Uncovering HIV Infection in the Emergency Department

A 2011 Public Health Perspective

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Disclosures

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Dr. Haukoos’s presentation was reviewed in light of his disclosures. No bias was found, only raw data was presented, and no recommendations were made. No conflict exists.
Overview

The problem

Our approaches and solutions

Impact and outcomes

Current state
Awareness in the United States

Number with HIV Infection: 1,200,000

Number unaware of HIV Infection: 230,000

Annual New Infections: 56,300
Every 9½ minutes, someone in the U.S. is infected with HIV.
Figure 1. Trends in numbers of emergency departments and related visits: United States, 1995–2005

SOURCES: CDC/NCHS National Hospital Ambulatory Medical Care Survey, American Hospital Association.
EDs and Public Health

Emergency Medical Care

Primary Prevention

Secondary Prevention

Tertiary Prevention

Surveillance of Disease, Injury, and Health Risk

Monitoring Healthcare Access

Delivery of Preventive Services

Policy Development to Improve Public’s Health

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HIV Impacts the ED

Racial and Ethnic Minorities
Heterosexual Men and Women
Economically Disadvantaged

Under- or Uninsured
No Primary Care

2011 Urgent Matters Webinar
Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings
CDC Recommendations Summary

Routine (non-targeted) HIV screening in all healthcare settings with undiagnosed prevalence \( \geq 0.1\% \) for patients aged 13 to 64 years

Voluntary testing using an opt-out approach

Integrated consent for HIV testing

Streamline prevention counseling

“Treatment with highly active antiretroviral therapy is widely available and is more effective when started earlier in the course of HIV infection.”

“...persons who are aware of their HIV infection are much less likely to transmit HIV.”

Rapid tests “have made testing more feasible in a variety of venues.”

“Thus, the potential benefits of routine HIV screening include improved public health outcomes and improved disease prevention...”

Bartlett et al. JAMA 2008;300:945-951. 2011 Urgent Matters Webinar
Evidence Synthesis

Number 46

Screening for Human Immunodeficiency Virus: Focused Update of a 2005 Systematic Evidence Review for the U. S. Preventive Services Task Force

Prepared for:
Agency for Healthcare Research and Quality
U. S. Department of Health and Human Services
340 Guarter Road
Rockville, MD 20850
www.ahrq.gov

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Oregon Evidence-based Practice Center
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Portland, Oregon 97239
www.ohsu.edu/epc/upfr/index.htm

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AHRQ Pub. No. 07-0597-EF-1
April 2007
Strategies for Uncovering HIV

Operational Considerations for All Testing Models

- Opt-in versus Opt-out Consent
- Education versus Counseling
- Rapid versus Conventional Assay
- Point-of-Care Testing versus Laboratory-based Testing
- Result Notification, Reporting, and Linkage of Positives
- Native versus External Resources

Clinical Practice

Development and Implementation of a Model to Improve Identification of Patients Infected with HIV Using Diagnostic Rapid Testing in the Emergency Department

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Abstract

Objectives: Infection with the human immunodeficiency virus (HIV) continues to expand in nontraditional risk groups, and the prevalence of undiagnosed infection remains relatively high in the patient populations of urban emergency departments (EDs). Unfortunately, HIV testing in this setting remains uncommon. The objectives of this study were 1) to develop a physician-based diagnostic rapid HIV testing model, 2) to implement this model in a high-volume urban ED, and 3) to prospectively characterize the patients who were targeted by physicians for testing and determine the proportions who completed rapid HIV counseling, testing, and referral tested positive for HIV infection and were successfully linked into medical and preventative care.

Methods: An interdisciplinary group of investigators developed a model for performing physician-based diagnostic rapid HIV testing in the ED. This model was then evaluated using a prospective cohort study design. Emergency physicians identified patients at risk for undiagnosed HIV infection using clinical judgment and consensus guidelines. Testing was performed by the hospital's central laboratory, and clinical social workers performed pretest and posttest counseling and provided appropriate medical and preventative care referrals, as defined by the model.

Results: Over the 30-month study period, 105,856 patients were evaluated in the ED. Of these, 681 (0.64%; 95% confidence interval [CI] = 0.60% to 0.69%) were identified by physicians and completed rapid HIV counseling, testing, and referral. Of the 681 patients, 15 (2.2%; 95% CI = 1.2% to 3.6%) patients tested positive for HIV infection and 12 (80%; 95% CI = 52% to 96%) were successfully linked into care.

Conclusions: A physician-based diagnostic HIV testing model was developed, successfully implemented, and sustained in a high-volume, urban ED setting. While the use of this model successfully identified patients with undiagnosed HIV infection in the ED, the overall level of testing remained low. Innovative testing programs, such as nontargeted screening, more specific targeted screening, or alternative hybrid methods, are needed to more effectively identify undiagnosed HIV infection in the ED patient population.

Keywords: HIV, identification, prevention, diagnostic rapid testing, targeted testing, emergency department
Routine Opt-Out Rapid HIV Screening and Detection of HIV Infection in Emergency Department Patients

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Context: The Centers for Disease Control and Prevention (CDC) recommends routine (nontargeted) opt-out HIV screening in health care settings, including emergency departments (EDs), where the prevalence of undiagnosed infection is 0.1% or greater. The utility of this approach in EDs remains unknown.

Objective: To determine whether nontargeted opt-out rapid HIV screening in the ED was associated with identification of more patients with newly diagnosed HIV infection than physician-directed diagnostic rapid HIV testing.

Design, Setting, and Patients: Quasi-experimental equivalent time-samples design in an urban public safety-net hospital with an approximate annual ED census of 55,000 patient visits. Patients were 16 years or older and capable of providing consent for rapid HIV testing.

Interventions: Nontargeted opt-out rapid HIV screening and physician-directed diagnostic rapid HIV testing alternated in sequential 4-month time intervals between April 15, 2007, and April 15, 2009.

Main Outcome Measures: Number of patients with newly identified HIV infection and the association between nontargeted opt-out rapid HIV screening and identification of HIV infection.

Results: In the opt-out phase, of 28,043 eligible ED patients, 6,953 patients (25%) completed HIV testing. Of these patients, 231 patients were diagnosed. Ten of 602 patients (0.17%; 95% CI, 0.07%-0.27%) who did not decline HIV screening in the opt-out phase had new HIV diagnoses, and 5 of 251 patients (2.2%; 95% CI, 0.7%-5.0%) who were diagnostically tested during the opt-out phase had new HIV diagnoses. In the diagnostic phase, of 29,925 eligible patients, 243 (0.8%) completed HIV testing. Of these, 4 patients (1.6%; 95% CI, 0.5%-4.2%) had new diagnoses. The prevalence of new HIV diagnoses in the opt-out phase (including those diagnostically tested) and in the diagnostic phase was 15 in 28,043 (0.05%; 95% CI, 0.03%-0.09%) and 4 in 29,925 (0.01%; 95% CI, 0.004%-0.03%), respectively. Non-targeted opt-out HIV screening was independently associated with new HIV diagnoses (risk ratio, 3.6; 95% CI, 1.2-10.8) when adjusting for patient demographics, insurance status, and whether diagnostic testing was performed in the opt-out phase.

Conclusion: Nontargeted opt-out rapid HIV screening in the ED is associated with the identification of a modestly increased number of patients with new HIV diagnoses, most of whom were identified late in the course of disease.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Newly-Diagnosed HIV Infection</th>
<th>All-Diagnosed HIV Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (95% CI)</td>
<td>RR (95% CI)</td>
</tr>
<tr>
<td>Non-targeted screening</td>
<td>3.6 (1.2 – 10.8)</td>
<td>3.5 (1.3 – 9.3)</td>
</tr>
<tr>
<td>Diagnostic testing during non-targeted screening</td>
<td>56.3 (21.1 – 150.3)</td>
<td>71.3 (33.1 – 153.3)</td>
</tr>
<tr>
<td>Age</td>
<td>1.0 (0.9 – 1.0)</td>
<td>1.0 (0.9 – 1.0)</td>
</tr>
<tr>
<td>Male gender</td>
<td>4.6 (1.6 – 13.2)</td>
<td>4.5 (1.5 – 13.5)</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>0.9 (0.2 – 3.4)</td>
<td>1.5 (0.5 – 5.1)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.3 (0.5 – 3.0)</td>
<td>1.9 (0.8 – 4.2)</td>
</tr>
<tr>
<td>Other</td>
<td>1.9 (0.4 – 8.4)</td>
<td>1.8 (0.4 – 7.9)</td>
</tr>
<tr>
<td>Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State sponsored</td>
<td>5.4 (1.3 – 23.8)</td>
<td>5.1 (1.1 – 24.5)</td>
</tr>
<tr>
<td>Uninsured</td>
<td>1.4 (0.3 – 7.3)</td>
<td>2.7 (0.6 – 13.1)</td>
</tr>
<tr>
<td>Medicare / Medicaid</td>
<td>3.6 (0.8 – 16.7)</td>
<td>3.4 (0.7 – 17.2)</td>
</tr>
<tr>
<td></td>
<td>Kiosk-Based Opt-Out Screening†</td>
<td>Kiosk-Based Opt-In Screening†</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Duration</td>
<td>31 days</td>
<td>31 days</td>
</tr>
<tr>
<td>Total number of eligible patients</td>
<td>5,789</td>
<td>5,328</td>
</tr>
<tr>
<td>Number of patients offered a rapid HIV test</td>
<td>5,551</td>
<td>5,127</td>
</tr>
<tr>
<td>Number of patients who agreed to be tested at kiosk or MSE</td>
<td>3,365</td>
<td>831</td>
</tr>
<tr>
<td>Total number of patients tested</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of patients tested per day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of patients screen tested</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of patients diagnostically tested</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Understand Opt Out

| Table | Patient understanding of kiosk-based opt-out and opt-in consent for rapid HIV testing in the emergency department and adult urgent care center, Denver, Colorado. |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
|       | Agreed Using Kiosk-Based Opt-Out Consent | Agreed Using Kiosk-Based Opt-In Consent |
|       | N (%) | N (%) | p |
| Not informed about HIV test* | 108 / 201 (54) | 2 / 80 (3) | <0.001 |
| Did not agree to an HIV test† | 32 / 84 (38) | 2 / 74 (3) | <0.001 |

* All patients were asked, “During your visit today, were you informed that a free HIV test would be performed unless you declined?” or “During your visit today, were you offered a free HIV test?”
† Patients who indicated they were informed that consent was being obtained for HIV testing were asked, “Did you agree to a free HIV test today?”
Targeted Screening
All Over Again
## Table. The Denver HIV Risk Score.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$ (95% CI)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;22 or &gt;60 years</td>
<td>ref -</td>
<td>0</td>
</tr>
<tr>
<td>22-25 or 55-60 years</td>
<td>0.4 (0.3 – 0.8)</td>
<td>+4</td>
</tr>
<tr>
<td>26-32 or 47-54 years</td>
<td>1.0 (0.7 – 1.3)</td>
<td>+10</td>
</tr>
<tr>
<td>33-46 years</td>
<td>1.1 (0.8 – 1.4)</td>
<td>+12</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>ref -</td>
<td>0</td>
</tr>
<tr>
<td>Male</td>
<td>2.1 (1.8 – 2.4)</td>
<td>+21</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.9 (0.7 – 1.1)</td>
<td>+9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.3 (0.1 – 0.5)</td>
<td>+3</td>
</tr>
<tr>
<td>Other*</td>
<td>-0.1 (-0.3 – 0.1)</td>
<td>0</td>
</tr>
<tr>
<td>White</td>
<td>ref -</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sexual Practices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex with a male</td>
<td>2.3 (2.0 – 2.6)</td>
<td>+22</td>
</tr>
<tr>
<td>Vaginal intercourse</td>
<td>-1.1 (-0.9 – -1.3)</td>
<td>-10</td>
</tr>
<tr>
<td>Receptive anal intercourse</td>
<td>0.4 (0.2 – 0.6)</td>
<td>+8</td>
</tr>
<tr>
<td><strong>Other Risks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injection drug use</td>
<td>0.8 (0.6 – 1.1)</td>
<td>+9</td>
</tr>
<tr>
<td>Past HIV test</td>
<td>-0.4 (-0.2 – -0.6)</td>
<td>-4</td>
</tr>
</tbody>
</table>

*Represents American or Alaskan Native, Native Hawaiian, or non-Hawaiian Pacific Islander.

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### HIV Risk Score

<table>
<thead>
<tr>
<th>HIV Risk Score</th>
<th>HIV Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>0</td>
</tr>
<tr>
<td>20-29</td>
<td>1</td>
</tr>
<tr>
<td>30-39</td>
<td>2</td>
</tr>
<tr>
<td>40-49</td>
<td>3-4</td>
</tr>
<tr>
<td>&gt;50</td>
<td>5-7</td>
</tr>
</tbody>
</table>

### Derivation
- **Denver**: 92,635, 504 (0.5%)

### Validation
- **Cincinnati**: 22,983, 168 (0.7%)
1. All EDs and should provide some form of HIV testing

Epicenter of healthcare encounters among those most at risk in the U.S.

Pilot and demonstration projects confirm feasibility

Although unknown, it is likely that a small proportion of the ~4,000 EDs in the U.S. perform HIV testing
2. The most effective testing approach is still unknown

Growing understanding of impact of programmatic features

Screening is likely a valuable approach

Limited number of clinical trials
3. Integration of testing into clinical environment is important to sustainability

- Allows for flexibility
- Maximizes resource utilization
Uncovering HIV Infection in the Emergency Department

A 2011 Public Health Perspective

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