to use of the Emergency Severity Index 5-level triage system, widely used in the community, with resultant increase in patients (previously, what would be level 3 patients were triaged to ED or urgent care based on triage nurse evaluation; now, all level 3 patients come to ED); and the protocol continued to be upheld.

The number of patients tested was low, and there were no patients who tested positive during the study period. This limits the ability to assess scalability of our approach, as well as resiliency of protocol and staff support after a potentially emotionally charged experience of a patient testing positive.

Finally, our qualitative assessment did not formally include a sustainability assessment. Given that many ED staff perceive HIV screening as outside of core ED activities and that there exists frequent house staff turnover in our ED, as well as usual staffing turnover, long-term sustainability is a significant issue.

5. Conclusions

A nontargeted HIV screening program was implemented in a VHA ED, using native resources and CBPR principles

in design of the implementation process. Time constraints and operational barriers such as written consent and documentation in the electronic medical record seemed to be dominant barriers to HIV testing. Facilitators included ease of test administration and belief that ED patients were at higher risk. The ED staff attitudes toward routine HIV screening in the ED were generally neutral to positive. The impact of using a CBPR approach was not clearly positive, but may facilitate staff acceptance of ED-based HIV testing. It seems that ED-based HIV testing is feasible within a VHA setting.

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Appendix A

Participant Code _____ **Date** _____

Process Evaluation

1. Can you tell me what your job title is? Please explain briefly what your job entails.

2. How important do you think routine HIV rapid testing (RT) is for patients in the ED?

1= Not at all important			5= Very important	
1	2	3	4	5

3. Roughly how many HIV rapid tests have you offered/ administered thus far?

4. What is your level of satisfaction with **routinely offering** HIV RT to ED patients? (For nurses: what is your level of satisfaction with having RT **routinely** offered?)

1= Not at all satisfied			5= Very satisfied	
1	2	3	4	5

5. In your opinion, is RT an appropriate means for HIV testing patients?

6. In your opinion, should HIV RT be routinely available?

6a. If no, would you favor risk-based testing?

7. Are there patients who should not be offered the test based on age, medical condition or other circumstances? If so, whom?

For nurses only

8. What is your level of satisfaction with **administering** HIV rapid tests?

1= Not at all satisfied			5= Very satisfied	
1	2	3	4	5

9. How well did Dr. Knapp's in-service prepare you for administering rapid testing?

1= Not at all			5= Very well	
1	2	3	4	5

10. How well did the laboratory in-service prepare you for administering rapid testing?

1= Not at all			5= Very well	
1	2	3	4	5

11. What do you think could be improved about the HIV RT training?

Process evaluation:

12. Because a variety of individuals work collaboratively in the ED, you may have knowledge of activities that may or may not directly pertain to you. Please check off from the list of activities below those (if any) that you think are barriers to effective implementation of HIV RT in this setting:

- ☐ triage nurse identifying eligible patients (attaching magnet and post-it)
- ☐ charge nurse attaching magnet to board
- ☐ provider offering the test
- ☐ nurse administering the HIV rapid test
- ☐ nurse interpreting the results
- ☐ nurse delivering results to doctor
- ☐ provider delivering the results to patient
- ☐ using CPRS to input results
- ☐ nurse placing triage sheet in collection bin
- ☐ other _____
- ☐ I found no barriers to implementation

13. Sometimes patients that are eligible are not offered an HIV RT. What do you think are the main reasons for why providers choose **not to offer** an HIV RT?

14. Other times patients refuse an HIV RT that is offered to them. What do you think are the main reasons for **why patients refuse** the test?

15. What are ways that the implementation of HIV RT in the ED can be improved?

16. Overall, how strongly do you favor the inclusion of routine RT as part of ED duties?

1= Not at all			5= Very strongly	
1	2	3	4	5

Addendum for Key Informants:

17. How strongly would you encourage your staff to implement routine HIV RT?

1= Not at all			5= Very strongly	
1	2	3	4	5

18. In your opinion how sustainable is this new system for HIV testing in the ED?

1= Not at all sustainable			5= Very sustainable	
1	2	3	4	5

19. As a leader in the ED, we would like to ask you about your thoughts regarding the implementation. What is your perspective as to how the implementation is going? How are your staff integrating RT into their individual workloads? How able/receptive are your staff to implementing HIV RT on a regular basis? Did any negative issues arise? What is the potential to sustain this intervention at the conclusion of this research? What would you need to support ongoing efforts?