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Comparison of Missed Opportunities for Earlier HIV Diagnosis in 3 Geographically Proximate Emergency Departments

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Abstract

Objective—Differences in the prevalence of undiagnosed HIV between different types of emergency departments (EDs) are not well understood. We seek to define missed opportunities for HIV diagnosis within 3 geographically proximate EDs serving different patient populations in a single metropolitan area.

Methods—For an urban academic, an urban community, and a suburban community ED located within 10 miles of one another, we reviewed visit records for a cohort of patients who received a new diagnosis of HIV between July 1999 and June 2003. Missed opportunities for earlier HIV diagnosis were defined as ED visits in the year before diagnosis, during which there was no documented ED HIV testing offer or test. Outcomes were the number of missed opportunity visits and the number of patients with a missed opportunity for each ED. We secondarily reviewed medical records for missed opportunity encounters, using an extensive list of indications that might conceivably trigger testing.

Results—Among 276 patients with a new HIV diagnosis, 123 (44.5%) visited an ED in the year before diagnosis or received a diagnosis in the ED. The urban academic ED HIV testing program diagnosed 23 (8.3%) cases and offered testing to 24 (8.7%) patients who declined. Missed opportunities occurred during 187 visits made by 76 (27.5%) patients. These included 70 patients with 157 visits at the urban academic ED, 9 patients with 24 visits at the urban community ED, and 4 patients with 6 visits at the suburban community ED. Medical records were available for 172 of the 187 missed opportunity visits. Visits were characterized by the following potential testing indicators: HIV risk factors (58; 34%), related diagnosis indicating risk (7; 4%), AIDS-defining illness (8; 5%), physician suspicion of HIV (29; 17%), and nonspecific signs or symptoms of illness potentially consistent with HIV (126; 73%).

Conclusion—Geographically proximate EDs differ in their opportunities for earlier HIV diagnosis, but all 3 sites had missed opportunities. Many ED patients with undiagnosed HIV have potential indications for testing documented even in the absence of a dedicated risk assessment,

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although most of these are nonspecific signs or symptoms of illness that may not be clinically useful selection criteria.

INTRODUCTION

Background

Early diagnosis of HIV is critical for reducing transmission and improving outcomes for infected persons.[1–6] Studies of missed opportunities for earlier diagnosis have suggested where screening should be conducted and how patients should be selected for screening.[6–10] Such studies have shown that patients with undiagnosed HIV often present to health care settings and, in particular, to emergency departments (EDs) before eventually receiving their diagnosis.[9–15] Current Centers for Disease Control and Prevention recommendations for universal screening are based in part on evidence that missed opportunities for earlier diagnosis exist for which potential indications of the need for testing are insufficient to optimize targeted screening.[6,9] However, some uncertainty remains about whether indications suggestive of HIV infection are sufficiently identifiable during ED visits before diagnosis.[9,10,12,14,16] Some studies (that have not involved detailed chart review) found missed opportunities with no identifiable risk factors,[9,12] but others have identified triggers for HIV testing with considerable frequency.[14]

Importance

Most HIV screening in EDs to date has been in higher-prevalence, urban, academic centers serving disadvantaged patient populations.[15,17–27] Because HIV epidemiology mirrors typical patterns of health disparity,[28–30] undiagnosed HIV might be less common in EDs serving more affluent populations. Whether such settings have sufficient prevalence of undiagnosed HIV to warrant expanded screening is unknown. Without such data, emergency physicians may not consider screening for undiagnosed HIV as relevant to their individual practice because they perceive the burden of undiagnosed disease to be low. Furthermore, because diagnostic testing and targeted screening remain likely approaches for EDs with lower prevalence of undiagnosed HIV, it is important to understand the degree to which opportunities for earlier diagnosis may be recognizable by clinicians.

Goals of This Investigation

We hypothesized that the number of visits by patients with undiagnosed HIV to 3 geographically proximate EDs varies in a predictable way according to differences in the population using each ED but that missed opportunities for earlier diagnosis occurred at all 3 sites. We further hypothesized that potential testing indications would be documented in the medical records for a high proportion of ED visits.

METHODS

Study Design

This study is a secondary analysis of ED clinical and administrative records for a cohort of patients receiving a new diagnosis of HIV between July 1999 and June 2003.[31] We conducted a retrospective review of the medical records for all ED visits in the year before diagnosis, when patients were highly likely to have been infected with HIV. The study was approved by the institutional review boards of all participating institutions.

Setting

The study included visits to 3 EDs that occurred between 1998 and 2003. The EDs were located within 10 miles of one another in Cincinnati, OH. According to the 2000 US census,

the county in which the EDs were located had a population of 845,303 that was 23% black, 73% white, and 1.1% Hispanic. Regional prevalence of diagnosed HIV/AIDS is approximately 0.2%.[32] The 3 EDs included an urban academic hospital, an urban community hospital, and a suburban community hospital, all staffed by the same group of emergency physicians. Each physician primarily practiced at 1 center but provided backup for all settings, had an academic appointment within the local college of medicine, practiced at least occasionally in the academic ED, and had teaching responsibilities for the affiliated emergency medicine residency. All 3 hospitals were classified as teaching hospitals and had some involvement with emergency medicine research. Other than this, the practice patterns and patient populations were specific to the 3 sites.

Basic sociodemographic data for the patients presenting to the 3 EDs were obtained from hospital databases. The academic ED was located adjacent to a college of medicine. The hospital was a 665-bed urban, academic, quaternary care institution serving a predominantly socioeconomically disadvantaged population and was the only Level I trauma center in the region. This ED had an annual census of more than 80,000 visits by patients, who were 56% black, with an equal number of male and female patients. The payer mix in the ED was 33% private insurance, 20% Medicaid, 12% Medicare, and 35% self-pay or uninsured. A targeted ED HIV screening program, in continuous operation since 1998,[22] was an adjunct clinical program of the ED, staffed by trained counselors who provided testing and comprehensive prevention counseling, using conventional HIV enzyme immunoassay with confirmatory Western blot. During the study period, counselors were available from 8 AM until 10 PM. When counselors were not available, the medical staff could still conduct testing through the program, with result notification by counselors at a later time. Patients were offered testing according to review of triage notations, referrals from ED staff for targeted screening or diagnostic testing, and patient request. The proportion of positive HIV tests for patients tested by the program was approximately 0.7%.[31,33,34]

The urban community hospital was a 550-bed facility located within 1 mile of the academic hospital, serving both an affluent tertiary care referral population and the local socioeconomically disadvantaged population, including privately insured patients (the majority), Medicare (23%), Medicaid (11%), and uninsured patients (14%). The ED had an annual census of approximately 45,000 that was 42% black and 61% female patients.

The suburban community hospital had 200 beds and an annual ED census of 35,000 that was 71% white and 59% female patients. It served primarily an insured population, with higher socioeconomic status; 6% were Medicaid recipients, 12% were uninsured, and 27% received Medicare. This hospital, located about 10 miles from the other 2, was situated amid some of the wealthiest suburbs of the city.

Selection of Participants

All patients who had received a new diagnosis were selected from those in care at an HIV treatment center located on the same academic health center campus as the urban, academic ED.[31] This infectious disease clinic served as the main provider of primary and specialty care for patients infected with HIV in the region, caring for approximately 67% of those known to be infected and approximately 90% of those known to be receiving medical care.[31] Medical records were available to review for each of the 3 EDs from July 1998 onward, which allowed review for ED visits in the year before diagnosis for all patients who had received a new diagnosis and were linked to care at the HIV treatment center from July 1999 through June 2003.

Methods of Measurement

We reviewed administrative records for each hospital to identify ED encounters that occurred during the year before each patient's diagnosis. Chart abstraction was completed in duplicate with standardized case report forms for ED visits meeting the study criteria. For frequent ED users, only the 10 most recent ED visits were included in detailed chart review. Data collected included explicit mention of whether the patient was offered an HIV test, explicit mention of whether the patient refused an HIV test, record of an ED HIV test, any documented suspicion of HIV illness, whether the patient was hospitalized after the ED visit, and any indication that might conceivably prompt HIV diagnostic testing or targeted screening. Potential testing indications (Appendix E1, available online at http://www.annemergmed.com) included HIV risk factors, illnesses that would be considered AIDS defining if the patient were infected with HIV, concurrent sexually transmitted disease diagnosis or exposure, physician suspicion of HIV illness, and nonspecific signs or symptoms of illness potentially consistent with HIV infection.

Outcome Measures

For the purposes of the study, "missed opportunity" was defined as an ED visit during which an HIV test was neither offered nor provided to a patient with undiagnosed HIV. Primary outcomes were the number of patients and number of visits with missed opportunities for each ED. Secondary outcomes included the proportion of ED visits with documented patient characteristics (ie, apparent to clinician through usual course of ED care) that might conceivably trigger an HIV test.

Data Analysis

Descriptive analysis was conducted with SPSS (version 17.0; SPSS, Inc., Chicago, IL). Secondary outcomes include only visits for which data from detailed chart review were available.

RESULTS

There were 276 patients who received a diagnosis of HIV and were linked to care at the HIV treatment center between July 1999 and June 2003. The median age was 33 years (range 17 to 77 years), 76% were men, 46% were black, and median initial CD4 count was 324 (range 0 to 1,756/μL). Among 276 patients with newly diagnosed HIV, 123 (44.5%) visited an ED in the year before diagnosis or received diagnosis in the ED. The urban academic ED HIV testing program diagnosed 23 (8.3%) cases and offered testing to 24 (8.7%) patients who declined. Missed opportunities occurred during 187 visits made by 76 (27.5%) patients. Characteristics of the study cohort and the subset of patients from this cohort with missed opportunities in the year before diagnosis for each ED are presented in Table 1. For the urban academic, urban community, and suburban community EDs, there were 70, 9, and 4 patients, respectively, with at least 1 ED visit. Sixty-four patients visited only the urban academic ED, 4 visited only the urban community ED, and 1 visited only the suburban community ED. Four patients visited both the urban academic and urban community EDs, 2 visited both the urban academic and suburban community EDs, and 1 visited the urban and suburban community EDs. No patient visited all 3 EDs. The number of patients with missed opportunities at each facility is shown in conjunction with the number of visits with missed opportunities at each facility in Table 2.

Medical records were available for detailed chart review for 172 of the 187 missed opportunity visits. Potential testing indicators were commonly documented, but the majority were nonspecific signs or symptoms of illness potentially consistent with HIV (126; 73%). Summary data for missed opportunities including categories of potential testing indications

documented in the medical records are shown in Table 3; the detailed list of potential triggers constituting these categories are further detailed in Appendix E1, available online at http://www.annemergmed.com. Table 3 also shows the number and proportion of missed opportunity visits that resulted in hospitalization.

LIMITATIONS

This study was not a representative assessment of missed opportunities for HIV testing in EDs because it did not assess all ED patients for the presence of HIV infection. It ascertained the relative distribution of missed opportunities between 3 geographically proximal EDs. The absolute number of missed opportunities identified by the study is certain to be an underestimate. The study included only patients who received a diagnosis and were linked to care. Patients who did not receive a diagnosis or were not linked to care were not included but could represent substantially underestimated missed opportunities in the ED because persons who do not receive a diagnosis or are not linked to care might be more likely to visit EDs. In addition, the ED screening program at the urban academic center enabled diagnoses during visits that might otherwise have been missed opportunities. We also limited the number of missed opportunities for any one patient to 10. Finally, most patients would have been infected for much longer than 1 year, yet ED visits more than 1 year before diagnosis were not included.

Our extensive list of potential testing indications included many criteria that are highly nonspecific for HIV infection, and the aggregate list is of sufficient length to prohibit its use as a clinical instrument. Although our findings describe clinical characteristics apparent during the usual course of ED care for patients who have not received a diagnosis, they do not clarify a clinically useful selection strategy for prospective identification of this patient group. We also counted hospitalized patients as missed ED opportunities consistent with the benefits of such patients receiving a diagnosis before admission.[35] However, in several cases the patient was admittedly specifically because of clinician concern for undiagnosed HIV; classification of these as missed opportunities might not be appropriate.

Although we did not weight the results by facility size, the significant differences between centers in frequency of missed opportunities would not be substantively altered by relatively smaller differences in visit volume. It is possible that patients were not infected during visits classified as missed opportunities, although our use of only the year before diagnosis was designed to be highly conservative.

DISCUSSION

Our results demonstrate the *relative* distribution of undiagnosed HIV across 3 geographically proximate EDs serving different populations in a city with low to moderate HIV prevalence. The number of missed opportunities differed between facilities, but all centers had at least some encounters with persons with undiagnosed HIV. We also found that medical records often contained documentation of potential testing indications even without formal risk assessments by providers, although the majority of these were nonspecific signs of general illness that might not be clinically useful selection criteria. We also found that the urban academic center's targeted screening program offered an HIV test to 38% of the patients with undiagnosed HIV who visited the ED. These findings provide support for 2 complementary policies for HIV screening. First, universal screening is likely necessary to detect all cases of undiagnosed HIV. Second, if universal screening is not feasible, targeting populations by venue, with attention to readily apparent testing indications, could detect many persons with undiagnosed HIV.

Demonstrating the relative burden of undiagnosed HIV in different EDs could inform the translation of ED-based HIV testing into practice. Initial demonstrations of ED HIV screening yield came from selected centers, usually urban teaching hospitals serving indigent populations. Expansion of ED-based HIV screening beyond these initial centers continues to proceed on a hospital-by-hospital basis, and the perceived need for screening exerts a significant influence. Our practical observation during the past decade was that the same physicians perceived the need for HIV testing at one hospital but not at another less than 15 driving minutes distant. Anecdotally, the populations were perceived to be sufficiently different to enable this practice variation. Demonstration of missed opportunities represents one way among several[36] (also cite Lindsell et al same issue, ref 43), to influence such perceptions.

Although missed opportunities were demonstrated in each ED, the high proportion at the urban academic center suggests allocating resources for HIV to the highest yield center before working to overcome barriers to testing in the others. However, our data should be interpreted with great caution in this regard and not used to suggest that EDs serving affluent populations have no potential role in earlier diagnosis of HIV. As detailed in the "Limitations," our study was not designed to determine the total number of missed opportunities in each ED.

Conclusions

Geographically proximate EDs differ in the number of opportunities for identifying patients with undiagnosed HIV, but all centers had at least some encounters with HIV-positive persons who were unaware of their status. Many of those encounters included at least some indication for HIV testing. Our results suggest that only universal screening will identify all patients with undiagnosed HIV, but when that is not feasible, emergency physicians could improve detection of undiagnosed HIV by testing patients with indications identified during the course of usual clinical care. All EDs should, at a minimum, have the capability for provider-initiated HIV testing.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Patient characteristics documented in the medical record and number of patients visiting each ED* in the year before diagnosis.

	No (%)			
Patient Characteristics	**All New Positive Results (n=276)**	**Urban Academic ED (n=70)**	**Urban Community ED (n=9)**	**Suburban Community ED (n=4)**
Age, y (range)	33 (17–77)	32 (20–59)	43 (25–68)	29 (20–43)
Race				
Black	127 (46)	47 (67.1)	6 (66.7)	3 (75.0)
Other	131 (47)	20 (28.6)	2 (22.2)	1 (25.0)
Hispanic	18 (07)	3 (4.3)	1 (11.1)	0 (0.0)
Sex				
Male	210 (76)	49 (70.0)	5 (55.6)	2 (50.0)
Female	66 (24)	21 (30.0)	4 (44.4)	2 (50.0)
CD4 (range)	324 (0–1,756)	299 (0–1,756)	316 (20–901)	632 (316–1,305)

* There were 76 patients with at least 1 visit to an ED, of whom 4 visited both the urban academic and urban community EDs, 2 visited both the urban academic and suburban community EDs, and 1 visited both the urban and suburban community EDs.

Table 2

Number of patients and visits by facility.

Facility	Total Patients	Total Visits	Median	Range
Urban academic	70	157	1	1–10
Urban community	9	24	2	1–7
Suburban community	4	6	2	1–2
Any facility	76	187	2	1–10

Table 3

Number and characteristics of visits classified as missed opportunities.

Visit Characteristics	No. (%)			
	Urban Academic ED, N=142	Urban Community ED, N=24	Suburban Community ED, N=6	Total, N=172
Potential testing indicators *				
HIV risk factors	50 (35.2)	7 (29.2)	1 (16.7)	58 (33.7)
Symptoms consistent with HIV	103 (72.5)	17 (70.8)	6 (100.0)	126 (73.3)
AIDS-defining illness †	8 (5.6)	0	0	8 (4.7)
Related diagnosis ‡	7 (4.9)	0	0	7 (4.1)
Physician suspicion	29 (20.4)	0	0	29 (16.9)
Hospitalization after ED visit	24 (16.9)	2 (8.3)	3 (50.0)	29 (16.9)

* As documented in medical record during missed opportunity ED visit. Detailed list of potential indicators appears in Appendix E1, available online at http://www.annemergmed.com.

† Illnesses that would be considered AIDS defining if the patient were infected with HIV.

‡ Concurrent sexually transmitted disease diagnosis or exposure.