Rapid point-of-care HIV testing: A review of the evidence

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Testing is the first and most crucial step in the HIV treatment cascade. Without regular HIV testing, especially among people who may be at ongoing high risk for infection, there is no other way to know a person’s HIV status. A rapid point-of-care HIV test is a testing technology that allows people to be tested for HIV and know their HIV status during the same visit, usually in less than an hour.

What are the findings of the evidence review?

The available scientific literature was reviewed to determine if rapid point-of-care testing improves outcomes related to testing. The evidence review demonstrated that:

1. **Rapid testing is feasible**: Evidence suggests that rapid testing is feasible in a variety of venues and can be performed by non-healthcare providers (strength of the evidence is moderate).
2. **People prefer rapid testing**: Evidence suggests that between 40% and 90% of people prefer rapid testing (strength of the evidence is moderate). Preference rates varied by venue and risk group.
3. **People will accept rapid testing**: Evidence suggests between 45% and 95% of people will accept a rapid test when one is offered (strength of the evidence is strong). Uptake varied by venue and risk group.
4. **People choose rapid testing over standard testing**: Evidence suggests between 87% and 97% of people will choose a rapid test over a standard test (strength of the evidence is strong).
5. **Rapid testing reaches people who have never been tested**: Evidence suggests that between 10% and 52% of people taking a rapid test are first-time testers (strength of the evidence is moderate). This varied by venue and risk group.
6. **Rapid testing reaches people who have not tested recently**: Evidence suggests that between 29% and 56% of people taking a rapid test had not had a recent HIV test (strength of the evidence is moderate). This varied by risk group.
7. **People tested with a rapid test receive their results**: Evidence suggests that between 27% and 100% of people receive their results when taking a rapid test (strength of the evidence is strong). This varied by venue and risk group.
8. **Rates of confirmatory testing are high**: Evidence suggests that between 70% and 100% of people who test positive with a rapid test receive a confirmatory HIV test (strength of the evidence is moderate).
9. **Rapid testing reaches people who are living with HIV but are undiagnosed**: Evidence suggests that up to 20% of people who take a rapid test receive a positive result (strength of the evidence is strong). This varies by venue and risk group.
10. **People who test positive with a rapid test are successfully linked to care**: Evidence suggests that people who test positive with a rapid test are linked to care between 22% and 100% of the time (strength of the evidence is moderate). This depended on testing venue and risk group.
11. **People are satisfied with rapid testing**: Moderate evidence suggests that between 70% and 99% of people tested with a rapid test are satisfied with their testing experience. Satisfaction depended on testing
Jurisdictions considering a rapid point-of-care testing program may want to learn from a jurisdiction that has already implemented one. Currently, Canada has a number of rapid point-of-care testing programs in many provinces, including: one of Ontario’s anonymous HIV testing sites and a program that provides HIV screening with a rapid test in dental clinics. Recent pilot programs have also offered rapid testing by peer testers and in a prison setting.

What is this review about?

A rapid point-of-care HIV test is a testing technology that allows people to be tested for HIV and know their HIV status during the same visit, usually in less than an hour.

The INSTI HIV-1/HIV-2 Antibody Test is the only rapid point-of-care test approved for use in Canada and can only be used by testers who also provide pre- and post-test counselling. Rapid HIV testing is available in different ways in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario and Quebec. Rapid testing is not available in New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, and in the territories.

This evidence review will:

1. define rapid point-of-care testing;
2. demonstrate rapid testing’s feasibility and acceptability;
3. demonstrate that rapid testing reaches people who have never been tested or who haven’t tested frequently;
4. demonstrate that rapid testing has a strong track record in returning results to the people who are tested;
5. demonstrate that rapid testing reaches people who are living with HIV but are undiagnosed;
6. demonstrate that people who test positive with a rapid test are successfully linked to care; and
7. describe satisfaction with rapid testing and review the reasons for preference for rapid testing.

Why should people be tested for HIV?

Testing is the first and most crucial step in the HIV treatment cascade. Without regular HIV testing, especially among people who may be at ongoing high risk for infection, there is no other way to know a person’s HIV status.

We know that not everyone is being reached with current approaches to testing. An estimated 25% of people living with HIV in Canada were undiagnosed in 2011.\(^1\) We also know that some people are not being tested. Forty-seven percent of Canadians have never been tested for HIV.\(^2\) Although the rates of life-time testing are higher among groups at ongoing high risk, we know, for example, that 15%\(^3\) of people who inject drugs and 25%\(^4\) of gay men and other men who have sex with men (MSM) have not tested for HIV in the last two years.

People who are aware that they are HIV positive can access care and support services and initiate treatment when they are ready. Advances in treatment mean that people with HIV can live almost as long and as healthily as people who are uninfected.\(^5\) \(^6\) \(^7\) \(^8\) \(^9\) To get the most out of treatment, research suggests antiretroviral drugs may need to be started soon after HIV infection.\(^5\) \(^10\) Currently, however, many people in Canada are not learning about their HIV status until late in their disease, when they start to develop symptoms or opportunistic infections.\(^11\) \(^12\) At this point, antiretroviral treatment can still help to improve their health but not as effectively as when treatment is started earlier.\(^12\)

Knowledge of HIV status is also important for the prevention of HIV transmission. HIV testing is a core component of some HIV prevention strategies, including pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP).

In addition, once people know they are HIV positive, they generally take measures to reduce their risk of HIV transmission.\(^13\) Once diagnosed, treatment can be initiated and this can further help reduce the risk of HIV transmission.\(^14\)

For those who test negative for HIV, testing represents an important opportunity to provide HIV prevention information and counselling.
In 2013, the Public Health Agency of Canada (PHAC) released an HIV Screening and Testing Guide that “seeks to reduce the number of undiagnosed HIV infections in Canada by offering a framework for care providers to explore options that will enhance their ability to provide HIV testing, as well as to better tailor their testing approaches to meet the specific needs of their practice and clients.” The rapid HIV test is one of the tools that PHAC suggests can be used to increase HIV testing opportunities to a wider range of clients.

**What is rapid point-of-care HIV testing?**

Rapid point-of-care HIV testing is a method of testing that allows clients to be tested for HIV and receive their results during the same visit. Rapid tests can be performed anywhere, unlike standard tests which rely on blood samples that are analyzed in a lab. A rapid test looks for antibodies to HIV in the blood, rather than looking for the virus itself. It can take up to three months from the time of an exposure to HIV for the test to detect antibodies in a person’s blood. This period is called the window period. However, most people develop enough HIV antibodies for a rapid test to be accurate before the end of the window period. A person can be tested earlier and should not wait for the end of the window period to be tested. However, if a person tests negative within the window period they should be retested at the end of the three-month window period.

One of the key features of rapid tests is that they can return results within minutes. Programs that provide rapid testing to clients offer pre- and post-testing counselling along with the test, which means that the appointment may last up to 60 minutes.

Rapid tests are screening tests. This means that some results cannot be considered definitive. For example, if a test is negative, also called non-reactive, and the client is potentially in the window period, another blood-based test may be needed to confirm the result. In addition, if the rapid test is positive, called a preliminary positive or reactive result, the client is encouraged to get confirmatory testing. Confirmatory tests are done through a blood sample taken after the reactive result has been given to the client. The blood sample is sent to a lab, with results returned in one to two weeks.

**What types of rapid tests exist?**

In Canada, the only rapid test licenced for use is the INSTI HIV-1/HIV-2 Antibody Test. This is a test that uses a finger prick to collect blood from the soft skin of the finger to test for antibodies to HIV. There are a number of other types of finger-prick tests that have been licensed around the world but not in Canada.

Another type of rapid test is the oral test. Oral tests use a swab to test the saliva from a person’s mouth. The most commonly used oral test is Oraquick, which has been licensed in the United States for use by trained professionals and for home-based use. No oral tests have been licensed for use in Canada.

**How accurate is the rapid test?**

The accuracy of a rapid test is measured by its sensitivity and specificity. Sensitivity is the percentage of results that will be correctly positive when HIV is actually present. The INSTI HIV-1/HIV-2 Antibody Test’s sensitivity is 99.6%. Specificity is the percentage of results that will be correctly negative when HIV is not present. The INSTI HIV-1/HIV-2 Antibody Test’s specificity is 99.3%. These two numbers tell us that this test doesn’t give very many incorrect results. It is very good at accurately identifying people who have HIV and those who don’t.

**Does rapid point-of-care testing work?**

The available scientific literature was reviewed to determine if rapid point-of-care testing improves outcomes related to testing. Details on the methodology we used can be found at the end of this article. Evidence presented in this review comes from studies that used oral and/or finger-prick tests. Even though oral tests are not available in Canada, we present research that used oral tests where the evidence shows that the rapid nature of the test is more important than the fact that the test uses an oral swab. It does not cover evidence related to self-testing.

The available scientific evidence to support each outcome was assessed and assigned an evidence rating. Although the evidence rating is flexible (to a certain degree), ratings were based on the following criteria:
1. **Strong Evidence:** At least one systematic review or a large body of randomized control trials and quasi-experimental studies (and observational research) supports the ability of the intervention to impact on the outcome.

2. **Moderate Evidence:** Limited randomized control trials and/or quasi-experimental studies (with the support of observational research) support the ability of the intervention to impact the outcome.

3. **Limited Evidence:** Observational research supports the ability of the intervention to impact the outcome.

4. **No Evidence:** No published research exists to support the ability of the intervention to impact the outcome.

The strength of the evidence is based on the quantity and quality of the evidence (**type of study design**) and not the size of the outcome.

**Is rapid testing feasible?**

A feasibility study measures whether something can be done easily and conveniently. Feasibility can be measured in a number of ways. There is moderate evidence to suggest that rapid testing is feasible in a variety of venues and that it is feasible for non-healthcare providers to administer these tests correctly.

Evidence from two quasi-experimental and two cross-sectional studies demonstrates that HIV rapid testing is feasible in a variety of venues, including bathhouses, jails, sexually transmitted infections (STI) clinics, and hospitals.

Three studies looked at whether rapid tests could be performed by non-healthcare providers. One cross-sectional study found that trained workers completed all steps in the testing process 90% of the time. A quasi-experimental study, which used trained non-healthcare providers to provide rapid testing, found that almost all counsellors felt comfortable performing the test after 12 weeks of use. One quasi-experimental study also demonstrated that untrained operators could perform the INSTI HIV-1/HIV 2 Antibody Test and interpret the results accurately when following the package insert instructions.

**Testing and diagnosis**

Testing is the first and most crucial step in the HIV treatment cascade. For a person living with HIV to achieve an undetectable viral load, which improves overall health and reduces the likelihood of transmission to others, they need access to a continuum of services: HIV testing and diagnosis; linkage to appropriate medical care (and other health services); support while in care; access to antiretroviral treatment if and when they are ready; and support while on treatment.

An HIV test is the only way a person can know they have HIV. If someone tests positive, the person can be linked to specialized health and psychosocial supports. When someone tests negative, it provides a good opportunity to have a conversation that reinforces risk reduction and safer sex strategies and to link them to other services when appropriate.

The acceptability of HIV tests can be measured in three ways:

1. preference – where a client indicates, on a survey, that they prefer rapid testing over other forms of testing;
2. uptake – where a client accepts a rapid test when it is offered; and
3. choice – when a client opts to receive a rapid test over a standard test.

**Preference**

There is moderate evidence from one randomized controlled trial, one quasi-experimental program, and four cross-sectional studies that clients prefer rapid testing over standard testing. Between 40% and 90% of clients stated a preference for rapid testing. Preference depended on the venue where testing was offered and the risk group to which a client belonged.

Preference for rapid testing was measured in a variety of venues. A cross-sectional study among clients in an STI clinic found a 90% preference rate for rapid testing over standard testing. In a cross-sectional study, 88% of
prisoners surveyed said they prefer rapid testing over standard testing. A cross-sectional study among women in a primary care clinic found that 81% prefer rapid testing over standard testing. At an STI clinic, 40% of clients expressed a preference for rapid testing over standard testing.

Research has specifically investigated preference for rapid testing among MSM, who are one of the key populations at ongoing high risk for HIV infection. This population could benefit from increased access to low-barrier testing. One randomized controlled trial among MSM at an STI clinic found that 88% of clients preferred a rapid test over standard blood testing. In another study, among young MSM of colour recruited at social events, 64% said they preferred rapid testing.

**Uptake**

When someone is offered a rapid test they can either accept the test or decline it. If someone accepts the test, this is considered uptake.

There is strong evidence from two systematic reviews, one randomized controlled trial, 11 quasi-experimental studies, and one cross-sectional study that clients will accept a rapid test when offered. Uptake of rapid tests ranged from 45% to 95%. Uptake depended on the venue where testing was offered and the risk group to which the client belonged.

The majority of studies looked at uptake in hospitals, in the emergency room, and during labour and delivery.

Uptake in emergency departments ranged from 53% to 91%. One study looked at uptake among youth in emergency departments specifically. A quasi-experimental study found that 87% of youth accepted a rapid test when it was offered in this venue. This finding is supported by a systematic review that found that the highest uptake rates for rapid testing among youth (ranging from 83% to 93%) were in emergency departments.

Uptake rates are also high among women in active labour. A systematic review found that between 83% and 97% of pregnant women accept rapid testing. In addition two quasi-experimental studies found uptake rates of 84% and 86%. Research on uptake rates has also taken place in other venues and among other populations. Uptake rates have been measured among African and Caribbean patients in family practice, among high-risk populations in an outreach setting, among prisoners in a prison setting, among Black university students on campus, and among clients at an STI clinic.

Uptake rates measured in one randomized controlled trial, one quasi-experimental study, and a cross-sectional study found uptake rates were highest among prisoners (95%), and in high-risk populations reached through a mobile site (95%) and at an STI clinic (77%). High uptake rates among these populations may be due to increased awareness of their risk for HIV and a willingness to test.

Lower uptake rates were observed in some populations. Uptake rates measured in two quasi-experimental studies were lowest among African and Caribbean clients in family practice (45%) and Black university students tested on campus (50%). In a quasi-experimental study, uptake rates were also low among clients of sex workers (45–50%). Lower uptake rates among these populations may stem from the fact that they were not anticipating the offer of a test or do not perceive themselves to be at risk for HIV.

**Do clients choose rapid tests over standard tests?**

Some studies have looked at whether clients will choose rapid tests over standard tests within a true testing situation. Choice is different from uptake because choice involves a decision about which test to use. There is no choice to be made for uptake because only the rapid test is offered. Choice is also different from preference because the option of choosing between a rapid test and a standard one is not theoretical as it is when clients state their preferences on surveys.
There is strong evidence from one systematic review, three quasi-experimental studies, and one case-control study conducted in STI clinics or HIV programs that between 87% and 97% of clients will choose a rapid test over a standard blood test when offered a choice.

A systematic review also found a three-fold increase in uptake of HIV testing when rapid testing was compared to standard testing in randomized controlled trials.

However, there is evidence from one study that some clients may prefer standard testing over rapid testing. One cross-sectional study conducted in Baltimore’s STI clinics found that clients chose a standard test 56% of the time when offered a choice between a rapid and standard test.

**Does rapid testing reach people who have never been tested for HIV?**

It is important that HIV testing strategies use a whole range of testing approaches to bring people into testing. This may reduce the number of people who have never tested for HIV and increase the number of HIV-positive people who are aware of their status. Rapid testing is a critical technology for engaging clients in regular HIV testing.

There is moderate evidence from six quasi-experimental studies and three cross-sectional studies that rapid testing programs reach people who have never been tested before. Depending on venue where a test was performed and the risk group to which the client belonged, between 10% and 52% of clients tested with rapid tests are first-time testers.

A quasi-experimental study that looked at the effects of a city-wide campaign to increase rapid testing rates found that 32% of the people who tested during the campaign had never tested before. Importantly, the evidence from the study showed that 15% of people who were newly diagnosed with HIV during the campaign were first-time testers. This suggests that rapid testing attracts people who had never been tested for HIV despite being at risk for HIV.

Research also shows that a significant proportion of people who seek rapid testing in STI clinics and in emergency departments have never been tested before. These venues may be an important testing location for patients who do not want to be tested for HIV by their family doctors. In STI clinics, including outreach clinics, three quasi-experimental studies found that between 30% and 52% of clients testing for HIV with a rapid test had never been tested before. In addition, one cross-sectional study found that 52% of patients tested in the emergency department with a rapid test had never been tested before.

There is also population-based evidence to suggest that rapid testing reaches first-time testers in specific populations. The research shows that many women and heterosexual men who seek rapid testing are first-time testers. Two cross-sectional studies found that more than 50% of both women and heterosexual men were first-time testers. Rapid testing is also reaching first-time testers among MSM. One quasi-experimental study found that 10% of MSM seeking rapid testing had never tested before. One cross-sectional study found that 24% of MSM who sought rapid testing had never been tested before. Finally, rapid testing is also reaching first-time testers among transgender populations. A quasi-experimental study among trans people found that 8.1% of trans men who used the rapid testing site had never been tested for HIV.

**Does rapid testing reach people who haven’t tested regularly?**

There is evidence to suggest that most people who are at ongoing high risk for HIV infection have been tested at least once. However, rates of recent testing in these high-risk groups are lower. Regular HIV testing is important for people at ongoing high risk for HIV infection. PHAC recommends annual testing (at a minimum) for people at ongoing high risk for HIV.

There is moderate evidence from four quasi-experimental studies that rapid testing reaches people who have not tested regularly. Integrating rapid testing into existing testing strategies may be an effective means of
increasing regular testing. Between 29% and 56% of clients tested with a rapid test had not tested regularly for HIV. This varied by risk group.

Critically, rapid testing programs are reaching key populations at ongoing high risk for HIV infection, such as trans women and MSM, who have not been tested recently. One quasi-experimental study found that among trans women accessing rapid testing 46% had not tested in the last year. Another quasi-experimental study among MSM found that 29% of those who had accessed rapid testing had not tested in the last two years. There is evidence from one quasi-experimental study, which provided outreach testing to high-risk groups, that 43% had not been tested in the last year. The groups tested in the study included racialized communities, people with multiple sex partners and MSM. A city-wide rapid testing campaign found that 56% of people who accessed rapid testing had not been tested in the last year.

Receipt of results

One of the barriers to getting HIV test results when using a standard test is that clients must return for their results in one to two weeks. If clients do not return, they do not receive their test results. One of the advantages of rapid tests is that results are available during the same visit, improving the likelihood that clients will receive their results. There is strong evidence from one systematic review, one meta-analysis, one literature review, four randomized controlled trials, eight quasi-experimental studies, one case-control study, and two cross-sectional studies that clients who are tested using a rapid test are very likely to receive their test results. Between 27% and 100% of clients received their results when they had a rapid test, depending on the venue in which they were tested and the population.

A systematic review found that participants who received rapid testing were almost two-fold more likely to receive their results than participants who received standard testing. Many studies have compared the proportion of testers who received their results through rapid testing to standard testing including a meta-analysis, two randomized-controlled trials, two quasi-experimental studies, and a case-control study. The meta-analysis found that clients testing with a rapid test are 1.5 to 2.2-times more likely to receive their test results than clients who have a standard test.

The remaining studies investigated whether more clients received their rapid test results compared to standard test results within hospitals, an anonymous HIV testing program, and among veterans. The evidence includes a randomized-controlled trial, which found that 95% of patients in a hospital received their rapid test results compared to 43% of patients who had a standard test. A quasi-experimental study among youth in a hospital found that 91% of patients received their rapid test results compared to 47% who had a standard test. In addition, a case-control study of patients in a hospital found that among patients who tested positive for HIV, 100% who had a rapid test were given their test results before being discharged from the hospital, compared to 84% with a standard test.

One study looked at the return of results of rapid tests versus standard tests in an anonymous HIV testing program. The quasi-experimental study found that 100% of clients received their rapid test results compared to 86% with a standard test.

Finally, a randomized-controlled trial investigated the receipt of results of rapid versus standard tests among veterans. It found that 80% received their rapid test results compared to 15% with a standard test.

In addition to studies that compared the rates at which clients received results between rapid and standard tests, there is research that has reported rates of receipt of results for rapid testing with no comparison group or without comparison to standard tests.

This research supports the evidence presented from studies with comparison groups and also provides evidence
from other venues and for other populations that rapid test clients are very likely to receive their results. This research includes one literature review,\textsuperscript{56} two randomized-controlled trials,\textsuperscript{20,59} six quasi-experimental studies,\textsuperscript{34,61,62,63,64,65} and two cross-sectional studies.\textsuperscript{67,68}

There is evidence from a literature review that found that the percentage of clients that received their rapid test results ranged between 27% and 100%.\textsuperscript{56} The lower end of the range was found in a quasi-experimental study that used an older testing technology that took longer to yield results and was conducted in an emergency department, where wait times for results tend to be longer than in other venues.

The available research provides evidence that the percentage of clients who receive their results is very high in different venues, including:

- STI clinics: 99%\textsuperscript{62,63}
- Mobile outreach settings: 100%\textsuperscript{67}
- Prisons: 100%\textsuperscript{20}
- Bathhouses: 99-100%\textsuperscript{64,65}
- Emergency departments: 89%\textsuperscript{68}

The available research also provides evidence that the percentage of clients who receive their results is very high in different populations, including:

- Youth – 96%\textsuperscript{61}
- Probationers – 93-100%;\textsuperscript{59}
- Black university students – 100%\textsuperscript{34}

**Confirmatory testing**

Although approved rapid HIV tests have high sensitivity and specificity, which means they are accurate most of the time, negative tests during the window period following a high-risk activity, and any reactive result should be confirmed with a standard HIV blood test.\textsuperscript{15} This test is called a confirmatory test. A reactive result from a rapid test is just the first step in an HIV diagnosis.

There is moderate evidence from one quasi-experimental study\textsuperscript{49} and two cross-sectional studies\textsuperscript{69,70} that people who receive a reactive result on a rapid test seek confirmatory testing. This research suggests that 70-100% of people receive confirmatory testing when their rapid tests are reactive.\textsuperscript{48,69,70}

**Do rapid testing programs find people who are living with HIV and don't know it?**

HIV testing programs – regardless of whether they use rapid or standard tests – are important because they offer clients the opportunity to learn their HIV status.

One way to measure whether rapid test programs are reaching people who don’t know they are HIV positive is through positivity rates. The positivity rate of a rapid testing program is determined by the number of people who are newly diagnosed with HIV divided by the overall number of people tested by the program.

There is strong evidence from two randomized control trials,\textsuperscript{20,71} 27 quasi-experimental studies,\textsuperscript{17,18,22,25,32,33,34,35,36,37,38,39,40,41,42,45,46,49,50,52,62,63,65,72,73,74,75} and nine cross-sectional studies\textsuperscript{19,53,54,67,69,70,76,77,78} that rapid testing programs find people who are living with HIV but are unaware of their infection. Positivity rates ranged between 0% and 20% depending on the venue in which clients were tested and their risk group.

Positivity rates range by venue

- STI clinics: 0.01–3.9%\textsuperscript{18,45,46,62,63,78}
- dedicated HIV testing programs: 0.8–20%\textsuperscript{22,25,69,77}
• outreach venues, including mobile sites: 0.4–15.4% 35, 36, 49, 54, 67, 70, 78
• emergency department: 0–3.2% 19, 37, 38, 39, 41, 63, 71, 72
• primary care clinics: 0.02–2.1% 40, 53
• detention: 0–0.9% 20, 63
• dental clinic: 0.53% 76

The highest positivity rates by setting included venues that attract people who may be at higher risk for HIV infection, including STI clinics, dedicated HIV testing programs and outreach venues. Sites like emergency rooms and primary care clinics also found people who were unaware of their HIV infection, but to a lesser extent. These sites may be important venues for testing of people who do not believe they are at high risk for HIV but who may, nevertheless, be in need of testing.

Positivity rates also vary by population:

• trans women: 12% 50
• MSM: 2–5.8% 17, 51, 64, 73, 74
• women in labour: 0.007–0.7% 32, 33
• clients of sex workers: 0% 42, 73
• Black university students: 0% 43

The highest positivity rates by population were among trans women and MSM, both known key populations at ongoing risk for HIV infection.

**Does rapid testing find people with HIV earlier in their infection?**

Rapid tests have the potential to diagnose people earlier in the course of their HIV infection because rapid testing programs tend to have fewer barriers. This may lead to fewer clients delaying testing. We know earlier entry into care can have significant positive health impacts on people living with HIV.

There is moderate evidence from one randomized-controlled trial, 79 two quasi-experimental studies, 52, 65 and three cross-sectional studies 21 that rapid tests find people early in the course of their HIV infection.

Two quasi-experimental studies found that rapid testing programs identify MSM in the acute or early stage of infection, as measured by pooled HIV testing or through a serological testing algorithm for recent HIV seroconversion. These two studies found that between 33% and 40% of MSM who tested HIV positive were in the early stages of infection. 52, 65

Two research studies also showed that rapid testing finds people earlier in the course of their infection, but not necessarily in the earliest phases. 21, 79 A randomized-control trial at 40 primary care clinics compared the CD4+ counts of people who were tested with a rapid test to those who received usual care. This study found that the median CD4+ count among those tested with the rapid test was 369 cells/microlitre compared to 194/microlitre for the usual care group. 79 Higher CD4+ counts suggest a more robust immune system, and more recent infection. In addition, a cross-sectional study conducted at a testing program for MSM found that men who took a rapid test had a median CD4+ count of 550 cells/mm³, which was higher than in traditional testing programs. 21

**Are people who test positive through rapid testing successfully linked to HIV care?**

Once diagnosed, a person living with HIV should ideally see an HIV primary care provider so that their health can be monitored and they can seek any psychosocial supports they may need. Early entry into care and treatment can have significant positive health outcomes for people living with HIV.

There are a number of ways successful linkage to care is defined. Definitions can include client acceptance of a referral, attendance at a first HIV-specific appointment, and attending a visit with a specialist in the last year.

There is moderate evidence from one literature review, 56 eight quasi-experimental studies, 18, 36, 37, 49, 62, 63, 65, 80 and
eight cross-sectional studies\textsuperscript{19, 21, 68, 70, 76, 81, 82, 83} that rapid test clients are successfully linked to care. Between 22% and 100% of clients were linked to care after testing positive with a rapid test. This depended on where they were tested and their risk group.

A literature review found that rates of linkage to care for rapid test clients range from 47% to 100%.\textsuperscript{56} A variety of studies support this finding.

Rates of linkage to care vary depending on the venue in which they were tested and diagnosed.

- Hospitals: 80–100%\textsuperscript{19, 37, 63, 68, 81}
- STI clinics and HIV testing programs: 86–100%\textsuperscript{18, 62, 63, 80, 82, 83}
- Community-based venues: 80%\textsuperscript{21}
- Dental clinic: 79%\textsuperscript{76}
- Shelters: 87%\textsuperscript{70}
- Bathhouse: 75%\textsuperscript{65}
- Outreach venues: 64–100%\textsuperscript{36, 49}
- Jails: 22%\textsuperscript{62}

Research has specifically investigated linkage to care for MSM who test positive for HIV through rapid testing. Two quasi-experimental studies\textsuperscript{65, 80} and one cross-sectional study\textsuperscript{21} found that between 75% and 100% were successfully linked to care.

**Client-reported outcomes**

Client satisfaction with rapid testing is important if we want people to continue to test regularly for HIV. There is moderate evidence from one literature review,\textsuperscript{56} one quasi-experimental study\textsuperscript{46} and two cross-sectional studies\textsuperscript{21, 77} that clients are satisfied with the rapid testing experience. Between 70% and 99% of clients were satisfied with their experience. Satisfaction depended on where a client was tested and whether they tested positive or negative.

A review of the literature found that 97% of people seeking a rapid HIV test would recommend the test to others, suggesting they were satisfied with their experience.\textsuperscript{56} Two studies – a quasi-experimental study in an STI clinic and a cross-sectional study at a rapid testing program – found that 99% of clients were satisfied with their experience.\textsuperscript{46, 77}

Satisfaction with the testing experience may be impacted by the results of the HIV test. One study differentiated satisfaction ratings between clients who received a negative result and clients who received a positive result. The study found that 92% of clients who tested negative were satisfied with their experience compared to 70% of clients who tested positive.\textsuperscript{21}

**Why do clients prefer rapid testing?**

Knowing why clients prefer a rapid test over a standard test may improve future uptake of rapid testing. The reasons clients prefer rapid testing over standard testing may also provide some insight into the barriers people experience to HIV testing, and help program planners continue to reduce those barriers.

There is strong evidence from one systematic review,\textsuperscript{31} three quasi-experimental studies\textsuperscript{60, 84, 85} and six cross-sectional studies\textsuperscript{28, 29, 55, 69, 78, 86} that clients prefer rapid testing because of the quick results.

A systematic review found that 90% of rapid testing clients prefer a rapid test because of the faster results.\textsuperscript{31} Choosing a rapid test because of the faster results was cited across populations of people seeking testing. Among MSM, between 85% and 90% liked the same-day results.\textsuperscript{28, 78, 86} For prisoners, 98% also cited faster results as the reason they preferred a rapid test.\textsuperscript{29} One study found that 84% of youth cited rapidity of results as the reason they preferred a rapid test.\textsuperscript{28}
preferred rapid testing. Two quasi-experimental studies and two qualitative studies, which documented the views of clients on HIV testing, found that clients liked getting results quickly.

Two studies found that the reason some clients may prefer rapid tests is because they don’t have to return for results. One study among young MSM of colour found that 2% preferred a rapid test because they thought they might not come back for the results of a standard test. A study among African-American clients of a rapid testing program found that clients liked the rapid test because they did not have to return for their results.

Finally, there is evidence that shows that the rapid return of results lessens anxiety associated with testing. One study among young MSM of colour found that 7% preferred a rapid test because they were too nervous to wait for results. Another study among African-American clients of a rapid testing program found that clients liked the rapid test because the fast results reduced their anxiety and stress.

Is rapid testing expensive?

Each rapid test kit costs more than a conventional HIV test so testing for HIV using a rapid test is more expensive for each test performed. However, research suggests that rapid testing is more cost effective than conventional testing when the number of people who receive their test results is factored into the equation. Since rapid testing returns more results than conventional testing, the overall cost is less per result returned to the client.

Summary Table: Evidence to support rapid testing outcomes

<table>
<thead>
<tr>
<th></th>
<th>Strong</th>
<th>Moderate</th>
<th>Limited</th>
<th>None</th>
<th>Conflicting</th>
<th>Ineffective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client preference</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test uptake</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clients choose rapid over standard tests</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test reaches people who have never tested</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test reaches people who do not test regularly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clients receive results</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clients get confirmatory test</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test positivity rate</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client diagnosis earlier in disease progress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client linkage to care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Client satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
What does this mean for jurisdictions considering a rapid testing program?

There is evidence to suggest that rapid point-of-care testing, in a variety of venues and among various populations, is feasible. The evidence also suggests that non-healthcare providers can perform the test accurately.

Rapid testing can improve rates of HIV testing and diagnosis. This is especially true in hospitals where high uptake rates have been observed in the emergency department, where physicians are ordering a number of diagnostic tests. Rates are also high among pregnant women (during their pregnancy and labour and delivery). This may be attributable to the normalization of HIV testing for pregnant women.

There is also evidence to support the conclusion that rapid testing programs encourage people who have never tested to test for the first time, attract clients who haven’t tested regularly but should, and find people who are living with HIV and don’t know it. The highest positivity rates by setting included venues that attract people who may be at higher risk for HIV infection, including STI clinics, dedicated HIV testing programs and outreach venues.

Sites like emergency rooms and primary care clinics also found people who were unaware of their HIV infection, but to a lesser extent. These sites may be important venues for testing people who do not believe they are at high risk for HIV but who may, nevertheless, be in need of testing.

Critically, there is also evidence that clients will accept a rapid test when it is offered, that clients prefer rapid testing to standard testing, and that clients – both clients who test negative and those who test positive – are satisfied with the rapid testing experience. Finally, there is evidence to suggest that clients who test positive are successfully linked to HIV care.

Jurisdictions considering a rapid point-of-care testing program may want to learn from a jurisdiction that has already implemented one. Currently, Canada has a number of rapid point-of-care testing programs, in many provinces, including: one of Ontario’s anonymous HIV testing sites, and a program that provides HIV screening with a rapid test in dental clinics. Recent pilot programs have also offered rapid testing by peer testers and in a prison setting.

Methodology

This review is based on a search that included the use of PubMed, CINAHL, Embase, PsycINFO, Medline, LGBT Life and Google Scholar. Keyword search terms included rapid, test*, screen*, HIV, point of care, point of service, bathhouse, street, receipt, anx*, cost*, feasib*, accept*, uptake, link*, facilit*, impact, accurac*, and effectiv*, where * denotes that the search looked for all iterations of a word (i.e.,accurate, accuracy, etc). Geographic keywords included Canada and the names of all Canadian provinces and territories. MeSH search terms included HIV infection/diagnosis and HIV seropositivity/diagnosis. The reference lists of relevant articles were also reviewed for additional citations. The search focused on North American studies relevant to rapid testing in Canada.

Resource

Study designs  – University of Ottawa

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