

An overview of recent evidence on barriers and facilitators to HIV testing

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Abstract

Background: To address the issue of undiagnosed HIV infections, the Public Health Agency of Canada released the *Human Immunodeficiency Virus—HIV Screening and Testing Guide* in 2012, which identified several barriers and facilitators for HIV testing.

Objective: The objective of this overview is to summarize the most recent evidence regarding barriers and facilitators to HIV testing, to expand upon the research conducted for the *HIV Screening and Testing Guide*.

Methods: A review of the literature published between 2010 and 2014 was conducted using Scopus, PubMed (MEDLINE), and the Cochrane Library; websites of groups such as the Centers for Disease Control and Prevention, European Centre for Disease Prevention and Control, Australian Department of Health, and New Zealand Ministry of Health were searched for recent reports. Studies were categorized based on the barrier or facilitator identified, and the results were summarized.

Results: In addition to the known barriers of lack of perceived risk, lack of comfort or knowledge, provider time constraints, and fear of the diagnosis, stigma and discrimination, new studies have identified additional barriers including: fear regarding disclosure or lack of confidentiality, lack of access, lack of compensation of providers, and lack of human resources to carry out testing. In addition to the known facilitators of increased awareness and normalization of HIV screening and testing, opt-out testing was identified as a facilitator in recent studies.

Conclusion: Since 2010, research has advanced our knowledge of barriers and facilitators and can be applied to help decrease the number of undiagnosed HIV infections.

Introduction

Human immunodeficiency virus (HIV) infection is now largely considered a manageable condition due to advances in treatment. Without appropriate interventions, however, HIV can progress to acquired immune deficiency syndrome (AIDS), which can lead to illness and death. Reducing the spread of HIV in Canada requires concerted efforts at widespread screening and testing to identify individuals who may miss opportunities to obtain treatment, and thus unknowingly be transmitting the virus to others. Providing early HIV diagnosis is important in preserving quality of life for those who are infected, and reducing the number of undiagnosed cases of HIV will help to prevent transmission of the virus (1).

In Canada, approximately 75,500 individuals were living with HIV at the end of 2014 and an estimated 21% of those were unaware of their infection (2). To complement existing initiatives to reduce the number of undiagnosed HIV cases in Canada, the Public Health Agency of Canada (the Agency) released the *Human Immunodeficiency Virus—HIV Screening and Testing Guide* (the Guide) in 2012 to support health

care providers with normalizing HIV testing (1). Within the Guide, several barriers and facilitators to HIV screening and testing were identified, specifically: lack of perceived risk for HIV infection among patients and providers; comfort and knowledge with respect to HIV testing among patients and providers; providers' time constraints; cumbersome consent procedures; and managing fears of stigma or discrimination associated with testing and risk behaviours in general (1).

The studies used to inform the Guide were published prior to 2010 (1). As the implementation and normalization of routine HIV screening and testing remain an important issue for public health in Canada, a broad overview of more recent studies on the barriers and facilitators of HIV testing was warranted. We chose to do an overview of the literature because the inconsistent definition of barriers and facilitators across studies as well as the overlap between barriers and facilitators limited the ability to perform a systematic review.

The objective of this overview was to summarize the most recent evidence regarding barriers and facilitators of HIV screening and testing in Canada, and similar developed countries in order to help identify gaps in knowledge, and potentially inform future revisions to the Guide.

Methods

A literature review was conducted using databases such as Scopus, PubMed (MEDLINE), and the Cochrane Library. Search terms included “HIV” or “human immunodeficiency virus” and “screening” or “testing” and “barriers” or “facilitators” or “predictors.” Other literature sources searched for relevant reports included the websites of the Centers for Disease Control and Prevention (CDC), the European Centre for Disease Prevention and Control (ECDC), the Australian Department of Health, and the New Zealand Ministry of Health. Studies and reports from Canada, the United States, Europe, Australia, and New Zealand, published between 2010 and 2014, were included in the literature review; editorials, commentaries and letters to the editor were excluded. The key barriers and facilitators identified in each of the studies were reviewed and categorized, and evidence tables were developed to summarize and organize the key findings. The organization of study results into barrier and facilitator categories was confirmed by two of the authors of this article—S. Ha and T. Austin. Barriers and facilitators are described in **Table 1**.

Table 1: Description of barriers and facilitators

Barriers	Definition
Lack of perceived risk of HIV infection	For patients: the patient does not believe he/she has a risk of acquiring HIV, or believes that his/her behaviours prevent risk. For providers: the provider does not believe his/her patients have a risk of acquiring HIV, or assumes they are at low risk, and may also believe that HIV is not an issue for his/her patient population or region of practice.
Comfort discussing and lack of knowledge of HIV	For patients: the patient does not feel comfortable discussing HIV or other sexual issues with the provider, and may have a general lack of knowledge about HIV, or how and where to get tested. For providers: the provider feels discomfort or anxiety in asking sexual questions to the patient, or in eliciting patient fears regarding HIV. He/she may lack knowledge of consent procedures, how to manage positive results and reporting procedures for their jurisdiction, and may feel that a lack of specific training prevents them from testing for HIV.
Health care provider time constraints	Health care providers have a lack of time for HIV testing and associated counselling, or have competing priorities during a visit that prevent them from testing for HIV.

Fear, stigma and discrimination	The patient fears a positive result, social repercussions for seeking testing or for testing positive (discrimination, rejection), being unable to cope with results, or that he/she will see someone he/she knows at the clinic.
Access to testing	A lack of ability to access testing in general (due to remote/rural location, lack of insurance [U.S. studies], testing location hours of operation, language barriers), or an inability to access a variety of testing services that are typically available (e.g., lack of anonymous testing in rural locations vs. metropolitan locations) acts as a barrier to testing.
Financial and human resource constraints	Cases where providers may not perform HIV testing due to a lack of compensation, or there is an inability to run HIV testing initiatives due to lack of staff.
Facilitators	Definition
Normalizing HIV testing	Reducing the negative stigma surrounding HIV by making it a routine test (similar to checking cholesterol, for instance). Offering testing as part of regular care.
Opt-out testing	HIV testing is offered and administered unless the patient specifically refuses.
Increasing knowledge and awareness	Using patient-centred educational material to make patients more knowledgeable, more likely to see HIV testing as a positive thing, and improve interest in testing. Using provider-centred materials to enhance training around HIV testing, and improve provider-patient communication.

Results

Overall 34 studies and reports on barriers and facilitators to HIV testing were identified. The majority of these were American, while a smaller number were from European countries and Australia. One report and one study were from Canada; no literature was found from New Zealand.

Barriers

Lack of perceived risk of HIV infection

An important barrier to HIV testing is the perceived lack of risk that stems from the inability to accurately assess levels of risk, either for one's self (on the part of patients or clients) or for patients (on the part of health care providers), which has the potential to act as a barrier. In a systematic review of European studies by Deblonde et al., low risk perception was identified as a barrier in four (out of 24) of the studies analyzed (3). In a survey of 629 Europeans recently diagnosed with HIV, 73% of respondents indicated that low risk perception was a reason for not having previously been tested (4). A survey of 519 HIV-negative men in Australia found that 41.2% of respondents cited believing they had not engaged in risky behaviour as a reason for delaying or avoiding testing (5). Similarly, several American interview-based studies have looked at barriers to initial testing in patients with HIV/AIDS, or factors that contributed to late diagnosis of HIV in individuals who developed AIDS within 12 months of HIV diagnosis (6–8).

Low risk perception is a recurring theme among these studies (6–8). One of these studies, from San Francisco, found that low risk perception was mentioned by 14 out of 41 interviewees, and another from New York found that 89 of 139 interviewees cited low risk perception (7,8). Health care providers from North Carolina interviewed by White et al. also identified low risk perception as a patient barrier towards routine testing (9). In addition, interviews with primary care providers, infectious disease specialists and internal medicine residents have suggested that patients' perceived lack of risk poses a challenge for testing (10,11). Therefore, patients who perceive themselves as low risk for HIV infection are less likely to seek HIV testing.

In contrast, inappropriate assessment of risk by health care providers themselves may also act as a barrier. Among health care providers, results from surveys and interviews have found inaccurate or low risk perception to be a common barrier to HIV testing. In a survey of 221 health care providers in Washington, 57% agreed that perceiving the patient as low risk is a barrier to testing (12). Open-ended interviews with 24 health care providers in Mississippi and Rhode Island also identified incorrect assumptions of patients' risks as a barrier (13). In a survey of HIV testing coordinators, program directors, nurse managers and laboratory directors from hospitals, community-based organizations and clinics/health centres in Washington, DC, and Houston, Texas, a frequently selected barrier was that HIV was not an issue for the patient population (68.6% in Washington, 20.9% in Houston) (14). Similarly, in a survey of 515 clinical educators from the Society of General Internal Medicine in the U.S., reasons behind whether or not trainees were encouraged to perform routine HIV testing were investigated. The most common reason for not encouraging trainees to perform routine HIV testing was a perception of low local prevalence (15).

Lack of knowledge and discomfort

Lack of knowledge is an important barrier for patients and it influences other barriers. A U.S. survey of 443 adults in nine academic internal medicine clinics found that significant predictors of self-reported HIV testing were a patient's knowledge about HIV (odds ratio [OR]=1.3), as well as patient request for testing (OR=103.3) (16). As a result, the authors suggest that "simple waiting room prompts (to ask for HIV testing) and public education campaigns may represent the most efficient interventions to increase HIV testing rates" (16). Lack of knowledge may also be a factor in terms of where to go for testing; this was described as a barrier in the systematic review by Deblonde et al. (3). Patient discomfort or refusal of testing was also cited as a barrier in one American study (14).

Several barriers to routine HIV testing related to health care providers' knowledge and comfort level have been identified. In studies from the U.S., lack of familiarity with local regulations regarding HIV testing procedures and disagreements with national recommendations were considered barriers to HIV testing (15,17,18). A barrier resulting from a systematic review was provider anxiety about offering HIV testing in a primary care setting (3). Similarly, interviews with health care providers in Mississippi, Rhode Island and Massachusetts identified discomfort in initiating conversations about HIV testing as a barrier (13,19). Other studies in the United States and Europe suggest that fears about how to deal with positive results, as well as feelings of inexperience or lack of training with respect to procedures and regulations, may act as a barrier for health care providers (11,13,17,18,20,21).

Health care provider time constraints

Time constraints and competing priorities during patient visits are commonly experienced by health care providers. Time constraints can arise due to lengthy consent procedures (depending on local regulations) as well as lengthy pre- and post-test counselling procedures (9,12,15,17,18,20,22,24). Health care providers may perceive time constraints as a barrier due to the lack of familiarity of local regulations (e.g., if they are unaware that testing requires only verbal consent, they may perceive the procedures required to obtain consent as being more time consuming than they actually are).

Fear, stigma and discrimination

When patients are fearful of positive results, they may be less likely to request an HIV test (3,5,25). Thus, fear of the test itself or of potential positive results may act as a barrier, in addition to fears of being discriminated against or stigmatized. In recent literature, fear of stigma or discrimination from the community have emerged as barriers to HIV testing and may deter a patient from seeking HIV testing in the first place (25–27). In particular, this may be evident in small communities where the patient may be likely to encounter individuals he/she knows during the testing process (23). Patient fear of social repercussions due to a positive test is a very commonly mentioned barrier, both by patients and health care providers (4,7,9,11,22,26,28,29).

Patient fear regarding the possibility of disclosure or a lack of confidentiality is another barrier to HIV testing (3,4,27). Youth may have particular reason to fear disclosure due to staff being unaware of testing confidentiality practices. In a study examining barriers to youth HIV testing in New York, of 131 HIV testing site representatives that were interviewed using a “secret shopper” approach, 14% either gave incorrect information, or did not know, when asked whether parents could find out the youth’s test result (30). Fears with respect to anonymity likely also reflect fears regarding the stigma associated with testing and the potential discrimination from family or community members. Health care providers interviewed in one study suggested that assurances of confidentiality for the patients were of great importance as a facilitator (13). Patient fears related to stigma, consequences of positive results and confidentiality could also potentially stem from a lack of knowledge (e.g., a patient may not realize that they can live a long healthy life with current HIV treatments, in the case of a positive test), highlighting the overlap that can exist among barriers.

Access to testing

People living in rural or remote areas may not be able to access a variety of HIV testing services as easily as people living in denser metropolitan areas. Providers in Mississippi, for example, suggested that the need to travel long distances for testing services was a barrier for patients in their jurisdiction (11). In a separate U.S. study of individuals who received late diagnoses of HIV, living in a rural area was more commonly associated with late diagnoses than living in an urban area (31). Similarly, an Australian study found that having a practice in a metropolitan area was associated with more HIV testing than having a practice in a non-metropolitan area (OR=1.40) (32).

In a Canadian review of barriers faced by women with respect to HIV testing, the author stressed that anonymous testing may not be universally available (26). Among adolescents receiving rapid HIV testing in an emergency department (n=114), 80% of those surveyed stated they would be more likely to get a test if a rapid version was available (33). In the study by Hyden et al., in which 131 HIV testing site representatives in New York were interviewed, only 12% of the sites provided testing outside the hours of 08:30 to 17:00, Monday to Friday (30). Similarly, 23% of the sites exclusively offered testing on weekdays between 09:00 and 15:00. Thus, the operating hours of testing sites could represent a significant barrier to youth who are in school, as well as those who are unable to take time off work during the week. In a survey of Australian HIV-negative men, 15.2% of participants cited difficulty getting an appointment as a reason for delaying testing (5). Health care providers have also identified that language barriers may also act as a barrier to accessing HIV testing (12,18,34).

Financial and human resource constraints

Health care providers frequently mentioned lack of resources or compensation as personal and institutional barriers. Having financial and physical resources, as well as being able to employ enough staff to run routine HIV testing initiatives within hospitals and community clinics, emerged as a barrier within American and European studies (3,13,14,18,20). Health care providers have also cited a lack of compensation for the extra time spent on HIV testing and its related procedures as a barrier (9,11,22,23). Due to the lack of recent Canadian studies in this area, it is not entirely clear whether these issues would emerge as barriers in Canada.

A summary of recent studies on barriers to HIV testing is presented in **Appendix 1**.

Facilitators

Normalizing HIV testing

The Agency, the CDC and the ECDC recommend normalizing HIV testing by including it as part of routine care (1,22,35). Including HIV testing as a component of periodic routine medical care is a multi-faceted approach in the sense that normalized testing not only reduces the stigma associated with HIV, but also encourages more patients to be receptive to the idea of testing, and to be tested (1,10,16,29,33). Several sources have highlighted that patients are more likely to be tested for HIV if they are offered a test as

opposed to requesting the test themselves (16,29,33). According to Haines et al., 67% of surveyed adolescents stated that they would be more likely to participate in testing if it were offered, as opposed to having to request it (33).

Normalized testing has been linked to reduced stigma among patients who are tested for HIV. In a survey of Scottish men who have sex with men (MSM), individuals who had been tested in the past year had less fear of positive results, and a greater testing norm than those who had been tested more than one year ago, or had never been tested (36). Other studies suggest that “HIV should be no different than screening for glucose levels, cholesterol levels, or blood pressure” (17).

Opt-out testing

With opt-out testing, HIV testing is offered and administered, unless explicitly refused by the patient. Opt-out testing has been identified as a potential facilitator for HIV testing as it eliminates the requirement for lengthy consent procedures, removing this barrier for health care providers and patients. In this sense it addresses the issue of a lack of time, as well as concerns regarding any lack of reimbursement for extra time spent. Although opt-out testing could be effective in increasing testing rates (3), it is important that patients have the capacity to consent and understand the implications of an HIV test. Some provinces and territories in Canada have already adopted an opt-out strategy to prenatal HIV screening (26).

Increasing knowledge and awareness

Increasing the availability of HIV-related knowledge translation material to improve awareness could be useful to highlight the benefits of testing. When patients are educated about the benefits of testing and are educated with respect to HIV (for instance, regarding the effectiveness of antiretroviral therapies and methods for reducing transmission risk), they are more likely to be tested (34). Adam et al. found that greater HIV knowledge was associated with better testing routines among MSM (37). Studies examining the predictors of HIV testing suggest that individuals are more likely to seek testing if they foresee positive outcomes (e.g., protecting family, peace of mind) as opposed to negative ones (e.g., stigma) (29,37). Studies examining facilitators or factors associated with recent HIV testing suggest that increasing patient and health care provider knowledge using HIV literature and HIV-specific training is a potential facilitator (13,17,23). Health care providers found that patient interest and willingness, as well as knowledge of local consent and counselling regulations were facilitators to testing (13,23).

Not surprisingly, health care providers suggest improvement in HIV-specific training for providers, increased availability of HIV literature for providers and patients, patient education initiatives, and improvements in provider communication as possible facilitators of routine HIV testing (13,17,23). The Guide recommends “[streamlining] the provision of pre-test information using print, video, mobile and web-based resources” (1).

A summary of recent studies of facilitators of HIV testing is presented in **Appendix 2**.

Discussion

Our overview of the recent literature confirmed the ongoing importance of all the barriers that were identified in the *HIV Screening and Testing Guide*: lack of perceived risk, lack of comfort or knowledge, provider time constraints, and fear, stigma, and discrimination. Additional barriers identified in this review include fears regarding disclosure or a lack of confidentiality, lack of access, lack of compensation for providers, and the lack of human resources to carry out testing initiatives.

In terms of facilitators, while the Guide does recommend the normalization of HIV screening and testing, and touches upon the topic of increasing awareness (e.g., by emphasizing HIV as a chronic manageable condition), little is mentioned regarding opt-out testing as a potential facilitator (1). Opt-out testing was

identified as a facilitator in this overview, as it addresses some key barriers. Although it is currently used in some parts of Canada as part of prenatal screening, it is unclear whether opt-out testing for the general population will result in significant improvements in identifying HIV-positive individuals.

A strength of the current overview is that it provides a brief snapshot of what has been learned about barriers and facilitators of HIV screening and testing since the creation of the Guide in 2012. A limitation of this overview is that it only included studies from high-income countries. This may limit global generalizability of the results, but they remain relevant for Canada. Also, there was no systematic assessment of bias performed for the included studies. This overview, however, is intended to provide a snapshot of the evidence, as opposed to grading the quality of that evidence.

This study has identified a number of areas for future work. First, these findings could be used to inform future iterations of the Guide, and could be used by other organizations to inform programming. Second, while it is important to identify and be aware of important barriers, more research could be performed to review and evaluate interventions aimed at addressing these barriers (e.g., knowledge translation products, campaigns, etc.). Third, HIV testing strategies such as couples testing and self-testing were not identified as facilitators in the current review. Future research could consider the merits of these strategies. Finally, overall there was a lack of Canadian studies; thus, studies to confirm the relevance of the above-mentioned barriers and facilitators in the Canadian context would be useful.

Conclusion

Understanding the major barriers and facilitators to HIV testing is essential to increase the number of individuals being tested for HIV as it can inform effective strategies to decrease the 21% of those infected who are unaware of their HIV status (2). Targeted interventions could address the barriers and capitalize on the facilitators.

Acknowledgements

The authors would like to acknowledge Jun Wu and Simon Foley from the Public Health Agency of Canada for their support in the development of this article.

Conflict of interest

None

Funding

The authors have no sources of external funding to declare.

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Appendix 1: Summary of studies on barriers to HIV testing

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Lorenc et al., (2011) (25)	England	What is the qualitative evidence related to views and attitudes of MSM concerning HIV testing?	Systematic review	Men who have sex with men (MSM)	Barriers include: <ul style="list-style-type: none"> • Fear of consequences of positive test • Perception of stigma from other gay men or from wider culture
Deblonde et al. (2010) (3)	11 countries in Europe, the Middle East and Russia	What are barriers to HIV testing?	Systematic review	Various	For patients: <ul style="list-style-type: none"> • Fear (of positive result, inability to cope with results, stigma) • Low risk perception among certain patients • Worries related to confidentiality • Lack of knowledge of where to receive testing For providers: <ul style="list-style-type: none"> • Anxiety over asking about HIV testing • Lack of training • Reluctance to offer testing • Lack of resources • Lack of universal policies
CDC (2013) (22)	United States	Examine trends in testing among different groups—discusses barriers in “commentary” section.	Review	Several	For patients: <ul style="list-style-type: none"> • Fear/concerns about stigma or discrimination based on test results • Costs of tests For providers: <ul style="list-style-type: none"> • Perception that risk-based testing is more effective than routine testing • Concerns regarding reimbursement for testing • Lengthy informed consent and pre-test counselling process • Not being certified to provide HIV counselling • HIV testing not available in the provider’s institution
DeMarco et al. (2012) (28)	United States	Barriers to following CDC recommendation of routine HIV testing	Review	Various	For patients: <ul style="list-style-type: none"> • Fears related to stigma, being discriminated against, or judged for getting tested • Lack of perceived risk • Lack of easy access • Concerns about confidentiality/anonymity For providers: <ul style="list-style-type: none"> • Lack of time to implement/carry out routine testing procedures • Perceived low risk in the community • Uncertainties about ability to properly counsel patients

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Wertheimer (2011) (26)	Canada	What are the barriers that women face when it comes to HIV testing/screening?	Review	Women	For patients: <ul style="list-style-type: none"> • Fear of judgment from community or health care provider • Fear of lack of confidentiality or that they will see people they know at clinic • Access (e.g., anonymous testing not available in all provinces) For providers: <ul style="list-style-type: none"> • Assumption that patient is low risk
Yazdanpanah et al. (2010) (34)	24 countries in Europe and Russia	Barriers to earlier testing: Why do patients present late? How to overcome barriers?	Review	Several studies with variety of populations	For patients: <ul style="list-style-type: none"> • Denial of risk factors • Lack of knowledge regarding care options for HIV-positive individuals • Fear of consequences of positive test (mainly worries related to discrimination and rejection) For providers: <ul style="list-style-type: none"> • Consent process and pre-test counselling requirements • Competing priorities • Language challenges
Deblonde et al. (2014) (4)	Belgium, Estonia, Finland, Portugal	What are reasons for HIV testing, or reasons for not having been tested prior to HIV diagnosis?	Survey	Recently diagnosed HIV-positive patients (72% male)	Reasons for not testing: <ul style="list-style-type: none"> • Low risk perception most frequently cited (73% of participants) • Not feeling ill • Fear of HIV disease • Fear of stigma and discrimination • Fear of breach of confidentiality • Practical and financial barriers
Hallmark et al. (2014) (14)	United States	To what extent do you agree with a number of possible barriers using a five-point scale?	Survey	HIV testing coordinators, program directors, nurse managers, and/or lab directors, in various settings	Highest rated/frequently selected: <ul style="list-style-type: none"> • Lack of funding for testing • Patient discomfort/refusal • HIV is not a problem for the client population • Limited staff time to provide testing • Limited staff size to provide testing
Iqbal, DeSouza & Yudin (2014) (27)	Canada	Willingness to accept testing (yes/no) and attitudes towards HIV testing in labour. What are differences between those who accept and those who don't?	Survey	HIV-negative expectant mothers presenting at hospital in labour	Top reasons for not accepting: <ul style="list-style-type: none"> • Don't want to know • Too much labour pain • Fear of pain from testing • Fear of breach of confidentiality • Fear of partner's family or community's reaction

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Prestage, Brown & Keen (2012) (5)	Australia	What are reasons for delaying or avoiding HIV testing?	Survey	HIV-negative men	Commonly selected barriers: <ul style="list-style-type: none"> • I haven't done anything risky (41.2%) • Having to return another time for results (40.3%) • I haven't enough time (25.4%) • I haven't changed partners (19.8%) • I haven't had any illness or symptoms that made me worry (19.5%) • It's difficult to get an appointment (15.2%) • I'm afraid I might be told I have HIV (14.1%)
Arbelaez et al. (2012) (24)	United States	What are barriers to implementing routine HIV testing in emergency department?	Survey	Health care providers in emergency department	Most frequently cited barriers: <ul style="list-style-type: none"> • Lack of time (61%) • Lack of resources (60%) • Concerns about follow-up (59%)
Shirreffs et al. (2012) (12)	United States	Agree/disagree with commonly reported barriers?	Survey	Health care providers	<ul style="list-style-type: none"> • Patient is low risk (57%) • Extra time spent on counselling (31%) • Consent procedures (22%) • Legal issues (20%) • Language barrier (19%) • Other concerns with respect to time (17%) • Concerns about getting reimbursed (13%)
Berkenblit et al. (2012) (15)	United States	Do you encourage their trainees to perform routine HIV testing (yes/no)? If not, what are the reasons (select from several options)?	Survey	Clinical educators from the Society of General Internal Medicine	Reasons for not encouraging routine testing: <ul style="list-style-type: none"> • Perception of low local prevalence • More important teaching issues • Clinic environment too busy • Lack of familiarity with recommendations • Disagreement with recommendations
Korthius et al. (2011) (23)	United States	Agree/disagree with commonly reported barriers?	Survey	Internal medicine specialists	<ul style="list-style-type: none"> • Competing priorities during visit (79%) • Time (64%) • Patient reluctance (64%) • Consent requirements (49%)
Mimiaga et al. (2011) (20)	United States	What are barriers to the implementation of routine HIV testing at the site?	Survey	Senior administrators, medical directors and health care providers from community health centres	<ul style="list-style-type: none"> • Constraints on providers' time (68%) • Time required to administer counselling (65%) or to obtain informed consent (52%) • Lack of funding to support implementation (35%) • Need for additional training (34%) • Staff availability (33%) • Informed consent statutes/regulations (27%) • Educating health care providers about statutory/ regulatory requirements (25%)

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Glasman et al. (2010) (29)	United States	What factors influence individuals' intentions to seek/accept HIV testing?	Survey	Heterosexual men of Mexican decent	Less likely to seek testing if: <ul style="list-style-type: none"> Negative outcomes are expected, such as stigma, fatalism (OR=0.40)
Bogart et al. (2010) (18)	United States	What are barriers to providing rapid HIV testing?	Survey	Laboratory and department staff from hospitals Staff from community clinics and community-based organizations	For labs: <ul style="list-style-type: none"> Difficulty in learning procedures, state/ federal regulations Staff not sufficiently trained Not enough staff Possibility of false positives For hospital departments: <ul style="list-style-type: none"> Too many state/federal regulations Difficult to integrate counselling with other services Difficult to fit counselling into one session Not enough staff Difficulty explaining rapid test to patients with poor language abilities For clinics/community-based organizations: <ul style="list-style-type: none"> Lack of resources/space to implement rapid testing program Not enough staff Regulations difficult to understand Staff unsure how to link patients to care when tests are positive
White et al. (2014) (9)	United States	What are perceptions of barriers and facilitators to implementing routine HIV testing according to primary care physicians?	Interview	Primary care physicians	For patients: <ul style="list-style-type: none"> Low HIV risk perception Fear of stigma HIV test refusal For providers: <ul style="list-style-type: none"> HIV/AIDS stigma Socially conservative communities Lack of confidentiality Rural geography Time constraints and competing clinical priorities Lack of universal reimbursement
Schwartz, Block & Schafer (2014) (6)	United States	What are factors that led to, or are associated with, late diagnosis?	Interview	Individuals who received a late diagnosis of HIV (defined as having developed AIDS within 12 months of HIV diagnosis)	Recurrent themes in interviews: <ul style="list-style-type: none"> Lack of perception of risk for HIV Missed opportunities for testing while receiving care for illness Lack of offer from physician due to patients not fitting traditional risk category or because they did not disclose their risk factors Testing recommended but not pursued either due to financial reasons (e.g., no insurance) or due to fear of results
Brennan et al. (2013) (10)	United States	What are barriers and facilitators to adoption of universal HIV screening in a low-prevalence setting?	Interview	Internal medicine residents	Physicians perceived discussions about HIV testing as challenging due to: <ul style="list-style-type: none"> Stigma surrounding HIV Patient perception of low risk

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Sison et al. (2013) (11)	United States	What are physicians' attitudes and practices regarding HIV testing and linkage to care?	Interview	Primary care physicians and infectious disease specialists	For patients: <ul style="list-style-type: none"> • Fear of stigma • Lack of HIV care providers • Long distance to travel for treatment/care services For providers: <ul style="list-style-type: none"> • Lack of reimbursement • Lack of knowledge regarding state laws on consent • Perception that patients perceive themselves as low risk • Routine testing not offered by most providers
Hyden, Allegrante & Cohall (2013) (30)	United States	What potential barriers might adolescents face when seeking HIV testing?	Interview	HIV testing site representatives	<ul style="list-style-type: none"> • 12% of contacted agencies offered testing outside of 8:30 to 17:00, Monday through Friday • 23% offered testing exclusively between 9:00 and 15:00 on weekdays while most adolescents are in school • 17% were incorrect, unclear, or did not know if a parent's permission was required for a 15-year-old to be tested • 14% answered incorrectly or did not know when asked whether parents could find out an adolescent's test result
Hudson, Heilemann & Rodriguez (2012) (17)	United States	What are primary care providers' perspectives on, and experiences of, facilitators and barriers to offering voluntary HIV counselling and testing to all patients aged 13 to 64 as part of annual screening?	Interview	Primary care providers (defined as family practice, internal medicine or pediatrics)	<ul style="list-style-type: none"> • Feeling that patients will lose trust, feel stigmatized and coerced into testing • Time constraints with respect to consent and counselling procedures • Fears about ability to deal with positive results • Assumptions about need for testing based on age or marital status
Mills et al. (2011) (8)	United States	What were barriers to an HIV-positive individual's initial test?	Interview	HIV-positive individuals	Commonly selected: <ul style="list-style-type: none"> • Lack of perception of risk (69%) • Thought their behaviours kept them safe from getting HIV (52%) • No one offered them a test (42%) • Fear of positive test (23%) • Worried about confidentiality (17%) • Afraid they might lose friends or family if someone found out they tested positive (12%)
Johnson et al. (2011) (19)	United States	What are barriers to testing for health care providers?	Interview	Senior staff at community health centres	<ul style="list-style-type: none"> • Lack of time • Lack of resources (financial and staffing) • Discomfort with subject (asking sexual questions, eliciting patient fear)

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Schwarcz et al. (2011) (7)	United States	What are the factors that led to late testing/diagnosis of HIV?	Interview	Individuals who developed AIDS within 12 months of HIV diagnosis (88.4% male)	<ul style="list-style-type: none"> • Fear (e.g., of positive result, social repercussions, lack of support) (68%) • Lack of risk perception (34%) • Lack of health care insurance
Simmons et al. (2011) (13)	United States	What are barriers and facilitators of routine HIV testing?	Interview	Health care providers	<ul style="list-style-type: none"> • Discomfort initiating conversations with patients about HIV • Absence of patient-friendly literature • Incorrect assumptions about patient risk • Lack of HIV-specific training • Rapid pace of primary care office visits • Financial burden of increased HIV testing • Patient fear of test results • Patient concerns about confidentiality • Lack of availability of treatment for positive cases
Myers, Koester & Dufour (2011) (21)	United States	What are barriers to implementing and/or expanding HIV testing? What are strategies to overcome these barriers?	Interview	Program funding and managing administrators, and medical directors/physicians providing care in clinics	<p>For providers:</p> <ul style="list-style-type: none"> • Provider inexperience • Perceived patient reluctance to do test • Time requirements for obtaining consent and counselling • Competing priorities during visit • Uncertainty about added value of testing all patients
Trepka et al. (2014) (31)	United States	What are factors associated with late diagnosis in rural and urban dwelling individuals?	Chart review	Individuals who received a late HIV diagnosis (developed AIDS within three months of diagnosis)	Living in rural area more commonly associated with late diagnosis after controlling for age, sex, race/ethnicity, HIV transmission mode, country of birth, and diagnosis year (adjusted OR=1.39)

Appendix 2: Summary of studies on facilitators to HIV testing

Author (year)	Country	Question(s)/ study objective	Method	Population	Key findings/ facilitators identified
Lorenc et al. (2011) (25)	England	What is the qualitative evidence related to views and attitudes of MSM concerning HIV testing?	Systematic review	Men who have Sex with Men (MSM)	Motives for testing include: <ul style="list-style-type: none"> • Uncertainty of unknown HIV status • Sense of responsibility towards oneself or one's partner
Yazdanpanah et al. (2010) (34)	24 countries in Europe and Russia	Barriers to earlier testing: Why do patients present late? How to overcome barriers?	Review	Several studies with variety of populations	For patients: <ul style="list-style-type: none"> • Perception of risk • Perception of benefits from testing
Adam et al. (2014) (37)	Australia	What social-cognitive factors are associated with stronger HIV testing routines?	Survey	HIV-negative MSM	Correlates of HIV testing in multivariate analysis: <ul style="list-style-type: none"> • Age • HIV knowledge • Perceived "pros" of testing • Attitudes regarding HIV testing
Knussen, Flowers & McDaid (2014) (36)	Scotland	Which factors differ between individuals who have tested in the past year, who have tested more than one year ago, and who have never tested for HIV?	Survey	Convenience sample of Scottish MSM	Individuals who reported testing in the past year had: <ul style="list-style-type: none"> • Less fear of positive results • Greater rated norm of testing And were more likely to have: <ul style="list-style-type: none"> • At least one anal sex partner during the year (condom used) • Two to ten sexual partners (as opposed to none or one)
Deblonde et al. (2014) (4)	Belgium, Estonia, Finland, Portugal	What are reasons for HIV testing, or reasons for not having been tested prior to HIV diagnosis?	Survey	Recently diagnosed HIV-positive patients	Reasons prompting a test: <ul style="list-style-type: none"> • Worries about risk exposure • Checking one's status • Feeling ill
Sawlesh-warkar et al. (2011) (32)	Australia	What factors are associated with HIV testing by general practitioners?	Survey	General practitioners	Predictors of HIV testing included: <ul style="list-style-type: none"> • Management of a "risk factor" (OR=19.4) • Testing as part of screening (OR=10.6) • Younger general practitioner age (under 35 more likely to test than 55+, OR=1.74) • Practice in a metropolitan area (OR=1.4) • Patient age, gender (male > female, OR=3.0) • Patient is new to that practice (OR=2.1) • Being Indigenous (OR=1.7)
Korthius et al. (2011) (23)	United States	Agree/disagree with commonly reported barriers?	Survey	Internal medicine specialists	Commonly selected facilitators: <ul style="list-style-type: none"> • Increased compensation for HIV counselling (56%) • Having literature to give to patients (53%) • More info on local consent requirements

Author (year)	Country	Question(s)/ study objective	Method	Population	Key findings/ facilitators identified
Haines et al. (2011) (33)	United States	What are adolescents' attitudes and preferences towards emergency department-based HIV testing, future plans for testing, and counselling?	Survey	Convenience sample of adolescents (aged 14 to 21) receiving opt-in rapid HIV testing in an emergency department	<ul style="list-style-type: none"> 80% were more likely to get a test if a rapid version was available 67% were more likely to accept testing if it was offered, rather than having to request it 40% strongly agreed in regard to the preference for a same-sex counsellor
Glasman et al. (2010) (29)	United States	What factors influence individuals' intentions to seek and/or accept free HIV testing?	Survey	Heterosexual men of Mexican decent	<p>More likely to seek/accept testing if:</p> <ul style="list-style-type: none"> They associate testing with positive outcomes (e.g., setting positive example, protecting family, peace of mind) (OR=4.77 for seeking; OR=7.60 for accepting) They received HIV prevention advice from significant others (OR=2.96 for seeking)
Stefan et al. (2010) (16)	United States	What are the correlates of self-reported HIV testing?	Survey	Adult patients in academic internal medicine clinics	<p>Univariate correlates of HIV testing:</p> <ul style="list-style-type: none"> Provider recommendation Patient request Knowledge about HIV Being comfortable with doctor African American race Using street drugs Agreement with CDC recommendations <p>Multivariate regression model predictors of HIV testing:</p> <ul style="list-style-type: none"> Patient request for testing (OR=103.3) Patient knowledge about HIV (OR=1.30)
Brennan et al. (2013) (10)	United States	What are barriers and facilitators to adoption of universal HIV screening in a low-prevalence setting?	Interview	Internal medicine residents	Majority of patients were especially receptive to HIV screening when normalized and when an expert authority was referenced (e.g., CDC)
Sison et al. (2013) (11)	United States	What are physicians' attitudes and practices regarding HIV testing and linkage to care?	Interview	Primary care physicians and infectious disease specialists	<p>For providers:</p> <ul style="list-style-type: none"> Nearly all providers explained they would be willing to offer routine testing if they could bill for the service
Hudson, Heilemann & Rodriguez (2012) (17)	United States	What are primary care providers' perspectives on, and experiences of, facilitators and barriers to offering voluntary HIV counselling and testing to all patients aged 13 to as part of annual screening?	Interview	Primary care providers (defined as family practice, internal medicine, or pediatrics)	<ul style="list-style-type: none"> Normalizing HIV testing ("HIV should be no different than screening for glucose level, cholesterol level, or blood pressure") Resources and training to improve provider knowledge and comfort with current guidelines Patient education on HIV testing Personal style and communication (e.g., taking time to educate and motivate patients)

Author (year)	Country/region	Question(s)/study objective	Method	Population	Key findings/barriers identified
Simmons et al. (2011) (13)	United States	What are barriers and facilitators of routine HIV testing?	Interview	Health care providers	<ul style="list-style-type: none"> • Patient interest and willingness • Assurances of confidentiality • Availability of more HIV-specific literature and training in clinics • Providers being more proactive in offering testing
Myers, Koester & Dufour (2011) (21)	United States	What are barriers to implementing and/or expanding HIV testing? What are strategies to overcoming these barriers?	Interview	Program funding and managing administrators, and medical directors/physicians providing care in clinics	<ul style="list-style-type: none"> • Lifting of lengthy mandatory consent/counselling requirements • Making routine testing a priority • Correcting assumptions among providers that testing is universally available