

# Initial Outcomes of an Emergency Department Rapid HIV Testing Program in Western Kenya

MICHAEL JAY WAXMAN, M.D.,<sup>1,2</sup> SYLVESTER KIMAIYO, M.B., Ch.B., MMED,<sup>3</sup>  
NEFORD ONGARO, MMED,<sup>4</sup> KARA K. WOOLS-KALOUSTIAN, M.D.,<sup>5</sup>  
TIMOTHY P. FLANIGAN, M.D.,<sup>2</sup> and E. JANE CARTER, M.D.<sup>2</sup>

## ABSTRACT

This paper reports the initial operational outcomes of an emergency department-based HIV testing program in a high-prevalence and resource-limited setting by describing (1) the number and percentage of patients approached, tested, and found to be HIV positive and (2) the linkage of care to the HIV clinic. A retrospective log and chart review of the initial 5 months (January 2006 to April 2006) of the HIV testing program was performed. Patients were selected for HIV testing by routine screening and by provider initiated referrals. Out of the 1371 patients who were approached for HIV testing, 1339 (97.7%) patients were tested for HIV. Three hundred twelve (22.7%) of the patients tested were HIV positive. Within a sample group of patients newly diagnosed with HIV in the department, 82% were compliant with their initial HIV clinic visit and 65% were compliant with a 1-month follow-up visit. The implementation of an emergency department-based HIV testing program in a high HIV prevalence and resource poor country is feasible with a high percentage of patients accepting HIV testing and a high percentage of positive patients presenting to follow-up care. Establishment of rapid HIV testing in emergency departments can identify significant numbers of HIV-positive patients who would otherwise remain undiagnosed and provides an education opportunity for those patients who are HIV negative.

## INTRODUCTION

CONCERTED EFFORTS to scale-up HIV care in the developing world have increased the numbers of people diagnosed and treated for HIV. Despite this effort, the total number of people tested for HIV globally remains unacceptably low with an estimated 90% of people who are HIV-infected worldwide unaware of their status.<sup>1</sup> These individuals are unable to

benefit from antiretroviral therapy and continue to transmit HIV unknowingly. The Joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) recognize the urgent need to increase HIV testing services and now recommend that HIV testing be done in all health care settings where there is a high HIV prevalence and antiretroviral therapy is available.<sup>2</sup>

Introducing HIV testing in the emergency

<sup>1</sup>Department of Emergency Medicine, The Warren Alpert Medical School of Brown University, Providence, Rhode Island.

<sup>2</sup>Division of Infectious Diseases, Brown Medical School, The Miriam Hospital, Providence, Rhode Island.

<sup>3</sup>Department of Internal Medicine, <sup>4</sup>Department of Surgery, Moi University School of Medicine, Eldoret, Kenya.

<sup>5</sup>Division of Infectious Disease, Department of Medicine, Indiana University School of Medicine, Indianapolis, Indiana.

department setting serves the dual purpose of expanding HIV testing services to a new venue and improving clinical care for acutely ill patients. Most people in developing countries do not have access to routine health care and are only able to seek medical attention when they are ill. The acute care visit represents an ideal opportunity to perform HIV testing on patients who may not otherwise have an opportunity to be tested. Patients benefit from learning their HIV status and health care providers are given crucial clinical information when directing care.

While there is only little operational research published regarding HIV testing in EDs in resource poor countries, one study of routine HIV testing in a medical emergency unit in Kampala, Uganda found acceptance rates of HIV testing to be 95%.<sup>3</sup> In addition, there have been several HIV testing programs shown to be effective in other health care settings both in resource-rich and resource-poor countries. Studies in resource-rich countries have shown rapid HIV testing programs to be successful in sexually transmitted diseases clinics,<sup>4-6</sup> EDs,<sup>7-10</sup> prisons,<sup>11</sup> community centers,<sup>12</sup> and antenatal clinics.<sup>13-17</sup> In resource-poor countries, screening for HIV infection has been demonstrated to be effective in tuberculosis and antenatal clinics.<sup>18,19</sup>

### *Objective*

In January of 2006, Moi Teaching and Referral Hospital in Eldoret, Kenya, initiated an HIV testing program in the accident and emergency department. This publication describes (1) the operational workings of the accident and emergency department HIV-testing program, (2) the outcomes of the accident and emergency department HIV-testing program, and (3) the results of linkage to the HIV clinic within a consecutive sample of patients who were referred from the accident and emergency department.

## **MATERIALS AND METHODS**

### *Study site and population*

Moi Teaching and Referral Hospital, located in Eldoret, Kenya, is a national referral hospital that serves a catchment area of 13 million people. The accident and emergency depart-

ment at Moi Teaching and Referral Hospital serves approximately 4000 patients per month; 2400 of whom present for nonaccident related medical complaints.

Moi Teaching and Referral Hospital is affiliated with Moi University School of Medicine and with an HIV care program called the Academic Model for the Prevention and Treatment of HIV/AIDS (AMPATH).<sup>20</sup> AMPATH offers HIV care to all patients (including children and pregnant women) regardless of ability to pay. Antiretroviral therapy is provided in the context of a comprehensive program, which addresses not only the medical needs of the HIV-affected patients, but the nutritional, financial, and psychosocial needs of these patients as well. The main clinical care facility of AMPATH is located on the Moi Teaching and Referral Hospital campus. As of June 2006, AMPATH enrollment topped 30,000 patients, with over 50% of patients maintained on antiretroviral therapy. The estimated adult prevalence of HIV in Kenya is between 5.2%–7%.<sup>21</sup>

The accident and emergency department HIV testing program was initiated in January 2006. This publication is a description of the experience from the initial 5 months of program operation (January 2006 to May 2006).

### *HIV testing protocol*

The accident and emergency department HIV testing program was based on Kenyan Ministry of Health HIV testing guidelines for diagnostic HIV testing and counseling.<sup>22</sup> All patients with signs or symptoms of HIV were eligible for HIV testing. This included all medical patients or patients from other specialties who had signs or symptoms that could be attributed to HIV. Children and women who were pregnant were tested if they met the above criteria. While the accident and emergency department staff and HIV testing counselors were instructed to perform HIV testing on all eligible patients, in practice, patients were initially selected by a combined process of provider initiated referral and universal screening of medical patients.

Trained HIV testing counselors performed the HIV testing. Counselors used an opt-out testing approach. (Patients are informed that

HIV testing is a routine part of their care and will be performed unless they decline/refuse.) Two rapid HIV tests using a finger-stick blood sample were performed in parallel: Uni-Gold™ Recombigen® (Trinity Biotech, Bray, Ireland) and Determine® HIV-1/2 (Abbott Diagnostics, Abbot Park, IL). As per the WHO recommendations for use of rapid HIV testing and counseling in resource-constrained settings, patients with two reactive rapid HIV tests were considered to be HIV infected and no further confirmatory testing was done.<sup>23</sup>

The protocol for testing patients in the accident and emergency department was approved by the director of the hospital, the director of the accident and emergency department, and the director of AMPATH clinical services. A dedicated room in the accident and emergency department was set aside for the HIV testing counselor. Sensitization meetings were held with all staff. The HIV testing counselor maintained a procedural log which had been standardized for use throughout all AMPATH HIV testing sites. The log included patient's name, medical record number, date of birth, HIV test results, and disposition.

While the eventual goal of the accident and emergency department HIV testing program is to perform HIV testing on all patients presenting to the department, the HIV testing program began with 40 hours per week of operation. One full time HIV testing counselor conducted testing between the hours of 8 AM to 5 PM. As the program matured, increased staffing became available which led to additional hours of HIV testing.

The initial 5 months of HIV testing in the accident and emergency department focused mostly on "treat and discharge" ambulatory patients who would otherwise leave the hospital without knowing their HIV status. At least 50 of the 1339 patients tested for HIV during the study period were ultimately admitted.

### *Study design*

After approval of the Institutional Review Boards of both the Moi University School of Medicine (Eldoret, Kenya) and The Miriam Hospital (Providence, Rhode Island) a retrospective chart review of the HIV testing pro-

gram log and the AMPATH medical records was performed. Statistical analysis was performed using basic statistical techniques.

The number of HIV-positive patients successfully linked to care was determined by sub-analysis of the first 69 patients who were newly diagnosed with HIV infection by the accident and emergency department HIV testing program. (Follow-up data was available for 61 of 69 patients in the sample group.)

## RESULTS

The accident and emergency department HIV testing program was initiated in January 2006. In the first 5 months, 1371 patients were approached for HIV testing, of which 1339 patients (97.7%) accepted testing. Three hundred twelve patients (22.7% of those tested) were newly diagnosed with HIV. The number of patients tested increased monthly during the study period with 159 patients tested the first month and 493 patients in the fifth month. The percentage of patients who tested positive for HIV per month ranged from 19.4% to 29.2%.

The first 69 consecutive newly diagnosed HIV positive patients were tracked for basic medical and demographic characteristics and referral to the HIV clinic. All of the original 69 patients were "treat and discharge" patients. The medical record was available for 61 of the 69 patients. Forty of 61 patients (65%) with available follow-up had two clinic visits in the HIV clinic within the first month after diagnosis. Fifty-three of 61 patients (86.9%) with available follow-up had a CD4 count drawn at registration in the HIV clinic. The median CD4 count was 73 cells/mm<sup>3</sup>. The median age was 39 years old. Fifty-seven percent of patients were female.

## DISCUSSION

Our experience with HIV-testing in the Moi Teaching and Referral Hospital accident and emergency department demonstrates that an emergency department-based HIV testing program can be initiated with high level of patient acceptance and effective linkage to care.

In 5 months of operation 1371 patients were approached for testing with 97.7% acceptance. The number of patients approached and tested increased monthly. At the onset of the program, some accident and emergency department staff were hesitant to refer patients for HIV testing. This hesitancy stemmed from beliefs that the accident and emergency department was not suited to offer HIV care, HIV testing in the accident and emergency department might slow patient flow, or patients might be offended when their provider initiated testing. As time progressed, the staff became comfortable with HIV testing in the accident and emergency department and there was improved (almost universal) referral of patients for HIV testing during hours when an HIV testing counselor was available.

The high percentage of patients agreeing to testing (97.7%) demonstrates that patient refusal is not a barrier to successful emergency department-based HIV testing programs. The HIV testing was done in an opt-out fashion; whereby, patients were told they would be tested for HIV unless they refused. This approach to HIV testing is recommended by the Kenyan Ministry of Health and has been similarly successful in other venues at Moi Teaching and Referral Hospital.

With 86.9% of newly diagnosed HIV positive patients attending the initial HIV clinic visit and 65.6% of patients attending the one month HIV clinic visit, linkage to care from this emergency department-based HIV testing program was effective.

The 53 patients who were newly diagnosed with HIV through the accident and emergency department HIV testing program and tracked for baseline laboratory studies were found to have very low CD4 counts (median CD4 count of 73 cells/mm<sup>3</sup>). This was true even when compared to the initial CD4 counts of all patients enrolled in the AMPATH HIV care program (median CD4 count of 223 cells/mm<sup>3</sup>) in previously studies.<sup>24</sup> The very low CD4 counts found in accident and emergency department patients infers that most of these patients were being tested late in their HIV disease course and many of these patients may have come to medical attention because of an HIV related ill-

ness. It is worth emphasizing that the initial 53 accident and emergency patients were all ambulatory "treat and discharge patients." If these patients had not been tested in the accident and emergency department, they would have otherwise been discharged from the hospital not knowing their HIV status.

While the program discussed in the this paper did not conduct routine HIV screening of all emergency department patients, the role for emergency department-based HIV screening of asymptomatic individuals (in addition to those patients who may have signs or symptoms of HIV) may prove to be an important public health strategy. Routine, opt-out, HIV screening of all patients in the emergency department (regardless of whether they have signs or symptoms of HIV infection) is now recommended by the Centers for Disease Control and Prevention in the United States and, regardless of the setting, may lead to detection of HIV-infected individuals earlier in their disease course.<sup>25</sup>

### *Limitations*

By 5 months of operations, the program was testing over 500 patients per month. Although significant, this number represents only 20% of the eligible 2400 medical patients that visit accident and emergency department monthly.

Originally, there was only one HIV testing counselor to approach eligible patients during the weekday hours. It is possible that despite the algorithm to test all medical patients, patients with suggestive histories for HIV risk were prioritized for HIV testing. This may have led to a referral bias or targeted approach to HIV testing. Access to testing for all patients may lead to a greater number of patients tested per month; however, increased access to testing may also result in a lower percentage of patients who accept the testing and/or a lower percentage of patients who are newly diagnosed with HIV.

This model of HIV-testing at MTRH may not be applicable to all emergency department settings in resource poor countries. MTRH is fortunate to be the site of a well established and easily accessible HIV care program. There is currently no consensus as to whether HIV test-



ing of asymptomatic patients should be performed at sites where antiretroviral therapy is not available.

### CONCLUSIONS

The implementation of an emergency department-based HIV testing program in a resource poor country is feasible with a high percentage of patients accepting HIV testing and with effective linkage to care. Establishment of such services in areas of high HIV prevalence identifies significant numbers of patients who would otherwise remain undiagnosed and at risk for serious complications. In addition, testing significant numbers of patients who are negative for HIV offers an opportunity for HIV prevention services. Further studies are required to assess the feasibility of maintaining an HIV testing program in this setting and the utility of universal HIV testing in emergency departments in resource-poor countries.

### ACKNOWLEDGMENTS

The authors acknowledge the efforts of the Moi Teaching and Referral Hospital accident and emergency department staff, AMPATH HIV testing counselors, and the AMPATH staff who helped with the project. This research has been facilitated by the infrastructure and resources provided by the Lifespan/Tufts/Brown Center for AIDS Research, an National Institutes of Health funded program #P30AI42853. Dr. Waxman was supported by the National Institutes of Health grant 5T32DA013911-04.

### REFERENCES

1. UNAIDS/WHO. AIDS epidemic update. Geneva: December 2005.
2. UNAIDS/WHO. Policy statement on HIV testing. Geneva: June 2006.
3. Nakanjako D, Kanya M, Daniel K, et al. Acceptance of routine testing for HIV among adult patients at the medical emergency unit at a national referral hospital in Kampala, Uganda. *AIDS Behav* 2006, Nov. 10.
4. Liang TS, Erbeling E, Jacob CA, et al. Rapid HIV testing of clients of a mobile STD/HIV clinic. *AIDS Patient Care STDs* 2005;19:253–257.
5. Stanley B, Fraser J, Cox N. Uptake of HIV screening in genitourinary medicine after change to “opt-out” consent. *BMJ* 2003;326:1174.
6. Day S, Lakhani D, Hankins M, Rodgers CA: Improving uptake of HIV testing in patients with a confirmed STI. *Int J STD AIDS* 2004;15:626–28.
7. Kelen GD, Shahan JB, Quinn TC. Emergency department-based HIV screening and counseling: Experience with rapid and standard serologic testing. *Ann Emerg Med* 1999;33:147–1.
8. Glick NR, Silva A, Zun L, Whitman S. HIV testing in a resource-poor urban emergency department. *AIDS Educ Prev* 2004;16:126–136.
9. Rothman RE, Ketlogetswe KS, Dolan T, Wyer PC, Kelen GD. Preventive care in the emergency department: Should emergency departments conduct routine HIV screening? A systematic review. *Acad Emerg Med* 2003;10:278–285.
10. Goggin MA, Davidson AJ, Cantril SV, O’Keefe LK, Douglas JM. The extent of undiagnosed HIV infection among emergency department patients: Results of a blinded seroprevalence survey and a pilot HIV testing program. *J Emerg Med* 2000;19:13–19.
11. Beckwith CG, Atunah-Jay S, Macalino, et al. Feasibility and acceptability of rapid HIV testing in jail. *AIDS Patient Care STDs* 2007;21:41–47.
12. Smith L, Rudy E, Javanbakht M, et al. Client satisfaction with rapid HIV testing: Comparison between an urban sexually transmitted disease clinic and a community-based testing center. *AIDS Patient Care STDs* 2006;20:693–700.
13. Centers for Disease Control and Prevention. HIV testing among pregnant women—United States and Canada, 1998–2001. *MMWR* 2002;51:1013–1016.
14. Stringer E, Stringer J, Cliver S, Goldenberg R, Goepfert A. Evaluation of a new testing policy for human immunodeficiency virus to improve screening rates. *Obstet Gynecol* 2001;98:6.
15. Simpson W, Johnstone F, Boyd F, Goldberg D, Hart G, Prescott R. Uptake and acceptability of antenatal HIV testing: Randomized controlled trial of different methods of offering the test. *BMJ* 1998;316:262–267.
16. Simpson W, Johnstone F, Goldberg D, Gormley S, Hart G. Antenatal HIV testing: assessment of a routine voluntary approach. *BMJ* 1999;318:1660–1661.
17. Breese P, Burman W, Shlay J, Guinn D. The effectiveness of a verbal opt-out system for human immunodeficiency virus screening during pregnancy. *Obstet Gynecol* 2004;104:134–137.
18. Seipone K, Ntuny R, Smith M, et al. Introduction of routine HIV testing in prenatal care—Botswana, 2004. *JAMA* 2005;292:152–153.
19. Perez F, Zvandaziva C, Engelsmann B, Dabis F. Acceptability of routine HIV testing (“opt-out”) in antenatal services in two rural districts of Zimbabwe. *J Acquir Immune Defic Syndr* 2006;41:514–520.
20. Wools-Kaloustian K, Kimaiyo S, Diero L, et al. Viability and effectiveness of large-scale HIV treatment initiatives in sub-Saharan Africa: Experience from western Kenya. *AIDS* 2006;20:41–48.

21. UNAIDS/WHO. UNAIDS 2006 Report on the Global AIDS Epidemic, Annex 2: HIV and AIDS Estimates and Data, 2005 and 2003. Geneva: 2006.
22. National AIDS and STD Control Programme. Guidelines for HIV testing in clinical settings. Republic of Kenya: Ministry of Health, 2004.
23. World Health Organization. Rapid HIV tests: guidelines for use in HIV testing and counseling services in resource-constrained settings/World Health Organization. Geneva: 2004.
24. Diero LO, Shaffer D, Kimaiyo S, et al. Characteristics of HIV infected patients cared for at "academic model for the prevention and treatment of HIV/AIDS" clinics in western Kenya. *East Afr Med J* 2006;83:424–433.
25. Centers for Disease Control and Prevention. Revised recommendations for HIV testing of adults, adoles-

cents, and pregnant women in health-care setting. *MMWR Morb Mortal Wkly Rep* 2006;55:1–557.

Address reprint requests to:

*Michael Jay Waxman*

*Department of Emergency Medicine*

*The Warren Alpert Medical School of Brown*

*University*

*Division of Infectious Diseases*

*Brown Medical School*

*55 Claverick Street, Floor 2, 5228*

*Providence, RI 02903*

*E-mail: mwaxman@hotmail.com*

This article has been cited by:

1. Hansoti Bhakti, Stead David, Eisenberg Anna, Mvandaba Nomzamo, Mwinnyaa George, Patel Eshan U., Parrish Andy, Reynolds Steven J., Redd Andrew D., Fernandez Reinaldo, Rothman Richard E., Laeyendecker Oliver, Quinn Thomas C.. 2019. A Window Into the HIV Epidemic from a South African Emergency Department. *AIDS Research and Human Retroviruses* 35:2, 139-144. [[Abstract](#)] [[Full Text](#)] [[PDF](#)] [[PDF Plus](#)]
2. Madeleine Whalen, Pamela Mda, Andy Parrish, Thomas C. Quinn, Richard Rothman, David Stead, Bhakti Hansoti. 2018. Implementing emergency department-based HIV testing in a low-resource setting: The value of a structured feasibility assessment tool. *Southern African Journal of HIV Medicine* 19:1. . [[Crossref](#)]
3. Bhakti Hansoti, David Stead, Andy Parrish, Steven J. Reynolds, Andrew D. Redd, Madeleine M. Whalen, Nomzamo Mvandaba, Thomas C. Quinn. 2018. HIV testing in a South African Emergency Department: A missed opportunity. *PLOS ONE* 13:3, e0193858. [[Crossref](#)]
4. Theresa Ann Sipe, Terrika L. Barham, Wayne D. Johnson, Heather A. Joseph, Maria Luisa Tungol-Ashmon, Ann O'Leary. 2017. Structural Interventions in HIV Prevention: A Taxonomy and Descriptive Systematic Review. *AIDS and Behavior* 21:12, 3366-3430. [[Crossref](#)]
5. Bhakti Hansoti, Gabor D. Kelen, Thomas C. Quinn, Madeleine M. Whalen, Taylor T DesRosiers, Steven J. Reynolds, Andrew Redd, Richard E. Rothman. 2017. A systematic review of emergency department based HIV testing and linkage to care initiatives in low resource settings. *PLOS ONE* 12:11, e0187443. [[Crossref](#)]
6. Shifu Li, Shu Su, Shunxiang Li, Liangmin Gao, Ying Cai, Jincui Fu, Chunyuan Guo, Wei Lu, Feng Cheng, Jun Jing, Liang Chen, Lei Zhang. 2017. A comparison of effectiveness between oral rapid testing and routine serum-based testing for HIV in an outpatient dental clinic in Yuxi Prefecture, China: a case-control study. *BMJ Open* 7:6, e014601. [[Crossref](#)]
7. Bhakti Hansoti, Sarah E. Hill, Madeleine Whalen, David Stead, Andy Parrish, Richard Rothman, Yu-Hsiang Hsieh, Thomas C. Quinn. 2017. Patient and provider attitudes to emergency department-based HIV counselling and testing in South Africa. *Southern African Journal of HIV Medicine* 18:1. . [[Crossref](#)]
8. Monisha Sharma, Roger Ying, Gillian Tarr, Ruanne Barnabas. 2015. Systematic review and meta-analysis of community and facility-based HIV testing to address linkage to care gaps in sub-Saharan Africa. *Nature* 528:7580, S77-S85. [[Crossref](#)]
9. Emily L. Aaronson, Regan H. Marsh, Moytrayee Guha, Jeremiah D. Schuur, Shada A. Rouhani. 2015. Emergency department quality and safety indicators in resource-limited settings: an environmental survey. *International Journal of Emergency Medicine* 8:1. . [[Crossref](#)]
10. N. Lance Okeke, Jan Ostermann, Nathan M. Thielman. 2014. Enhancing Linkage and Retention in HIV Care: a Review of Interventions for Highly Resourced and Resource-Poor Settings. *Current HIV/AIDS Reports* 11:4, 376-392. [[Crossref](#)]
11. Felix R. Kayigamba, Mirjam I. Bakker, Judith Lammers, Veronicah Mugisha, Emmanuel Bagiruwigize, Anita Asimwe, Maarten F. Schim. van der Loeff. 2014. Provider-Initiated HIV Testing and Counselling in Rwanda: Acceptability among Clinic Attendees and Workers, Reasons for Testing and Predictors of Testing. *PLoS ONE* 9:4, e95459. [[Crossref](#)]
12. Darlene R. House, Saratiel L. Nyabera, Kurt Yusi, Daniel E. Rusyniak. 2014. Descriptive study of an emergency centre in Western Kenya: Challenges and opportunities. *African Journal of Emergency Medicine* 4:1, 19-24. [[Crossref](#)]
13. Geoffrey A. Preidis, Eric D. McCollum, William Kamiyango, Alejandro Garbino, Mina C. Hosseinipour, Peter N. Kazembe, Gordon E. Schutze, Mark W. Kline. 2013. Routine Inpatient Provider-Initiated HIV Testing in Malawi, Compared With Client-Initiated Community-Based Testing, Identifies Younger Children at Higher Risk of Early Mortality. *JAIDS Journal of Acquired Immune Deficiency Syndromes* 63:1, e16-e22. [[Crossref](#)]
14. K.O. Okosun, O.D. Makinde, I. Takaidza. 2013. Impact of optimal control on the treatment of HIV/AIDS and screening of unaware infectives. *Applied Mathematical Modelling* 37:6, 3802-3820. [[Crossref](#)]
15. Maria Roura, Deborah Watson-Jones, Tanya M. Kahawita, Laura Ferguson, David A. Ross. 2013. Provider-initiated testing and counselling programmes in sub-Saharan Africa. *AIDS* 27:4, 617-626. [[Crossref](#)]
16. Katharina Kranzer, Darshini Govindasamy, Nathan Ford, Victoria Johnston, Stephen D Lawn. 2012. Quantifying and addressing losses along the continuum of care for people living with HIV infection in sub-Saharan Africa: a systematic review. *Journal of the International AIDS Society* 15:2. . [[Crossref](#)]
17. Sachin Jain, Erik S. Lowman, Adam Kessler, Jaime Harper, Dino P. Rumoro, Kimberly Y. Smith, Yanina Purim-Shem-Tov, Harold A. Kessler. 2012. Seroprevalence Study Using Oral Rapid HIV Testing in a Large Urban Emergency Department. *The Journal of Emergency Medicine* 43:5, e269-e275. [[Crossref](#)]
18. April Christensen, Stephan Russ, Navindranauth Rambaran, Seth W. Wright. 2012. Patient perspectives on opt-out HIV screening in a Guyanese emergency department. *International Health* 4:3, 185-191. [[Crossref](#)]

19. Saleh Fares, Furqan B. Irfan. 2012. Thoracic Emergencies in Immunocompromised Patients. *Emergency Medicine Clinics of North America* **30**:2, 565-589. [[Crossref](#)]
20. Rashida A. Ferrand, Caroline Trigg, Tsitsi Bandason, Chiratidzo E. Ndhlovu, Stanley Mungofa, Kusum Nathoo, Diana M. Gibb, Frances M. Cowan, Elizabeth L. Corbett. 2011. Perception of Risk of Vertically Acquired HIV Infection and Acceptability of Provider-Initiated Testing and Counseling Among Adolescents in Zimbabwe. *American Journal of Public Health* **101**:12, 2325-2332. [[Crossref](#)]
21. Kayode Ijadunola, Titilayo Abiona, Joseph Balogun, Adetokunbo Aderounmu. 2011. Provider-initiated (Opt-out) HIV testing and counselling in a group of university students in Ile-Ife, Nigeria. *The European Journal of Contraception & Reproductive Health Care* **16**:5, 387-396. [[Crossref](#)]
22. Joel Negin, James Wariero, Patrick Mutuo, Stephen Jan, Paul Pronyk. 2009. Feasibility, acceptability and cost of home-based HIV testing in rural Kenya. *Tropical Medicine & International Health* **14**:8, 849-855. [[Crossref](#)]
23. Lambert Tetteh Appiah, Fiona Havers, Jane Gibson, Michael Kay, Fred Sarfo, David Chadwick. 2009. Efficacy and Acceptability of Rapid, Point-of-Care HIV Testing in Two Clinical Settings in Ghana. *AIDS Patient Care and STDs* **23**:5, 365-369. [[Abstract](#)] [[PDF](#)] [[PDF Plus](#)]
24. Michael J. Waxman, Paul Muganda, E. Jane Carter, Neford Ongaro. 2008. The role of emergency department HIV care in resource-poor settings: lessons learned in western Kenya. *International Journal of Emergency Medicine* **1**:4, 317-320. [[Crossref](#)]
25. Iris De Ryck, Olivier Koole, Rhoda Wanyenze, Robert Colebunders. 2008. Universal access to HIV care: pitfalls and the way forward. *Tropical Medicine & International Health* **13**:10, 1222-1224. [[Crossref](#)]