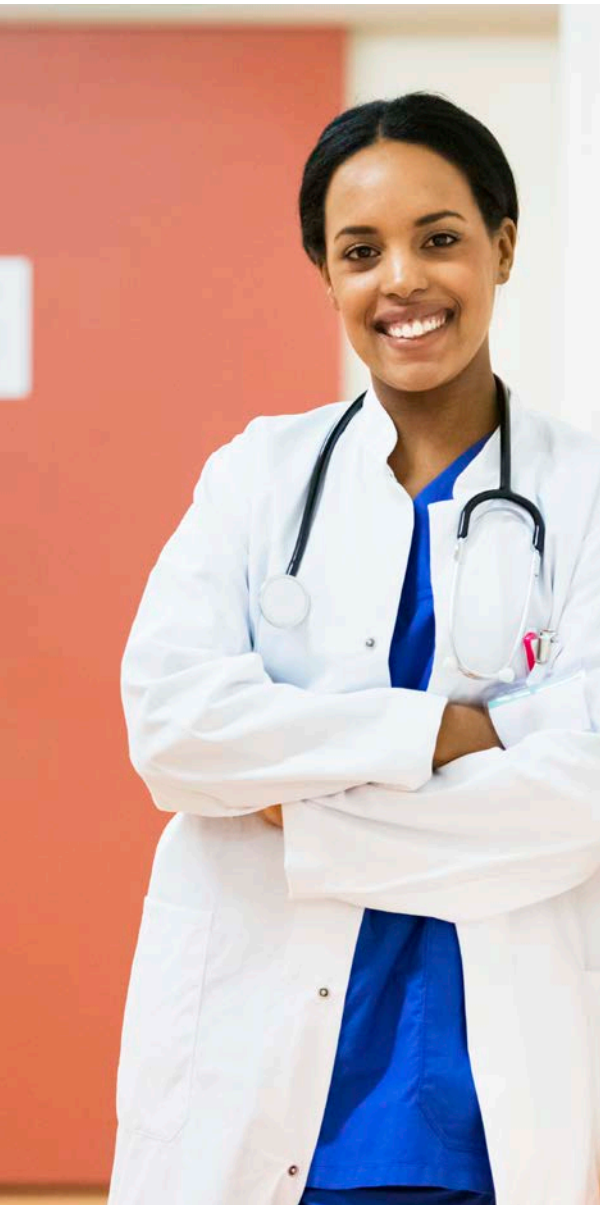

Strategic HIV Testing and Counseling Models for the Eastern Caribbean

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Abstract

HIV testing and counseling (HTC) serves as a critical gateway for treatment and prevention services shown to reduce HIV transmission efficiency and incidence. While it is clear that diagnosis of HIV is a critical intervention, the strategy for providing HTC that would be most effective for each country is not. Selection of the most effective strategy depends on several factors including: the nature of the HIV epidemic, the socio-cultural context, and current services, structures, and resources for HIV. Recent guidelines from the World Health Organization (WHO) recommend PITC, testing based on index HIV and TB cases, and mobile and outreach testing, as service delivery strategies for low-level and concentrated HIV epidemics in places like the Organization of Eastern Caribbean States (OECS).

In this paper we present a review of available grey and published literature to summarize the current situation in the OECS in relation to the HIV epidemic and testing services. This summary includes an assessment of WHO recommendations as well as new innovations in HTC service provision including use of rapid testing and network-based approaches. A mix of HTC strategies are presented that can increase the number of people who test and receive care and treatment services, including approaches that reach more clandestine populations or those that may not identify themselves as at-risk for HIV. Strategies for the use of existing data sources and surveillance systems to inform the selection of HTC service provision are also discussed.

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Introduction

Diagnosis of new cases of HIV through testing and counseling (HTC) serves as a gateway to the treatment and prevention services necessary to improve the quality of life for persons who are infected and reduce onward transmission (WHO 2007; WHO 2012; Janssen et al. 2001; Denison et al. 2008). Diagnosis of HIV followed by early initiation of antiretroviral therapy (ART) has been shown to reduce HIV transmission efficiency and incidence in clinical trial settings (Cohen et al. 2011; Anglemyer et al. 2011). Thus, effective HIV testing strategies are noted as a critical strategy for the UNAIDS's goal of "getting to zero" and achieving an "AIDS free generation" (UNAIDS 2010). Countries in the Organization of Eastern Caribbean States (OECS) are ideal contexts to replicate this approach of early diagnosis and treatment given the low prevalence of HIV and the feasibility of providing comprehensive care for people living with HIV through current health systems. However, treatment as prevention will remain a missed opportunity for OECS countries unless HTC programs are better able to diagnose people with HIV (PLHIV) and persons at an early stage of infection.

Client access to HIV testing is often fraught with many barriers such as real or perceived lack of privacy and confidentiality, lack of awareness of risk for HIV, or cultural norms of hostility toward HIV (Abell et al. 2007; MEASURE 2007a). Stigma and discrimination found in community settings and among healthcare providers can also severely hamper the effectiveness of any approach implemented (Abell et al. 2007). Previous evidence also suggests that many new infections are caused by people who are unaware of their HIV infection (Samet et al. 2001; Valleroy et al. 2000). One of the most significant barriers is reliance on a single model or limited models of HTC services that may inadvertently exclude populations, particularly those who may not identify their own need for services.

In an attempt to assist countries in selecting the most effective strategy for HTC services delivery, the World Health Organization (WHO) recently released guidelines for HTC service delivery approaches with specific considerations for epidemic type and feasibility of implementation based on available infrastructure (WHO 2012). The guidelines also emphasize the importance of cost effective approaches that are "measured by the number of infections newly identified for the number of tests performed," thus highlighting the importance of case identification rather than absolute numbers of tests conducted as a measure of program success. This is a critical consideration in the Caribbean region, given recent decreases in donor funding and movement towards increased country ownership of fiscal responsibility for HIV testing and treatment services.

CURRENT MODELS OF HTC SERVICE PROVISION IN THE OECS

The main testing strategy to reach those unaware of their serostatus applied in the Eastern Caribbean has been voluntary counseling and testing (VCT) through static healthcare facilities. This approach is often coupled with annual outreach testing days through fairs in public setting and mobilization/social marketing to encourage people to test. This traditional form of HTC is a passive strategy for case identification that requires people to initiate testing on their own and may miss higher risk groups. Additionally, most OECS countries use blood samples that usually require a two-week waiting period between testing and receipt of results, and site-based testing is often subject to higher rates of failure to return for results (personal communication with the Caribbean HIV/AIDS Alliance (CHAA)).

In recent years community-based rapid testing (CBRT) that provides results immediately on-site, using "animators" who are trained outreach workers from target populations to recruit people for testing, have been introduced in Barbados, St. Vincent and the Grenadines, and in Antigua and Barbuda (CHAA 2010; Strategic Plan 2010b). St. Vincent and Grenadines has also explored the use of provider-initiated testing and counseling (PITC) with training for a number of healthcare workers completed. However, the extent that PITC-related testing has actually been offered is not yet clear (CHAA 2010).

PURPOSE OF THIS REPORT

Alternative approaches and strategies that actively "seek, test, and treat" are needed to augment the number of people tested and to reach first time testers and persons with the greatest risk of exposure to infection with testing services in the OECS. A number of new strategies, such as outreach testing using rapid tests, social network referrals, and expanded PITC have been developed in low HIV prevalence settings and may also be effective in OECS countries (UNAIDS 2011). These strategies reduce access barriers by bringing services to the client, gain traction through the use of social influence, and may reduce the fear of stigma related to testing in specified HIV testing venues. However, not all approaches will work in all settings and may not be applicable for different key populations.

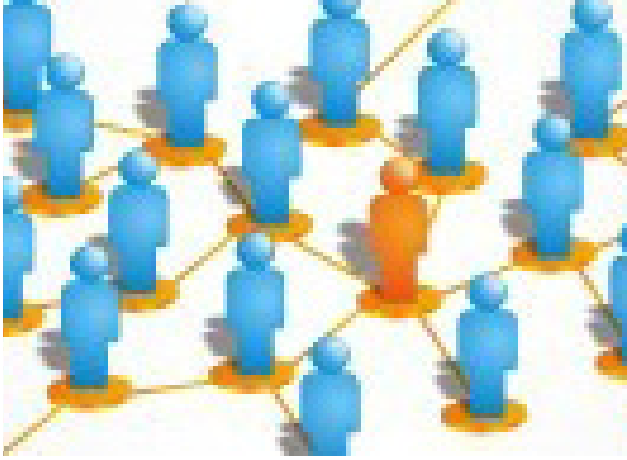
The purpose of this review was to ascertain which of the WHO recommended testing strategies for low-level and concentrated HIV epidemics would be most appropriate for the OECS. This review includes an overview of the current situation of HIV in the OECS and HTC programs, a summary of WHO recommendations for low-level and concentrated epidemic settings, and additional information on HIV testing strategies based on a review of published literature. Strategies for accessing data to inform the selection of HTC service provisions in the OECS are also discussed. Given available data and literature, this paper will focus on six of the seven OECS countries: Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevi s, St. Lucia, and St. Vincent and the Grenadines.

Methods

The focus of this review was to identify available literature on HIV and HIV testing in the OECS, and HTC testing strategies. First, information on HIV and HTC specific to the OECS was identified and reviewed. This information includes applicable grey literature, including national policy documents, strategic plans, behavior surveillance surveys, studies and assessments, reports, and peer reviewed publications. UNGASS country reports for each OECS country were reviewed. Program reports prepared by the Caribbean HIV Alliance and Population Services International for the OECS were also reviewed. Peer reviewed literature on HIV in the OECS was searched using the following databases: Pubmed, EBSCO SocINDEX, EBSCO Academic Search Complete, EBSCO PsychINFO, Ovid Global Health, Anthropology Plus, MONA Online Database, and Google Scholar. The following search terms were used to search each database: Caribbean, Eastern Caribbean, Barbados, Dominica, Antigua and Barbuda, Anguilla, Grenada, St. Lucia, St. Kitts and Nevis, St. Vincent and Grenadines. In addition to these databases, the websites of the following multilateral organizations were searched for publications on HIV in the OECS: UNICEF Eastern Caribbean Office (http://www.unicef.org/barbados/about.html), PAHO (www.paho.org), PAHO- CARMEN Network (http://www.amro.who.int/english/ad/dpc/nc/carmen-info.htm#docs), UN Economic Commission for Latin America and the Caribbean (http://www.eclac.cl/portofspain/), UN Information Center for Caribbean region (http://portofspain.unic.org/), UNAIDS (www.unaids.org), UNESCO (UNESDOC) (http://www.unesco.org/new/en/unesco/resources/publications/unesdoc-database/), UN WOMEN Caribbean Office (http://car.unwomen.org/ab_off.cfm?link_=17), UNDP LAC (http://www.undp.org/latinamerica/), UNFPA Caribbean (http://caribbean.unfpa.org/),UNODC (http://www.unodc.org/unodc/en/publications.html?ref=menutop), and the World Bank (www.worldbank.org). Additional regional websites were also searched including Inter-American Development Bank (www.iadb.org), Caribbean Development Bank (http://www.caribank.org/), Caribbean Community Climate Change Center (CARICOM) (http://www.caribbeanclimate.bz/), CAREC (www.carec.org), and CARICOM (www.caricom.org).

Second, the PubMed database was used to identify relevant peer-reviewed articles on the effectiveness of HIV strategies to complement information presented in the WHO guidance document on HTC strategies (WHO 2012). Search terms included HIV in combination with the following: AIDS, new testers, repeat testing, case identification, routine testing, provider initiated testing, acute HIV testing, Caribbean, Eastern Caribbean, Barbados, Dominica, Antigua and Barbuda, Anguilla, Grenada, St. Lucia, St. Kitts and Nevis, St. Vincent and Grenadines, diagnosis, seek test and treat, networks. Articles were eliminated if they were published prior to 2008 due to advancements in testing technologies, if they did not pertain to HIV tests in diagnosing or screening for infection, or if they were in a language other than English. Articles were further narrowed to include those that compared new or alternative testing procedures to standard voluntary counseling and testing (VCT), cost-effectiveness comparisons of different testing algorithms, and potential barriers and facilitators to testing in the Caribbean. The subsequent discussion is based on information provided in both the peer-reviewed articles and available grey literature where appropriate.

Current Situation of the HIV Epidemic in the OECS and Uptake of HTC services



The six OECS countries included in this paper are Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. These countries are characterized by low-level HIV epidemics with prevalence estimates ranging from 0.1% in Antigua and Barbuda to 0.75% in Dominica among adults 15-49 (UNGASS 2010a-f) (see Table 1). In most islands, data used to inform prevalence estimates of HIV is derived from prenatal screening. The number of PLHIV receiving antiretroviral treatment ranges across countries from 37 to 162 people based on data from 2009 (UNGASS 2010a–f).

There is a paucity of surveillance data specific to key populations at higher risk of HIV infection including men who have sex with men (MSM) and sex workers, although all countries conclude that these groups have potentially higher rates of HIV infection[1] and play an important role in sustaining epidemics (MOHE 2010; NACH 2010; UNGASS 2010a-f). This conclusion is based on special studies (MEASURE 2007a; International HIV&AIDS Alliance 2010; BSS 2007), programmatic data, as well as an assumption that transmission patterns may be similar to other larger English-speaking Caribbean countries with surveillance data among key populations at higher risk.

Two countries in the OECS provide risk behavior information on persons testing positive for HIV. In St. Lucia, among those diagnosed between 2008 and 2009 with HIV, 4% were men who reported sex with other men, while 49% of persons report no risk behavior for transmission (UNGASS 2010d). Given the stigma against male homosexuality, it is possible that this "unknown" category represents a high number of MSM reluctant to report homosexual behavior. In St. Vincent and Grenadines, 10% of diagnosed HIV cases report MSM behavior during the same reporting period (UNGASS 2010e).

In addition to these risk groups, migrants, youth on-the-block, mini-bus and taxi drivers, and in-school youth have also been noted as higher risk groups (BSS 2007). In St. Lucia, a study of risk behavior using time location sampling (PLACE 2006), documents high-risk behavior among patrons at specific venues (MEAURE 2007b). Two countries that have conducted sero-prevalence studies in prison settings document a higher prevalence of HIV infection among persons passing through prison facilities (St. Kitts and Nevis 2.4%, and Grenada 2.2%) (UNGASS 2010c; UNGASS 2010f; Boisson & Trotman 2009).

There is significant variation in estimates of HIV testing coverage across national reporting and special studies. Estimates of the percent of men and women aged 15-49 years testing for HIV annually ranges from 12% in St. Vincent and the Grenadines to 36% in St. Lucia, with data unavailable for this key UNGASS indicator in Dominica and Grenada for 2010. The number of persons tested annually also differs significantly across islands, with a low of 1,577 in St. Kitts and Nevis in 2009, and a high of 5,271 in St. Lucia that same year (UNGASS 2010a-f). HTC increased in both Antigua and Barbuda and St. Vincent and the Grenadines in 2010, potentially due to the introduction of community-based rapid tests (CBRT) (CHAA 2010).

Outside of estimates of the number of people testing, little is known about the profile of people testing and if higher risk persons are reached through the current testing strategies. A behavioral surveillance study conducted in 2005-2006 in the same six OECS provides some additional information[2] (BSS 2007). Of the 326 mini bus and taxi drivers interviewed across all six countries, 17% tested for HIV in the last 12 months, 48% had ever tested for HIV, and 73% felt it was possible to get a confidential test in their community. Of the 5,897 men and women aged 15-24 interviewed across all islands, a range from 6% in St. Kitts and Nevis to 12% in St. Lucia reported HIV testing in the last 12 months. HIV testing was somewhat higher among men and women aged 25-49 interviewed, with a range of 10% in Grenada to 17% in Antigua and Barbuda of respondents testing for HIV in the last 12 months in this age group (n=3,501).

[1] In St. Vincent and the Grenadines and St. Lucia, drug users are also noted as a key population at higher risk of HIV infection.
[2] The BSS report also refers to data collected among "youth on-the-block" in St. Vincent. Statistics for this group are not included in the final report but may be available from other sources.

However, data from special studies conducted by Population Services International in St. Lucia using the 'Tracking Results Continuously" (TRaC) methodology indicate that 62% of men 25-49 years old interviewed had tested for HIV in the last 12 months (n=854) (TRaC 2010[3]; PSI 2010a), as did 51% of sexually active youth aged 16-24 years (n=501) (PSI 2010b). Both TRaC studies were conducted throughout 10 parishes in St. Lucia. Another study using time location sampling through the "priorities for local AIDS control efforts" strategy reports that 34% of men interviewed (n=541) and 39.2% of women interviewed (n=342) at venues where people meet sex partners, had tested for HIV in the last 12 months (MEASURE 2007b). Standardized and systematic surveillance data at the point of service provision is need to provide additional data on the reach of HIV testing services. A profile of clients who participate in HTC through different testing modalities is imperative for decision making about the type of HTC strategy that should be employed.

Table 1. HIV Epidemiological, HTC, and Health System Profile of Six OECS Countries*

Country	Population estimate*	HIV prev~	% tested for HIV & result in last 12 mos.~	Testing strategy^	No. on ART~	Health facilities^^	Key population data
Antigua & Barbuda	87,884	0.1%	3.19% in 2008 3.54% in 2009	Static VCT VCT days/ CBRT	98	18 CHC outreach sites 9 health centers 1 hospital 1 public laboratory 5 private laboratory	None available
Dominica	72,969	0.75%	Not available	Static VCT VCT days	38	45 CHC/outreach sites 7 district health centers 2 district hospitals PMH hospital capital	SW TRaC 2008
Grenada	108,419	0.57%	Not available	Static VCT VCT days	54	33 medical stations 6 health centers 2 maternity units 2 district hospitals 1 general hospital 1 public, 2 private labs	SW TRaC 2006; Prison survey 2005
St. Kitts & Nevis	50,314	0.46%	16%	Static VCT VCT days	37	17 health centers 2 rural hospitals 1 general hospital St. Kitts 1 hospital in Nevis 2 geriatric homes	Prison survey
St. Lucia	161,557	0.28%	36%	Static VCT VCT days	124	34 CHC 2 District hospitals 3 Acute general hospitals 1 Psychiatric hospital Private offices/labs	MSM HIV prevalence data in UNGASS 2010
St. Vincent & Grenadines	103,869	0.4%	12%	Static VCT VCT days PITC (trained) CBRT	162	39 health centers 9 health districts 5 rural hospitals 1 acute general hospital 1 mental health centre 1 home for the elderly 1 private hospital 2 private laboratories	MSM TRaC 2008 MSM HIV prevalence data in UNGASS 2010

*Population estimates found at CIA World Fact Book, https://www.cia.gov, accessed January 14, 2012

~HIV prevalence estimates, % men & women 15-49 tested for HIV & result in last 12 months (UNGASS indicator #7), estimate of number of people tested annually, and estimate of number of people living with HIV on treatment based on UNGASS 2010 country reports

^Testing strategy gleaned from UNGASS reports for all countries; EC-CAP Year 3 Report for Antigua and Barbuda, St. Kitts and Nevis, and St. Vincent and Grenadines, and St. Vincent and Grenadines National Strategy 2010-2014

^^ Health facilities data from HIV SPA and PAHO Health system profile reports

[3] This number contrasts with the BSS report finding that 13% of men and women 25-49 surveyed in St. Lucia (n=578) had tested for HIV in the last 12 months.

Mobile and outreach HIV testing using rapid tests

Mobile and outreach testing refers to a variety of settings in the community that may offer HTC testing (for example, churches, places of entertainment, and sporting events) (WHO 2012). Mobile and outreach testing strategies can substantially increase the number of people testing. If targeted appropriately, this type of HTC may also reach key populations at higher risk for HIV. Sites for mobile or outreach testing are sometimes referred to as alternative testing venues. Several studies have found greater proportions of younger clients, first-time testers, and HIV-positive cases through mobile and outreach testing services compared to site-based VCT (Lahuerta et al. 2011; Sweat et al. 2011; Halkitis et al. 2011; Nglazi et al. 2012; Kranzer et al. 2012). Combining mobile testing strategies with rapid testing can be a cost-effective approach for expanding coverage, reaching different target populations, and identifying people with newly diagnosed HIV infection for referral, treatment, and care services (Grabbe et al. 2010). For example, one study conducted in Guatemala demonstrated that mobile vans were able to reach a greater proportion of MSM, transgender people, and FSW compared to a sentinel STI clinic site (Lahuerta et al. 2011). Targeted mobile testing using rapid tests is likely to be a beneficial strategy given the context, needs, and resources available in the Eastern Caribbean.

In the OECS and the wider Caribbean region, annual national testing day campaigns are another common approach to outreach testing. A potential problem with this type of approach is that it is not likely to reach clients at higher risk for HIV. For this reason, the WHO recommends this form of outreach testing in generalized rather than low-level and concentrated epidemic settings (WHO 2010). Activities that focus on key populations at highest risk are emphasized for low-level and concentrated HIV epidemics. While not be the most efficient straregy in terms of reaching first time testers, new testers, nor persons at highest risk of infection, these type of events may assist in normalizing HIV testing, and reducing stigma related to HIV and HIV testing (WHO 2012). An alternative approach is to combine HIV testing as part of multi-disease campaigns (WHO 2012). This strategy might be more appropriate in the OECS, given the movement towards integration of HIV with other health services as a cost effective approach, particularly in regards to long term management of care for PLHIV.

Home-based HIV testing and counseling (HBHTC) is another form of mobile and outreach testing recommended by the WHO. In HBHTC, testing is provided through door-to-door outreach at the client's place of residence. This form of HIV testing seeks to reduce structural and logistical barriers to accessing testing (for example, transportation), and to reduce the stigma associated with attending HTC services at a specified site for HTC (WHO 2012). HBHTC has been explored mostly in generalized epidemics in Africa, where studies have shown exceedingly high rates of test acceptance, and increased participation of first-time testers using this strategy (Choko et al. 2011; Molesworth et al. 2010). When applying this strategy to the low-level epidemics settings like those in OECS, the WHO recommends HBHTC only for households and families with a known index person who has tested positive for HIV or TB in order to be cost effective (WHO 2012). HBHTC of index cases is only recommended when consent is provided by the index case.

It is important to target outreach and mobile services so that those most at risk are more likely to test, and providing incentives to clients may help to achieve this goal. For example, a study in South Africa found that higher HIV prevalence was only found at mobile sites that offered incentives in addition to active recruitment of men to test. In this study, there was a prevalence of 16.5% at incentivized sites versus 5.5% at non-incentivized sites (Nglazi et al 2012). In another study in the same country, prevalence at incentivized versus non-incentivized sites was 10.9% and 5.0%, respectively (Kranzer et al. 2012).

BARRIERS TO RAPID TEST TECHNOLOGY IN THE OECS

It is important for OECS countries to take into consideration several factors regarding the applicability of mobile and outreach approaches. First, a critical component of any mobile or outreach testing is the use of rapid test technology. Rapid tests provide test results in the community, during the first point of contact. This allows low-resource countries to test more people without cost expenditures or expensive laboratory or testing equipment (Parisi et al. 2009). It also eliminates barriers to testing services including the transportation, cost, and additional time required as well as potential stigma related to accessing testing at sites designated for HIV services. Sites that use only traditional testing (requiring a waiting period) have a higher percentage of people failing to return for results (Molitor et al. 1999). Use of rapid tests would ensure that results are available the same day on-site and reduce the proportion failing to return. Careful selection of rapid test brands is also needed to ensure appropriate levels of sensitivity and accuracy (Sibbald 2000; Pavie et al. 2010; Taegtmeyer et al. 2011; Rosenberg et al. 2012)

In the OECS policies that prohibit conducting rapid HIV tests outside of laboratory settings is a barrier to mobile and outreach testing. Policies that limit the type of personnel allowed to perform the test are also serve as barriers to this HTC strategy. The WHO recommendations include provision of the actual HIV test in the community setting is a requirement to meet the criteria for mobile and outreach services. Community mobilization for to promote HIV testing and referral to site-based testing alone is not sufficient.

Second, as mobile and outreach testing approaches are not designed to provide regular care, treatment and support services, systems need to be in place to ensure that mobile and outreach testing sites are able to link people diagnosed with HIV to care and support at stationary facilities. The effectiveness of linkages between mobile and outreach services compared to stationary facilities and the loss to follow-up at stationary services has not yet been robustly evaluated in the OECS. Failure to address this issue as part of a comprehensive mobile or outreach testing approach would represent a critical break in the continuum of testing and care and treatment services needed to stem transmission of HIV infection (WHO 2012).

Third, although an advantage of rapid testing is that it requires less training among those administering the tests, personnel training and capacity to appropriately follow rapid testing procedures should be considered (Constantine & Zink 2005). For example, a study by Wolpaw et al. (2010) observed that the extremely low sensitivity of using a rapid test in a South African hospital was largely attributed to test providers not following testing algorithms correctly, such as not waiting the required amount of time for the test to process, and using inconsistent techniques. When quality improvement measures were implemented including re-training staff in proper testing procedures, sensitivity rose to 95.1% (Wolpaw et al. 2010). Training of medical or other professionals administering the tests needs to increase proportional to the expansion of sites offering rapid testing.

Similarly, as the range of professionals potentially administering rapid tests expands, the quality of counseling clients receive should also be examined. Quality counseling can also help increase the likelihood that those who are accurately diagnosed as HIV positive follow-up with post-diagnosis care and prevention procedures to reduce potential transmission to others (Mwamburi et al. 2005). As results are received at the same visit, provisions need to be made to ensure that those administering rapid tests are also properly trained in counseling or that a trained professional counselor is available on site. This would also require cost provisions for training and consistent supervision to ensure quality standards are being met in counseling.

Finally, implementation may be more effective if it is combined with incentives for clients. The different costs associated with incentivized testing in the OECS will depend on when, where, and how often incentives for testing will be given, if any. This might be considered for a later phase of implementation or only for very specific target groups that are particularly clandestine or hard-to-reach.

TARGETED PROVIDER-INITIATED TESTING AND COUNSELING APPROACHES

Provider-Initiated Testing and Counseling (PITC) is a site-based approach that involves health care or other providers routinely offering HIV testing to clients as part of selected medical services (Becker et al. 2009; WHO 2012). This can include health care providers in the public, private or NGO sectors and a range of general delivery settings for adults and children. With a PITC approach, rather than the client seeking HTC services the provider offers HTC to clients seeking medical care. PITC has produced increases in the uptake of HIV testing compared with referral to on-site VCT (Dalal et al. 2011). PITC reduces the burden on clients to travel to VCT locations and the potential stigma of seeking services at a site known to conduct VCT or provide other services related to sexual health. For clients who test positive, and those in need of additional referral services, PITC has the added benefit of already being located within the healthcare system.

The WHO recommends that in low-level and concentrated HIV epidemics such as those in the OECS, PITC should focus on patients with known HIV risk factors, those with signs and symptoms consistent with HIV infection, TB and STI patients, and children known to have been exposed to HIV perinatally. PITC should also be offered in settings serving key populations at risk including sex workers, MSM, transgender people, migrants and ethnic minorities, and people who use injection drugs (PWUID). Additionally, PITC should be offered in drug treatment centers as well as prisons and other closed institutions (WHO 2012). Providers based at certain health care or other environments, such as family planning clinics, STI clinics, jails or prisons, or emergency rooms, are more likely to see HIV-infected or at-risk people, thus providing an opportunity to capitalize on points of contact with people of potentially heightened risk (Criniti et al. 2011; Kharsany et al. 2010; Begier et al. 2006; Walensky et al. 2011). This type of targeted PITC that couches HTC services within health facilities and community-based organizations serving higher risk populations is preferable to stand-alone VCT clinics. However, a major challenge to implementation of targeted PITC through community-based organizations in the OECS is the shortage of organizations serving higher risk clients including sex workers, PWUID, and MSM. Fear of stigma may serve as a significant barrier to these populations using services within the formal health system. Thus it is important to complement PITC strategies within the health system with mobile and outreach testing.

PITC continues to be a viable testing strategy that can be implemented within existing health services and health system infrastructure in the OECS. Expanding PITC in the healthcare setting would be particularly beneficial for the Eastern Caribbean with several considerations. First, provider training is needed so that they are able to recognize patients at heightened susceptibility to HIV. Provider training is also needed to ensure that the appropriate HIV testing protocol is followed, and that quality standards are met counseling and linkage to care. Facility and regional level training schedules, that include "refresher" training, would be of benefit.

Second, a range of healthcare providers should also be considered for training opportunities. For example, psychiatrists, counselors, psychologists, and other mental health workers should also be trained in PITC (Senn & Carey 2009). Inclusion of dentists can also increase the reach of the strategy. As training tends to be costly and time-consuming, countries will need to consider this investment as well as training alternatives such as on-site training to help defray time and financial costs. The overall cost-effectiveness of integrating PITC and HIV services into other types of services should be considered. One review of PITC programs found that integration in low- or middle-income countries have decreased costs compared to "stand-alone" services (Sweeney et al. 2012), however more data in the OECS so support this is warranted.

Finally, each facility should assess factors within the facility environment that may affect the optimal implementation of this strategy, such as clinic flow and the infrastructure of the organization. Patient confidentiality, administrative support to help manage services, and supervision are needed to ensure effective implementation. Provisions should also be in place to effectively link patients to appropriate treatment and prevention services.

New HTC strategies: Network approaches and self testing

Network-based approaches

Several network-based approaches to testing have been developed in other low-level and concentrated epidemic contexts that might also be considered in the OECS. Network-based approaches for HTC focus on the method of recruitment rather than the location of recruitment to reach higher risk clients. These types of referral strategies, including *social network referrals* and *partner notification/contact tracing*, capitalizes on existing network structures and relationships. The approach involves enlisting persons at higher risk or members of behavioral risk groups (both HIV-positive and HIV-negative) to recruit network associates believed to be at risk for HIV infection from within their social, sexual, and drug-use networks to participate in counseling, testing and referral services. While social networks can play a negative role as the conduit through which HIV is transmitted, network properties can also be positively harnessed on behalf of prevention efforts (Heckathorn et al. 1999).

Social network referral strategies have been successfully applied to increase case identification in a number of countries. For example, a three-phase study among at-risk Mexican women found that the addition of social network recruiting strategies significantly increased the uptake of women testing, from 11.9% with HIV prevention messages by outreach alone to 26.3% when contact through outreach workers was augmented by social network contacting (Ramos et al. 2010). Social network referrals have been successfully applied to augment routine partner notification in identifying HIV-positive patients (Jordan et al. 1998), people with sexually transmitted infections (Rothenberg & Narramore 1996; Rothenberg et al. 2000), and people previously unaware of their serostatus (Abramovitz et al. 2009). Recent adoption of network strategies as part of HIV testing programs in a U.S. urban setting resulted in increased case identification relative to venue-based testing alone (Halkitis et al. 2011).

Network-based approaches can help alleviate barriers to testing in several ways. First, as people within certain networks already know of the 'stigmatized' behaviors of others within their networks, they do not run the risk of being 'found out' by seeking testing services. Second, seeing other network members accessing services can help reduce fears and encourage participation. Third, the strategy can effectively reach otherwise hard-to-reach populations. For example, a study to evaluate the effectiveness of three HIV testing strategies among African American MSM found that the odds for HIV-positive infection were 3.6 times greater for the social network strategy than for the alternative venue testing or partner services (Halkitis et al. 2011).

Contact tracing and partner notification is another network-based strategy that asks people who test positive for HIV to provide contact information for their sexual partner(s). In contrast to the social network approach that is open to anyone within a network, this is a targeted strategy for specific sexual partners and assumes those contacted have already been sexually exposed to HIV. The effectiveness of this strategy may depend on the approach used. For example, a study by Brown et al. (2011) found that 51% of locatable partners presented for testing when contacted via active referral (i.e., having the healthcare provider contact partners) compared to only 24% who had been assigned passive referral (i.e., where the index partners themselves advise their partners to go for testing).

Contact tracing has also been found to be more cost-effective than VCT and PITC in low-prevalence (< 5% prevalence) areas (Armbruster et al. 2011). This same study also found the uptake of among those traced was between 68.9% and 83.3%. (Armbruster et al. 2011). Another study, also found the odds for detection of HIV-positive MSM to be 2.5 times greater for contact tracing/partner services than alternative venue testing (Halkitis et al. 2011).

Network-based approaches are highly suitable to the nature of the epidemic in the OECS, although there may be challenges based on the cultural context in reaching certain stigmatized populations, particularly MSM. A study of the feasibility of using respondent-driven-sampling (RDS) in St. Vincent and the Grenadines, concluded that stigma associated with homosexuality, and small social networks of MSM in this context posed a significant barrier to use of this network approach to recruit MSM (Johnston et al. 2010). However it should also be noted that this study involved only two in-depth interviews with MSM in St. Vincent and the Grenadines. Further, the attempt to implement RDS in the study did not follow recommendations including financial incentive for participation and employment of MSM as study staff. It is also important to note that feasibility of reaching MSM through network approach may change over time as the context and culture surrounding the stigmatized behavior may also change. For example, stigma against homosexuality has been noted as a significant problem in Jamaica, yet, changes in recent years due to advocacy work by civil society groups and the Ministry of Health facilitated the successful implementation of an RDS study including HIV testing among MSM in 2010 (Figueroa et al. 2011). Further research on the feasibility of using a network approach for MSM in the OECS is warranted. There is currently no evidence of similar challenges in using network-based approaches with other high risk groups such as sex workers, PWUID, and HIV-positive people, although this should also be further explored.

Another consideration is that although many network-based strategies have been shown to be relatively cost-effective, this may vary. Shrestha et al. (2010) found that the average cost per diagnosis at four different U.S. community-based organizations using social network referrals ranged from a low of US$11,578 to a high of US$16,101. Cost-related factors such as start-up costs, efficiency of recruiters, and amount of incentives offered for testing should be taken into consideration before implementation.

Another consideration is that as useful as network approaches are for positive influence, they can be as equally detrimental in spreading negative information with news regarding rude or unprofessional treatment and services traveling quickly through networks. This could potentially discourage a large number of people from participating. Staff training on stigma and discrimination should be concurrently addressed with this strategy to take full advantage of positive network properties.

Finally, although not a required component, network-based approaches may benefit from some form of referral tracking system. Though this has often been a challenge in a number of programs attempting to track similar types of referrals and referral completion, it is important for programs to monitor the effectiveness and reach of the strategy. Varying levels of success have been found with both paper- and electronic-based systems and the effectiveness of referral tracking mechanisms may vary by population.

SELF-TESTING FOR HIV

Self-testing for HIV provides individuals the opportunity to test for HIV at their own convenience at a time and place they prefer, and also offers privacy to persons concerned about confidentiality. It may also be cost effective given that it would require fewer resources to implement. However, there are a number of potential issues noted for self-testing including: potential inaccuracy of results, unethical use of self-testing such as justification for unprotected sex, concerns of the disposal of biohazards, and issues decoupling counseling services from testing. WHO does not currently recommend self-testing as a strategy, as more research is needed to determine how to implement the strategy and the true costs and benefits (WHO 2012). Depending on the results of these studies, this strategy might be considered in the future in the OECS.

Utilization of data to inform selection of HTC service provision

In this review, several options for HTC service provision in the OECS have been presented, taking into consideration available information on current HIV prevalence estimates and testing reach, and the profile of persons choosing to test. Additional evidence from ongoing HTC programs in the OECS would assist in creating the best match between HIV epidemic and HIV testing strategy. Data that would allow for the disaggregation of HIV-related information by testing site and type is fundamental to determining which testing strategy is most cost effective. It is ideal to use ongoing monitoring evaluation systems to accomplish this goal so that the monitoring of this data is sustainable over time making it possible to track changes in performance.

One option would be to analyze standard laboratory forms and registers that would include a unique identifier for each site as well as basic information on the number of tests performed and the number of positive cases identified by site. Currently, use of these standard laboratory forms is promoted throughout the OECS, although the accessibility of this data may by limited if it is not currently entered into an electronic database. The current data forms would also only give information on laboratories providing HIV testing services since rapid testing in the community is currently not used as a strategy. As mobile and outreach, targeted PITC, or network-based testing with the use of rapid tests is introduced, each site or type of testing could be provided with a unique number on this laboratory register. These forms would also provide the gender and age of testing clients served at each site or through each type of testing strategy.

Although more labor intensive, countries might also consider the introduction of a short demographic and HIV-related risk behavior survey to be administered to all clients at testing sites. This information would allow for the development of a risk profile by HTC strategy and comparison across sites, reasons for accessing services through a particular site, as well as more information related to testing history so that sites and strategies serving more new testers and higher risk people can be identified. This more in-depth information would be useful in determining cost effectiveness of each strategy. Given that similar information should be covered during pre-test and post-test counseling, a survey of this nature would not create excessive burden for providers. The introduction of electronic data collection techniques rather than paper and pencil forms might also be considered to reduce the burden on providers.

Conclusion

In the Eastern Caribbean, unprotected sexual intercourse is the primary mode of HIV transmission, leading to a low-level epidemic, with potentially higher HIV prevalence among sex workers, MSM and PWUID. Increasing HIV testing uptake among those at highest risk for infection is a shared strategic priorities across the region. However, the best way for each country to reach this goal depends on available infrastructure, available financial and human resources, HIV prevention, treatment, care and support services, and existing social, policy and legal frameworks. Based on WHO recommendations and our literature review the most promising HTC strategies in the OECS include: 1) targeted mobile and outreach testing using rapid tests in the community setting (including home-based testing for index HIV and TB cases); 2) inclusion of HIV testing as part of multi-disease health fairs (versus stand-alone national testing day events); 3) targeted PITC, and 4) network-based approaches.

With the exemption of health facility-based PITC, each of these approaches requires that rapid test technology be adopted. Adoption and implementation of rapid tests requires a shift in the current paradigm and system for providing HIV services, including the selection of the appropriate diagnostic test, changes in policies on where tests can be performed and by whom, as well as training lay personnel in how to perform the tests. However, the labor required for these necessary steps is outweighed by the potential benefit in increased efficiency in case identification by the proposed strategies.

Another challenge across countries in the OECS is the selection of a strategy with limited information about the behavioral and demographic profiles of those testing. Without knowing more about who currently tests and their HIV-related risk, key populations at risk may be missed. The ability to make informed decisions on how to direct HTC service provision is currently limited. Mechanisms to address this issue might include the review and analysis of laboratory HIV registry forms by type of HTC service provision, and the introduction of a short demographic and HIV-related behavioral survey for clients at all testing locations. Such a survey would provide information on previous testing for HIV and STI, concurrent diagnosis with AIDS, and HIV-related risk behavior. This is needed to complement existing information on number of people tested and number of diagnosed HIV cases. Target populations should also be involved in planning, implementing and evaluating programs employing this strategy. Ethnographic or related assessments would be useful to provide a better understanding of the target population, the networks, and the transmission and prevention patterns present.

This absence of data makes it difficult to determine if current testing strategies are reaching the right clients at the right time.

HIV/AIDS-related stigma and discrimination must also be addressed for any HTC strategy to be effective. Potential HIV-related stigma in the community at large as well as from providers within the formal healthcare system must be addressed. The extent of stigma and its effect on factors such as uptake of testing have not been robustly examined within the context of OECS countries, although it has been documented as a problem in other English-speaking Caribbean countries (Abell et al. 2007). HIV stigma is a challenge to implementing any testing strategy. It is also consider the availability of complementary prevention resources. As sexual contact is the primary mode of transmission in the region, particular attention to availability of and access to condoms is needed, as well as other forms of sexual risk reduction.

Reduction in HIV transmission requires widespread, sustained, and comprehensive efforts. While OECS countries have made significant headway in addressing the epidemic, there is still a significant need to increase the number of HIV positive cases identified and augment the number of those

testing positive receiving appropriate care and support services. There is no "one-size-fits-all" approach, even when targeting similar populations of interest. A mixture of approaches is needed, with simultaneous implementation of several strategies and the application of concurrent rigorous monitoring and evaluation plans to ensure quality standards are met and that goals are measurably achieved. Strategies that should be considered include mobile and outreach testing using rapid tests and targeting key populations including sex workers and MSM as well as high-risk heterosexuals, PITC targeted towards these same higher risk groups, home-based testing for family members and households of index HIV and TB cases, and network recruitment strategies including social network recruitment and contact tracing.

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Appendix

Author(s)	Title	Name of Journal	Year	Purpose	Study Design	Data Source/ Setting	Sample Size	Conclusions
Abramovitz, D., Volz, E.M., Strathdee, S.A., Patterson, T.L., Vera, A., Frost, S.D., ElCuete, P.	Using respondent-driven sampling in a hidden population at risk of HIV infection: who do HIV-positive recruiters recruit?	Sexually Transmitted Diseases	2009	To examine recruitment patterns of HIV positive injection drug users and identify factors associated with being recruited by HIV-positive IDU in a RDS-based study	Cross-sectional survey	Seeds were IDUs residing in Tijuana, Mexico; recruited other IDUs residing in Tijuana, Mexico	N=1,056 IDUs (1,024 recruits and 32 seeds)	HIV+ IDUs have different recruitment patterns than HIV- IDUs; positive IDUs tend to recruit other positive IDUs; RDS has the potential to successfully be used in the identification of HIV+ or other high-risk individuals
Anbazhagan, G.K., Krishnamoorthy, S., Thiyagarajan, T.	Seroprevalence of HCV and its co-infection with HBV and HIV among liver disease patients of South Tamil Nadu	World Journal of Hepatology	2010	To determine the seroprevalence of hepatitis C virus (HCV) and its co-infection with hepatitis B virus (HBV), hepatitis delta agent (HDV) and HIV among liver disease patents of south Tamil Nadu.	Cross-sectional	Study conducted among liver disease patients in South Tamil Nadu	N=1,012 samples (512 clinically diagnosed cases of liver disease patients and 500 apparently healthy age and sex matched individuals)	Routine testing of the blood for HCV in addition to HBV and HIV is needed. Individualized counseling is needed to identify those at risk and testing for those who want it.
Anglemeyer, A., Rutherford, G.W., Baggaley, R.C., et al.	Antiretroviral therapy for prevention of HIV transmission in HIV-discordant couples	Cochrane Database System Review	2011	To determine if ART use in an HIV-infected member of an HIV-discordant couple is associated with lower risk of HIV transmission to the uninfected partner compared to untreated discordant couples.	Literature review using Cochrane methods	N/A	N/A	ART is a potent intervention for prevention of HIV in discordant couples in which the index partner has ≤550 CD4 cells/μL. Counseling, support, follow up, and mutual disclosure may have a role in supporting adherence.
Armbruster, B., Helleringer, S., Kalilani-Phiri, L., Mkandawire, J., Kohler, H.P.	Exploring the relative costs of contact tracing for increasing HIV case finding in sub-Saharan countries	Journal of Acquired Immune Deficiency Syndrome	2011	To estimate the relative cost of identifying an undiagnosed HIV infection through contact tracing (CT) compared with client-initiated VCT and door-to-door provider-initiated testing	Parameter estimates and cost calculations	The Likoma Network Study (Malawi)	N=194 women (n=138) ad men (n=56)	The probability that partners of HIV index cases could be traced and that they would consent to HIV testing and counseling was high and varied by partner type; CT could complement client-initiated VCT or door-to-door PIT in a large number of sub-Saharan populations affected by generalized epidemic of varying magnitudes
Becker, J., Tsague, L., Sahabo, R., Twyman, P.	Provider Initiated Testing and Counseling (PITC) for HIV in resource-limited clinical settings: important questions unanswered	Pan African Medical Journal	2009	To discuss available studies regarding patient perceptions of routine PITC.	Review/Commentary	N/A	N/A	Testing programs need to be effectively integrated into routine provider activities to not overburden already under-resourced providers and facilities. Testing must emphasize voluntariness, limit coercion, and ensure effective linkages to care and treatment
Begier, E.M., Bennani, Y., Forgione, L., et al.	Undiagnosed HIV infection among New York City jail entrants, 2006: Results of a Blinded Serosurvey	Journal of Acquired Immune Deficiency Syndrome	2010	To determine HIV prevalence among jail entrants, including proportion undiagnosed.	Cross-sectional	New York City jails from 11 New York City Department of Corrections facilities	N=6,411 adult male and female jail entrants	28% of the 5%-9% jail entrants who were HIV infected were undiagnosed and denied recognizing HIV risk factors. There is a need to improve inmate acceptance of routine testing.

Appendix

Author(s)	Title	Name of Journal	Year	Purpose	Study Design	Data Source/ Setting	Sample Size	Conclusions
Boisson. E.V., Trotman, C.	HIV seroprevalence among male prison inmates in sex countries of the Organization of Eastern Caribbean states in the Caribbean (OECS)	West Indian Medical Journal	2009	To determine HIV prevalence among male prison inmates in the six OECS countries in the	Caribbean	Point prevalence surveys	Prisons in OECS	N=1,288 male inmates
Brown, L.B., Miller, W.C., Kamanga, G., et al.	HIV partner notification is effective and feasible in sub-Saharan Africa: opportunities for HIV treatment and prevention	Journal of Acquired Immune Deficiency Syndrome	2011	To determine the effectiveness of 3 partner notification methods (passive referral, contract referral, provider referral)	Randomized control trial	Persons newly diagnosed HIV infection at Kamuzu Cantral Hospital and Bwaila Hospital outpatient STI clinics in Lilongwe, Malawi	N=240 newly diagnosed HIV+ men and women	Provider-assisted partner notification resulted in more partners receiving counseling and testing services than passive referral, the current standard of care.
Campo, J., Cano, J., del Romero, J., et al.	Role of the dental surgeon in the early detection of adults with underlying HIV infection/AIDS	Medicina Oral Patologia Oral y Cirugia Bucal	2011	To review factors supporting the role of dental surgeons in identifying HIV-infected people unaware of their seropositive condition.	Review	N/A	N/A	Dental professionals can play an important role in the early detection of HIV infection. Efforts to inform and raise awareness among dental professionals are needed.
Choko. A.T., Desmond, N., Webb, E.L., et al.	The uptake and accuracy of oral kits for HIV self-testing in high HIV prevalence setting: a cross-sectional feasibility study in Blantyre, Malawi	PLoS Medicine	2011	To determine the acceptability of receiving HTC from a provider known personally to prospective clients.	Quasi-experimental	Study in urban Blantyre, Malawi	N=283 (n=216 adult members of 60 households and n=67 of 72 members of community peer groups)	Oral supervised self-testing was highly acceptable and accurate. This option has the potential for high uptake at the local community level if it can be supervised and safely linked to counseling and care.
Cohen, M.S., Chen, Y.Q., McCauley, M., et al.	Prevention of HIV-1 infection with early antiretroviral therapy	New England Journal of Medicine	2011	To evaluate the effect of combination antiretroviral	therapy on the prevention of HIV-1 transmission	to uninfected partners and on clinical events	in infected persons,	Randomized,
Criniti, S.M., Aaron, E., Hilley, A., Wolf, S.	Integration of routine rapid HIV screening in an urban family planning clinic	Journal of Midwifery and Women's Health	2011	To describe how 1 urban Title X-funded family planning clinic transitioned from using a designated HIV counselor for targeted testing to a model that uses clinic staff to provide integrated, routine, non-targeted, rapid HIV testing as standard of care.	Review of HIV testing documentation in medical charts	Title X-funded family planning clinic	N/A	Integrating routine HIV screening into a family planning clinic can be critical to identifying new HIV infections in women

Appendix

Author(s)	Title	Name of Journal	Year	Purpose	Study Design	Data Source/ Setting	Sample Size	Conclusions
Denison, J.A., O'Reilly, K.R., Schmid, G.P., et al.	HIV voluntary counseling and testing and behavioral risk reduction in developing countries: a meta-analysis, 1990-2005	AIDS Behavior	2008	To assess the effectiveness of HIV voluntary counseling and testing (VCT) in reducing HIV risk behaviors in developing countries.	Meta-analysis	N/A	N/A	The findings provide moderate evidence in support of VCT as an effective prevention strategy. Expanding access to HIV testing and counseling services must be accompanied by rigorous evaluation
Girardi, E., Scognamiglio, P., Sciarrone, M.R., et al.	High HIV prevalence in male patients with acute hepatitis A in the Rome metropolitan area, Italy 2002-2008	Journal of Hepatology	2011	To determine the prevalence of HIV infection in homosexual patients affected by hepatitis A	Retrospective analysis	Adult cases of hepatitis A reported by the National Institute of Infectious Disease, Rome, Italy	N=473	All individuals with acute hepatitis A should be routinely offered an HIV test.
Halkitis, P.N., Kupprat, S.A., McCree, D.H., et al.	Evaluation of the relative effectiveness of three HIV testing strategies targeting African American men who have sex with men (MSM) in New York City	Annals of Behavioral Medicine	2011	To evaluate the effectiveness of three HIV testing strategies for detecting previously undiagnosed 18-64 year old African American MSM	Quasi-experimental	Data form the New York City location of a multi-site study (conducted by Harlem United Community AIDS Center/ New York University)	N=558	The odds for detection of HIV+ MSM were 3.6 times greater for the social networks strategy and 2.5 times greater for partner services than alternative venue testing. Given difference in the individuals accessing testing across strategies, a multi-strategic testing approach may be needed to most fully identify undiagnosed HIV+ African American MSM
Kharsany, A.B.M., Karin, Q.A., Karim S.S.A.	Uptake of provider-initiated HIV testing and counseling among women attending an urban sexually transmitted disease clinic in South Africa – missed opportunities for early diagnosis of HIV infection	AIDS Care	2010	To determine the uptake of provider-initiated HIV testing and counseling among women attending an urban STD clinic in South Africa	Cross-sectional	Women in the waiting area of a STD clinic in South Africa	N=5,612	In settings where high-risk patients await health services, failure to implement PITC is a missed opportunity for patients to benefit from counseling, prevention, early diagnosis, and referral into care and treatment for HIV infection.
Kranzer, K., Govindasamy, D., van Schaik, N.	Incentivized recruitment of a population sample to a mobile HIV testing service increases the yield of newly diagnosed cases, including those in need of antiretroviral therapy	HIV Medicine	2012	To compare the yields of newly diagnosed cases of HIV infection and advanced immunodeficiency between individuals attending a mobile HCT services (as participants in a survey) and those accessing the same service as volunteers for routine testing	Population-based seroprevalence survey	Study based in peri-urban township in Cape Town, South Africa	N=1,813 adults	Compared with routine voluntary HCT, selection and invitation in combination with incentives increased the yield of newly diagnosed HIV infections and individuals needing ART.

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Lahuerta, M., Sabidó, M., Giardina, F., et al.	Comparison of users of an HIV/syphilis screening community-based mobile van and traditional voluntary counseling and testing sites in Guatemala	Sexually Transmitted Infections	2011	To compare behavioral characteristics and HIV and syphilis prevalence between subjects tested at a mobile van offering VCT and those tested at three STI clinics.		UALE Project, Guatemala	N=2,874 adults	Approaches such as the use of a mobile van helped to increase access to hard-to-reach groups.
Molesworth, A.M., Ndhlovu, R., Banda, E. et al.	High accuracy of home-based community rapid HIV testing in rural Malawi	Journal of Acquired Immune Deficiency Syndrome	2010	To assess the performance of rapid HIV antibody tests when used as part of a home-based community wide counseling and testing strategy.	Cross-sectional population survey	Karonga Prevention Study, rural northern Malawi	N=10,819 adults	Face-to-face rapid testing by health personnel with minimum training at the client's home performs well when used on a wide scale in the community setting.
Nglazi, M.D., van Schaik, N., Kranzar, K., et al.	An incentivized HIV counseling and testing program targeting hard-to-reach unemployed men in Cape Town, South Africa	Journal of Acquired Immune Deficiency Syndrome	2012	To assess the effectiveness of incentivized mobile HCT in reaching unemployed men.	Retrospective observational study	HCT data from a stationary clinic and incentivized and non-incentivized mobile testing services in Cape Town, South Africa	N=10.034 adult men (n=708 clinic based; n=5.214 non-incentivized mobile; n=4,112 incentivized mobile)	Incentivized mobile testing services may reach more previously untested men and significantly increase detection of HIV infection in men.
Parisi,M.R., Soldini, L., Di Perri, G., Tiberi, S., Lazzarin, A., Lillo, F.B.	Offer of rapid testing and alternative biological sample as practical tools to implement HIV screening programs	New Microbiologica	2009	Evaluate the sensitivity and specificity of an oral fluid-based rapid HIV test in comparison with routinely utilized methods	Experimental	Samples from the San Raffaele Hospital in Milan, Italy	N=875 samples of known positive (N=121) or known negative (N=754) subjects	Rapid test and alternative biological samples may contribute to HIV prevention strategies by reaching a larger population particularly when and where regular screening procedures are difficult to obtain
Pavie, J., Rachline, A., Loze, B., Niedbalski, L., Delaugerre, C., Laforgerie, E., Plantier, J.C., Rozenbaum, W., Chevret, S., Molina, J.M., Simon, F.	Sensitivity of five rapid HIV tests on oral fluid or finger-stick whole blood: a real-time comparison in a healthcare setting	PLoS ONE	2010	To determine the sensitivity of HIV antibody testing on total blood and/or oral fluid in routine healthcare settings	Quasi-experimental; prospective	Sample of adults with documented HIV infection from outpatient clinic in Saint Louis Hospital, Paris, France	N=200 adults with documented HIV-1 (n=194) or HIV-2 (n=6) infection	Rapid HIV tests were less sensitive on oral fluid than on finger-stick whole blood and less sensitive on finger-stick whole blood than on serum

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Ramos, R.L, Ferreira-Pinto, J.B., Rusch, M.L.A., Ramos, M.E.	Pasa la Voz (Spread the Word): using women's social networks for HIV education and testing	Public Health Reports	2010	To evaluate respondent-driven sampling methodology in a Mexican context.	Group comparison design	Pasa La Voz project in Ciudad Juarez, Chihuahua, Mexico	N=722 women	Compared to one-on-one outreach strategy, the Pasa La Voz methodology was successful at imparting a cost savings prevention education program with significant increases in the number of at-risk women being tested for HIV
Rosenberg, N.E., Kamanga, G., Phiri, S., Nsona, D., Pettifor, A., Rutstein, S.E., Kamwendo, D., et al.	Detection of acute HIV infection: a field evaluation of the Determine® HIV-1/2 Ag/Ab combo test	Journal of Infectious Diseases	2012	To assess the accuracy of the antigen portion of Combo RT to detect persons with acute HIV infection	Experimental	Volunteer patients from the Kamuzu Central Hospital Sexually Transmitted Infection Clinic and the Lighthouse Trust HIV Testing and Counseling Center in Lilongwe, Malawi	N=1,009 adult men and women	Combo RT displayed excellent performance for detecting established HIV infection and poor performance for detecting acute HIV infection; in the setting (Malawi), Combo RT is no more useful than current algorithms
Senn, T.E., Carey, M.P.	HIV testing among individuals with a severe mental illness: review suggestions for research, and clinical implications	Psychological Medicine	2009	To summarize knowledge about HIV testing prevalence, correlates, and interventions among individuals with a severe mental illness (SMI); to identify research needs; and to discuss clinical implications of the studies reviewed.	Literature review	N/A	N/A	Research on HIV testing among individuals with an SMI is needed. Mental health settings may be opportune venues for HIV testing, even though providers face ethical challenges when implementing testing programs in these settings.
Shrestha, R.K., Sansom, S.L., Kimbrough, L., Hutchinson, A.B., et al.	Cost-effectiveness of using social networks to identify undiagnosed HIV infection among minority populations	Journal of Public Health Management Practice	2010	To assess the cost and effectiveness of a social networking strategy to identify new HIV diagnoses among minority populations	Unclear	Four CBOs in Boston, Philadelphia, Washington, D.C., implementing social network recruiting for HIV testing and counseling	N=909 (n=92 recruiters; n=817 network associates)	The cost of notifying someone with a new HIV diagnosis using social networks varied across sites.
Sweat, M., Morin, S., Celentano, D., et al.	Community-based intervention to increase HIV testing and case detection in people aged 16-32 years in Tanzania, Zimbabwe, and Thailand (NIMH Project Accept, HPTN 043): a randomized study	Lancet Infectious Diseases	2011	To assess whether HIV testing could be increased by combination of community mobilization, mobile community-based VCT (CBVCT), and support after testing	Randomized study	NIMH Project Accept (10 communities in Tanzania, 8 in Zimbabwe, 14 in Thailand)	N=21,041 (n=2,920 in Tanzania; n=6,039 in Zimbabwe; n=12,082 in Thailand)	CBVCT should be considered a viable intervention to increase detection of HIV infection, especially in regions with restricted access to clinic-based VCT and support services after testing.

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Sweeney, S., Obure, C.D., Maier, C.B., et al.	Costs and efficiency of integrating HIV/ AIDS services with other health services: a systematic review of evidence and experience	Sexually Transmitted Infections	2012	To review the literature on the potential efficiency gains of integrating HIV services with other health services	Systematic literature review	N/A	N/A	Evidence supports further efforts to integrate HIV services. Evidence gaps remain and there is an urgent need for further research in this area.
Taegtmeyer, M., MacPherson, P., Jones, K., Hopkins, M. Moorcroft, J., Lalloo, D.G., Chawla, A.	Programmatic evaluation of a combined antigen and antibody test for rapid HIV diagnosis in a community and sexual health clinic screening programme	PLoS ONE	2011	To determine the performance of fourth generation antigen/antibody rapid test kits for earlier diagnosis of HIV in non-clinical settings under programmatic conditions	Quasi-experimental	Sample of adults seeking care at community services for IVDUs, MSM, asylum seekers, sex workers, and UK Africans through church groups in Liverpool, UK	N=953	Fourth generation rapid HIV tests have little additional benefit over third generation HIV kits for routine screening in low prevalence settings and high rates of false positives; third generation kits should be primarily used with laboratory testing of individuals thought to be at risk of acute HIV infection
Walensky, R.P, Morris, B.L., Reichmann, W.M., et al.	Resource utilization and cost-effectiveness of counselor- vs. provider-based rapid point-of-care HIV screening in the emergency department	PLoS ONE	2011	To evaluate the outcomes, costs, and cost-effectiveness of HIV screening when offered by either a member of the emergency department (ED) staff or by an HIV counselor	Mathematical model	Randomized clinical trial of providers vs. counselor-based HIV screening in the ED in the U.S.	N/A	The cost-effectiveness of provider-based HIV screening in an ED setting compares favorably to other US screening programs. Although at additional cost, counselor-based screening provides as much a return on investment as provider-based screening.
Wolpaw, B.J., Mathews, C., Chopra, M., Hardie, D., de Azevedo, V., Jennings, K., Lurie, M.N.	The failure of routine rapid HIV testing: a case study of improving low sensitivity in the fields	BMC Health Services Research	2010	To investigate the cause of poor test performance of a clinic rapid HIV testing process in a public service clinic in a peri-urban community near Cape Town, South Africa	Clinic reporting data	South African commissioned government report	N=1,177	Poor testing procedures can lead to low levels of HIV rapid test sensitivity; quality control measures for testing and personnel are needed; certain brands of rapid-testing kits may perform better than others