Published in final edited form as:
AIDS Care. 2014 February ; 26(2): 267–269. doi:10.1080/09540121.2013.808732.

Electronic vending machines for dispensing rapid HIV self-testing kits: A case study

Sean D. Young, PhD, MSHS[1], **Jeffrey Klausner, MD, MPH**[2], **Risa Fynn**[3], and **Robert Bolan, MD**[3]

[1]Department of Family Medicine, David Geffen School of Medicine, UCLA, Los Angeles CA, USA

[2]Division of Infectious Diseases, Department of Medicine, David Geffen School of Medicine, UCLA, Los Angeles CA, USA

[3]Los Angeles Gay and Lesbian Center, Los Angeles, CA, USA

Abstract

This short report evaluates the feasibility of using electronic vending machines for dispensing oral, fluid, rapid HIV-self testing kits in Los Angeles County. Feasibility criteria that needed to be addressed were defined as: 1) ability to find a manufacturer who would allow dispensing of HIV testing kits and could fit them to the dimensions of a vending machine, 2) ability to identify and address potential initial obstacles, trade-offs in choosing a machine location, and 3) ability to gain community approval for implementing this approach in a community setting. To address these issues, we contracted a vending machine company who could supply a customized, Internet-enabled machine that could dispense HIV kits and partnered with a local health center available to host the machine onsite and provide counseling to participants, if needed. Vending machines appear to be feasible technologies that can be used to distribute HIV testing kits.

Keywords

testing kits; technologies; vending machines; home-testing

Oral fluid rapid HIV tests, recently Food and Drug Administration (FDA)-cleared for over-the-counter use, may help to increase HIV testing access and acceptance. HIV-related stigma has contributed to decreases in testing interest and increases in unrecognized HIV infection (Mahajan, et al., 2008; Young, Shoptaw, Weiss, Munjas, & Gorbach, 2011). However, oral rapid tests, which can be privately self-administered at any time and from any location, are less stigmatizing and may improve testing rates (Wright & Katz, 2006). Oral rapid self-testing kits have already been shown to be acceptable by participants (Lyu, et al., 2011). These tests could be directly distributed from medical clinics and in local pharmacies (Myers, Bodach, Cutler, & Shepard, 2012), but testing acceptance at these locations might still be sub-optimal as most locations would require in-store/clinic hour visits and face-to-face HIV test purchases. Properly integrating oral rapid self-testing kits with an accessible, non-stigmatizing delivery method will be important for increasing testing acceptance.

Advances in vending machine technology could be combined with oral HIV tests to increase HIV testing availability through a non-stigmatizing delivery method. “HIV testing vending

Address Correspondence to: Sean Young, PhD, MSHS, 10880 Wilshire Blvd. Suite 1800, Los Angeles, CA 90024, p: 310-794-0619 ext. 240, f: 310-794-2768, sdyoung@mednet.ucla.edu.

There are no conflicts of interest.

machines" could offer 24-hour anonymous dispensing of HIV self-testing kits for private use. Accessing HIV tests through vending machines might not only improve testing access, but could also decrease HIV testing stigma. For example, providing machines in public locations could reduce stigma by "normalizing" testing behavior, and bundling non-stigmatizing items (e.g., candy) in a machine with stigmatized items (e.g., HIV testing kits) could reduce stigma and increase people's willingness to test (Young & Bendavid, 2010; Young, Nussbaum, & Monin, 2007). Modern electronic vending machines offer the ability for products and purchases to be monitored online through a database, making them an efficient method for measuring real-time cost and use. However, research has not examined manufacturer ability to use vending machines to dispense HIV testing kits. We therefore sought to explore the feasibility of using vending machines to dispense oral HIV testing kits.

Methods

Feasibility criteria were defined as: 1) ability to find a manufacturer who would allow dispensing of HIV testing kits and could fit them to the dimensions of a vending machine, 2) ability to identify and address potential initial obstacles, such as machine location and ability to obtain institutional review board approval, and 3) ability to gain community approval for implementing this approach in a community setting. We contacted colleagues with experience using computerized kiosks to learn about the availability of using vending machines for medical products. We conducted an Internet search to locate vending machine companies that could dispense HIV tests, provide an online data management system for monitoring use and inventory, and offer the ability to issue codes that could be used to redeem a free HIV test from the vending machine. Because we anticipated people using the machines might be first-time testers, we sought to partner with an organization that could offer pre- and post-test counseling and treatment. The Los Angeles Gay and Lesbian Center was contacted with this request to discuss the possibility of hosting a vending machine carrying Orasure Oraquick oral HIV testing kits (Orasure Technologies, Bethlehem, PA, USA) outside of their clinic so that participants could seek counseling and treatment onsite, if needed. The UCLA IRB approved this study.

Results

Out of the 3 identified vending distributors, we found one vending machine company who could supply a customized, Internet-enabled machine (UCapIt, Des Moines, IA) with software to monitor and dispense rapid HIV test kits to users providing a unique personal identification number. Machine inventory and usage data were accessible in real-time from a user-managed Website. Machine technology offered two possible platforms, either the ability to purchase HIV tests from the machine using cash or credit cards, or to offer credit card (but not cash) transactions along with the ability to enter a code that would dispense a free or discounted test.

The Los Angeles Gay and Lesbian Center agreed to participate and host the machine. We uncovered the following issues that needed addressing before implementing machine test distribution: stigma associated with testing at the Gay and Lesbian Center, ensuring participant and machine security, determining an appropriate onsite machine location, providing accessible hours, addressing financial competition due to city reimbursements for onsite clinic HIV testing, and assessing usefulness of machine distribution relative to a longstanding county-funded HIV counseling and testing program. The Center decided to host the machine at the Hollywood location because the machine could be kept outdoors for greater access and less face-to-face contact, and onsite security people were available to monitor and prevent possible vandalism. IRB approval, along with procurement, installation and training to set-up the machine took 5 months.

Discussion

Vending machines appear to be feasible technologies that can be used to distribute HIV rapid self-tests. We were given the opportunity to use vending machines that dispensed products through either credit card and cash purchase or credit card and a code that could be used to access products. As we planned to offer free HIV testing kits to participants as part of a research study, we chose to implement technology that allowed participants to input a unique code number to receive a free test. Because clinical staff determined that self-testing instructions were too complicated, we created additional user-friendly testing instructions, accompanied by images and contact information for participants to receive help, advice, and local post-test services. Communication between the primary academic research institution, the machine provider, and the community health clinic, was essential in order to overcome initial difficulties (such as learning that Internet access was not available for the vending machine during installation).

Researchers and organizations considering using vending machines to distribute rapid HIV self-testing kits should be aware of the test performance of rapid oral fluid self-tests, including the possibility of false negative results in those with early or acute infection and false positive results (Centers for Disease Control and Prevention, 2008; Patel, et al., 2007). As our use of rapid oral tests was, in part, intended to reach individuals who do not typically test (many of whom might be first time testers), testers must be able to understand the rapid test results (including the meaning of an HIV negative test result), understand how to deal with anxiety and psychological reactions to testing, and have access to post-test counseling and treatment, if testing positive. For this reason, we paired with the Los Angeles Gay and Lesbian Center and recommend initially situating machines near clinical facilities that offer these services.

Before implementing machine distribution of HIV-related tests and products, organizations and clinics need to assess the potential barriers they will encounter at their clinic. For example, although the Los Angeles Gay and Lesbian youth center location was discussed as a potential fit for hosting the machine, we realized that this location was gated and requires all entrants to meet with the facilities administration and complete a 15-minute assessment. Because the HIV vending machine testing approach was in part designed to avoid the stigma associated with face-to-face testing requests, additional security might have hindered use of the machine. We therefore believe that one of our successes was being able to integrate academic, medical, and community perspectives in order to anticipate and prevent potential challenges. This multi-disciplinary and multi-community perspective is essential both for planning and gaining approval and ensuring the safety of the community.

Before investing in infrastructure to distribute rapid HIV testing kits from vending machines, methods of tracking test usage should also be established. Although the vending machine technology allows tracking of whether tests are dispensed, it cannot detect whether the tests are actually administered. This information would be needed to determine the increased number of testers reached through these methods, and ultimately, to determine the cost-effectiveness of this approach.

One limitation of this study is the lack of assessing acceptability. Future research should focus on determining user acceptability of receiving HIV tests from vending machines, including measuring whether use of self-testing is associated with increased requests for HIV-related counseling and services. An additional limitation is that people who receive a testing kit might not perform test immediately and therefore would not make use of the proximity to a health clinic. However, having a machine located at a clinic is one method

that could at least help to inform testers about where they could return for counseling and services, if desired.

FDA-cleared rapid tests appear promising in their ability to reduce HIV testing stigma and provide a new and convenient method for self-testing of both HIV and other sexually transmitted diseases. Combining tests with technologies that provide alternative methods for anonymous dispensing of tests, such as through vending machines, might facilitate increased HIV testing acceptance and the identification of undiagnosed cases of HIV infection. Although this study was designed to assess the feasibility of using electronic vending machines to distribute HIV testing kits, these machines could also be used to distribute other stigmatizing products, such as home testing kits for other sexually transmitted infections, condoms, and sexual health materials.

Acknowledgments

This work has been generously supported by the help of the National Institutes of Mental Health (NIMH) and UCLA CHIPTS.

References

Centers for Disease Control and Prevention. MMWR: Early Release: False-positive oral fluid rapid HIV tests --- New York City,2005 -2008. 2008

Lyu SY, Morisky DE, Yeh CY, Twu SJ, Peng EY, Malow RM. Acceptability of rapid oral fluid HIV testing among male injection drug users in Taiwan, 1997 and 2007. AIDS Care. 2011; 23(4):508–514. [PubMed: 21271392]

Mahajan AP, Sayles JN, Patel VA, Remien RH, Sawires SR, Ortiz DJ, et al. Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward. Aids. 2008; 22(Suppl 2):S67–79. [PubMed: 18641472]

Myers J, Bodach S, Cutler B, Shepard C. Acceptability of Home Self -Test Kits for HIV in New York City, 2006. 2012 Paper presented at the ID Week 2012.

Patel P, Mackellar DA, Sullivan PS, Delaney KP, Sides TL, Newman AP, et al. Investigation of false positive results with an oral fluid rapid HIV-1/2 antibody test. Plos One. 2007; 2(1):e185. [PubMed: 17268576]

Wright AA, Katz IT. Home Testing for HIV. New England Journal of Medicine. 2006; 354(5):437–440. [PubMed: 16452553]

Young S, Shoptaw S, Weiss R, Munjas B, Gorbach P. Predictors of Unrecognized HIV Infection Among Poor and Ethnic Men Who Have Sex with Men in Los Angeles. AIDS and Behavior. 2011; 15(3):643–649. [PubMed: 20043200]

Young SD, Bendavid E. The relationship between HIV testing, stigma, and health service usage. AIDS Care. 2010; 22(3):373–380. [PubMed: 20390518]

Young SD, Nussbaum AD, Monin B. Potential moral stigma and reactions to testing for sexually transmitted diseases: Evidence for a disjunction fallacy. Personality and Social Psychology Bulletin. 2007; 33(6):789–799. [PubMed: 17488871]