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The routine offer of HIV testing in emergency departments: A review of the evidence

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The routine offer of an HIV test (routine testing) is the practice of systematically approaching patients with an offer of an HIV test when seeking healthcare, regardless of known risk factors or symptoms of HIV infection. The aim of routine HIV testing is to increase the number of people screened for HIV; improve early diagnosis of HIV; and link people who are diagnosed with HIV to clinical and support services.

Routine testing can be implemented in any healthcare setting. This review details routine testing programs in emergency departments. A review detailing the evidence to support routine HIV testing in primary care was published in July 2017.

A note on the language used in this review

We use the terms *routine offer of testing* and *routine testing* interchangeably, acknowledging that patients should only be tested with their explicit, informed and voluntary consent.

We use the term *offer* for both opt-in and opt-out programs when patients are approached for testing.

We use the term *accept* when patients in opt-in programs agree to testing, and patients in opt-out programs do not decline testing.

What are the findings of this review?

We reviewed the available scientific evidence to determine if routine HIV testing in emergency departments improves HIV testing outcomes. The evidence was:

1. **Moderate that patients are offered HIV testing within routine testing programs in emergency departments.** Offer rates ranged from 6% to 87%, with half of the studies finding offer rates of 50% or more and half finding offer rates of less than 50%.
2. **Moderate that HIV tests are accepted when offered within routine testing programs.** HIV test acceptance rates varied between 24% and 99%. Sixteen studies had acceptance rates of 50% or greater and six studies reported acceptance rates of less than 50%.
3. **Moderate that routine testing programs result in patients receiving an HIV test.** Patient testing ranged from 4% to 85%. Four studies found HIV testing rates of 50% or more and 13 studies found testing rates below 50%.
4. **Strong that routine testing programs identify people with HIV at rates above the cost-effectiveness threshold of 0.1%.** Positivity in emergency department settings ranged from 0.06% to 2.2%. Sixteen studies found a positivity rate above the cost-effectiveness threshold and one did not.
5. **Moderate on whether people diagnosed with HIV are linked to care in routine testing programs.**

Between 43% and 100% of people diagnosed with HIV were linked to HIV care across 12 studies.

Summary Table: Evidence to support routine offer of HIV testing outcomes

	Strong	Moderate	Limited	Mixed
HIV test offer		X		
HIV test acceptance		X		
HIV test completed		X		
HIV positivity above cost-effectiveness threshold	X			
Linkage to care		X		

We also identified from the evidence some factors that may have facilitated establishing a routine HIV testing program in an emergency department:

- Providing supportive institutional programs
- Providing clear testing recommendations
- Identifying a champion to provide ongoing encouragement and guidance to staff
- Providing training for staff
- Providing ongoing engagement and feedback on the success of the program
- Defining a workflow that is easy to implement and includes prompts to offer a test

What is this review about?

This review defines routine testing and distinguishes between opt-in and opt-out approaches. It also reviews whether, in emergency departments that have routine testing programs:

- Patients are routinely approached for HIV testing
- Patients accept testing when approached
- HIV tests are performed
- HIV diagnoses are made (above the cost-effectiveness threshold)
- Patients diagnosed with HIV are linked to care

This review also identifies from the available literature the factors that facilitate the development and delivery of routine HIV testing programs in emergency departments.

Why should people be tested for HIV?

HIV diagnosis at the earliest possible opportunity is crucial to maximize the health benefits of HIV care and treatment for a person with HIV. We know there are substantial health benefits to starting HIV treatment early.[1,2] We also have strong evidence that when people with HIV are engaged in care, adhere to their treatment, and maintain an undetectable viral load, their chance of transmitting HIV to others is significantly reduced.[3,4,5,6,7,8,9,10,11] In fact, people do not transmit HIV sexually when these conditions are met. However, people with HIV can only benefit from treatment if they know their HIV status and are engaged in care.

In Canada, we are not doing well at diagnosing HIV.[12,13,14] According to 2014 estimates from the Public Health Agency of Canada (PHAC), just over 16,000 people with HIV are unaware they have HIV.[15] This represents about 21% of all people with HIV but this proportion varies by population: 18% for men who have sex with men (MSM);

20% for people who use injection drugs; and 28% for heterosexual men and women.[16]

In addition, many people are being diagnosed late in the course of their HIV infection,[17,18] often having had multiple missed opportunities for earlier diagnosis in acute, community and primary care settings.[19] Timely diagnosis increases opportunities to link and engage people with HIV to care and treatment, which maximizes the health and prevention benefits of early treatment.

Despite the importance of HIV testing, many people have never been tested for HIV[20,21,22] or don't test as frequently as they should.[20,21] This may be due to individual, healthcare provider and structural barriers to testing. Individual-level barriers may include a lack of perceived risk of HIV infection,[20,23] discomfort in discussing and lack of knowledge of HIV,[20] fear of stigma and discrimination,[20,24,25] and fear that the test results will not be confidential.[24,26] Healthcare providers may also pose a barrier to testing – some healthcare providers don't have the necessary knowledge and skill to properly assess patient risk,[27] and some may be uncomfortable offering testing.[24,26,28,29] Finally, structural barriers to HIV testing may include poor access to testing services;[20] time constraints and competing priorities during healthcare appointments;[27,30] and lack of human and financial resources to offer testing in hospitals and clinics.[26,30]

What is routine HIV testing?

Routine testing is the practice of systematically approaching patients for HIV testing when they seek healthcare, regardless of known risk factors or symptoms of HIV infection.

There are two general types of routine HIV testing:

- **Opt-in testing**: patients are offered an HIV test and must *actively accept* testing before the test can occur.
- **Opt-out testing**: patients are notified that HIV testing is a part of normal care for everyone but they can decline. If they don't *actively decline* a test, consent to testing is assumed.

The routine offer of HIV testing is already part of healthcare practices in some settings in Canada

The PHAC *HIV testing and screening guide* makes a recommendation for the normalization of HIV testing in the general population by making the offer of HIV testing a component of routine medical care.[31] The guide does not provide specific recommendations on how often the discussion about HIV testing between patient and provider should happen.[31] In terms of provincial guidelines, British Columbia and Saskatchewan recommend the routine offer of HIV testing for the general population at least every five years, and more frequently for people who may be exposed to HIV in an ongoing way.[19,32]

The PHAC guide also recommends that all pregnant people be routinely offered an HIV test during their first prenatal visit.[31] The routine offer of HIV testing for pregnant people is also recommended by the Society of Obstetricians and Gynaecologists of Canada and many of the provinces have made similar recommendations, including Nova Scotia, Quebec, Ontario, Saskatchewan, Alberta, British Columbia and Yukon Territory.[19,33,34,35,36,37]

Does routine HIV testing in emergency departments work?

We reviewed the available scientific literature to determine if routine testing in emergency departments improves outcomes related to testing. Details on our methodology are at the end of this article. Evidence presented in this review comes from regions with HIV epidemics similar to our own, such as the United States, Europe and Australia. There is little published data from the Canadian context.

We assessed the available scientific evidence to support each outcome 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. **Mixed Evidence: Some research supports the ability of the intervention to impact the outcome and some research does not support the ability of the intervention to impact the outcome.**
5. **No Evidence:** No published research exists to support the ability of the intervention to impact the outcome.

What percentage of patients are offered HIV testing in emergency departments?

A policy to routinely offer patients HIV testing does not guarantee that all patients will be offered an HIV test. Imperfect offer rates may occur because healthcare providers and allied professionals may be uncomfortable talking about HIV testing.[24,26,27,28] They may also feel they do not have enough time to offer HIV tests when there are competing clinical priorities during patient visits.[27,30]

Overview

There is moderate evidence that HIV tests are routinely offered in emergency departments with a routine testing policy. Offer rates ranged from 6% to 87% across one randomized controlled trial,[38] one quasi-experimental study,[39] and eight observational studies.[27,40,41,42,43,44,45,46] There were six studies with an offer rate of 50% or greater[27,28,39,41,42,43] and six studies with an offer rate of less than 50%.[38,40,41,44,45,46] Offer rates were generally higher when a dedicated tester was used.

Evidence

Offer rates 50% or greater

A randomized controlled trial[38] compared the routine offer of HIV testing in an emergency department by a designated HIV testing counsellor to an offer of testing by a nursing assistant. The trial took place in Boston between February 2007 and July 2008. Opt-in rapid HIV tests were offered to patients. Offer rates were significantly higher in the counsellor arm compared to the nursing assistant arm. In the counsellor arm, 80% of patients (1,959 of 2,446) were offered testing compared to 36% in the nursing assistant arm (861 of 2,409).

A quasi-experimental study[39] compared routine opt-in HIV testing to routine opt-out HIV testing in an emergency department in Oakland, California, between January and April 2010. Some days were opt-in days, while others were opt-out. Rapid HIV tests were offered by designated HIV testing counsellors. Overall, 87% of patients (2,409 of 2,779) were offered an HIV test. The percentage of patients offered an HIV test was evenly split between opt-in and opt-out testing.

An observational study[41] compared an opt-in and an opt-out approach to routine HIV testing in an emergency department in Oakland, California, between February 2007 and January 2008. Designated HIV testing counsellors offered testing in both phases of the study. During the opt-in phase, patients were referred to testers by nurses; during the opt-out phase, they were referred to testers by medical assistants. Rapid tests were used in both phases. In the opt-in phase, 28% of patients (6,478 of 23,236) were offered an HIV test compared to 76% in the opt-out phase (20,280 of 26,757). This difference was statistically significant.

An observational study[42] reported findings from a routine HIV testing program in an emergency department in Augusta, Georgia. Patients, who were from urban and rural areas, were offered a rapid test by designated HIV testing counsellors through an opt-out approach. Between March 2008 and August 2009, 72% of patients were offered an HIV test (9,343 of 13,035).

An observational study[27] was conducted at four sites in London, England, including an emergency department between August and November, 2009. Patients were offered routine opt-in HIV testing. Rapid testing was offered by designated HIV testing counsellors. Over the three months of the study, 62% of patients (3,433 of 5,541) in the emergency department were offered an HIV test.

An observational study[43] was conducted of a routine HIV testing program in an emergency department in the

Brooklyn borough of New York City. The emergency department used an opt-out approach and a lab test, which was offered by medical assistants and triage nurses. Between August 2013 and July 2014, 54% of patients (31,423 of 57,852) were offered an HIV test.

Offer rates less than 50%

As already reviewed above, a randomized controlled trial[38] in Boston compared the routine offer of HIV testing in an emergency department by a designated HIV testing counsellor to an offer of testing by a nursing assistant. In the nursing assistant arm, 36% of patients (861/2,409) were offered testing compared to 80% in the counsellor arm (1,959 of 2,446).

An observational study[44] conducted in an emergency department in London, England, reported on findings from their opt-in routine HIV testing program. Lab tests were offered by clinical staff. Between March and May 2012, 48% of patients (2,697 of 5,657) were offered an HIV test.

As already reviewed above, an observational study[41] compared an opt-in and an opt-out approach to routine HIV testing in an emergency department in Oakland, California, between February 2007 and January 2008. In the opt-in phase, 28% of patients (6,478 of 23,236) were offered an HIV test compared to 76% in the opt-out phase (20,280 of 26,757).

An observational study[40] reported findings from a pilot project in six emergency departments in Paris, France. Between December 2009 and March 2010, patients were offered an opt-in rapid HIV test. Overall, 6% of patients (11,401 of 183,957) were offered an HIV test (offer rates ranged from 2.6% to 11%).

An observational study[46] reported data from three routine HIV testing programs in emergency departments in Los Angeles, California; Oakland, California; and New York City. All three offered rapid opt-in HIV testing between January 2005 and March 2006. In Los Angeles and New York, designated HIV testing counsellors offered tests to patients; in Oakland, nurses offered HIV tests. Overall, 19% of patients (34,627 of 186,415) were offered an HIV test.

An observational study[45] reported data from a routine HIV testing program based in an emergency department in London, England. Existing staff routinely offered opt-in lab testing to patients. Over 30 months starting in January 2011, 14% of patients were offered an HIV test (monthly range between 6% and 54%).

What percentage of patients accept testing when offered a test?

Not all patients accept (or do not refuse) HIV tests when offered. Patients may decline a test because they don't perceive themselves to be at risk for infection,[20,23] fear of stigma and discrimination if they test positive,[20,24,25] and fear that the test results will not be confidential.[24,26] Many patients refuse HIV tests because they have recently been tested.[20,47,48]

Overview

There is moderate evidence that people accept an HIV test during routine testing in emergency departments when it is offered. HIV test acceptance rates ranged between 24% to 99% across one systematic review and meta-analysis,[49] three randomized controlled trials,[38,50,51] three quasi-experimental studies,[39,52,53] and fourteen observational studies.[27,40,41,42,43,44,46,54,55,56,57,58,59,60] There were sixteen studies[27,38,39,40,41,42,44,46,51,52,54,55,56,57,58,59] that reported acceptance rates greater than 50% and six studies[41,43,50,53,60,61] that reported acceptance rates below 50%.

Acceptance rates 50% or greater

A randomized controlled trial[38] compared the routine offer of HIV testing in an emergency department by a designated HIV testing counsellor to an offer by a nursing assistant. The study took place in Boston between February 2007 and July 2008. Opt-in rapid HIV tests were offered to patients. Acceptance rates were higher in the nursing assistant arm compared to the counsellor arm. When a nursing assistant offered a test, 75% of patients (643 of 861) accepted compared to 71% of patients (1,382 of 1,959) when it was offered by a designated HIV

testing counsellor. This finding was statistically significant.

A quasi-experimental study[3] compared routine opt-in HIV testing to routine opt-out HIV testing in an emergency department in Oakland, California, between January and April 2010. Some days were opt-in days, while other were opt-out. Rapid HIV tests were offered by designated HIV testing counsellors. On opt-out days, 78% of patients (931 of 1,200) offered testing accepted testing compared to 63% on opt-in days (767 of 1,209).

A quasi-experimental study[52] reported on findings from a pilot project in which patients in an emergency department at a London, UK hospital were offered opt-in rapid HIV testing by designated HIV testing counsellors between January and May 2010. The designated HIV testing counsellors offered HIV testing with an educational video available in four languages. Ninety-three percent of patients (131 of 140) who watched the video and had not been tested in the previous three months accepted an HIV test.

An observational study[55] reported data from an opt-out routine HIV testing program in an emergency department in Houston, Texas. Healthcare providers offered lab tests to patients who were already having lab tests between October 2008 and April 2009. When an HIV test was offered, 99% of patients accepted.

An observational study[42] reported findings from a routine HIV testing program in an emergency department in Augusta, Georgia. Patients, who were from urban and rural areas, were offered a rapid test by designated HIV testing counsellors through an opt-out approach. Between March 2008 and August 2009, 91% of patients (8,504 of 9,343) accepted testing when it was offered.

An observational study[56] reported findings from an opt-out routine HIV testing program in an emergency department in Birmingham, Alabama. Nurses offered patients HIV tests; designated HIV testing assistants performed rapid HIV tests. Between September 2011 and December 2013, 88% of patients (66,501 of 75,621) offered a test accepted one.

An observational study[58] examined data from a program in Atlanta, Georgia, that routinely offered HIV testing to emergency department patients between May 2008 and March 2010. Designated HIV testing counsellors offered patients an opt-out rapid HIV test. Overall, 85% of patients (7,616 of 8,922) accepted an HIV test when it was offered.

An observational study[57] reported on data from an opt-out HIV testing program in an emergency department in the United Kingdom. Between July 2011 and March 2013, HIV lab tests were offered by nurses or doctors. The acceptance rate in this study was determined by randomly sampling 396 patients. Of the 396 patients in the sample, 84% of patients (154 of 183) approached for testing accepted an HIV test when it was offered.

A randomized controlled trial[51] in an emergency department in San Francisco, California, compared routine opt-in ("you can let us know if you want a test"), opt-out ("you will be tested unless you decline"), or active choice ("do you want an HIV test") HIV testing. Between June 2011 and June 2013, patients were offered rapid HIV tests by research assistants. Among those who were offered, 66% of patients accepted testing in the opt-out arm, 38% in the opt-in arm and 51% in the active choice arm and. Overall, 52% of patients who were offered a test accepted a test in this study.

An observational study[40] reported findings from a pilot project in six emergency departments in Paris, France. Between December 2009 and March 2010, patients were offered an opt-in rapid HIV test. Overall, 70% of patients accepted an HIV test when it was offered (range from 54% to 81%).

An observational study[27] was conducted at four sites in London, England, including an emergency department, between August and November, 2009. Patients were offered routine opt-in HIV testing. Rapid testing was offered by designated HIV testing counsellors. Over the three months of the study, 87% of tests offered (2,121 of 3,433) in the emergency department were accepted.

An observational study[54] reported findings from a routine HIV testing program in an emergency department in Minneapolis, Minnesota, from October 2009 to October 2010. Research associates that were not integrated into the flow of the emergency department offered patients rapid HIV tests. When patients were offered a test ,71%

accepted (2,811 of 3,957).

An observational study[44] conducted in an emergency department in London, England, reported on findings from their opt-in routine HIV testing program. Lab tests were offered by clinical staff. Between March and May 2012, 65% of patients (1,747 of 2,697) accepted an HIV test when it was offered.

An observational study[41] compared an opt-in and an opt-out approach to routine HIV testing in an emergency department in Oakland, California, between February 2007 and January 2008. Designated HIV testing counsellors offered testing in both phases of the study. During the opt-in phase, patients were referred to testers by nurses; during the opt-out phase, they were referred to testers by medical assistants. Rapid tests were used in both phases. Among those offered a test, 63% of patients accepted the test in the opt-in phase, compared to 31% in the opt-out phase. This finding was statistically significant.

An observational study[59] reported on findings from a emergency department-based routine testing program in Washington, DC. Opt-in rapid HIV tests were offered by designated HIV testing counsellors. Between October 2006 and October 2007, 59% of patients (7,528 of 12,836) who were offered an HIV test accepted one.

An observational study[46] reported data from three routine HIV testing programs in emergency departments in Los Angeles, California; Oakland, California; and New York City. All three emergency departments offered rapid opt-in HIV testing between January 2005 and March 2006. In Los Angeles and New York, designated HIV testing counsellors offered tests to patients; in Oakland, nurses offered HIV tests. Overall, 57% of patients (19,556 of 34,627) accepted an HIV test when one was offered (Los Angeles 98%, Oakland 39%, New York City 99%).

Acceptance rates less than 50%

A randomized controlled trial[50] compared routine HIV testing to targeted HIV testing in an emergency department in Cincinnati, Ohio, from January 2008 to December 2010. In the routine arm, opt-in lab testing was offered by designated HIV testing counsellors. Patients were targeted for the offer of an HIV test if they had an HIV risk factor or a symptom of HIV infection. Among those who were offered a test, 47% of patients (1,454 of 3,067) in the targeted testing arm accepted, which was higher than in the routine testing arm, where 41% of patients (1,915 of 4,692) accepted. This finding was statistically significant.

As already reviewed above, an observational study[41] compared an opt-in and an opt-out approach to routine HIV testing in an emergency department in Oakland, California, between February 2007 and January 2008. Among those offered a test, 63% of patients accepted the test in the opt-in phase, compared to 31% in the opt-out phase. This finding was statistically significant.

An observational study[61] reported on data from a pilot study in Boston, Massachusetts, in which routine HIV testing was offered to emergency department patients over four months in 2011/2012. Healthcare providers offered opt-in lab tests to patients. During the pilot, 36% of patients (788 of 2,188) accepted the test when it was offered .

An observational study[60] reported findings from a pilot study in which opt-out routine HIV testing was offered to patients already receiving lab tests in an emergency department in London, England. Between March and July 2013, 30% of patients (2,828 of 9,297) accepted testing when it was offered as part of the routine testing program.

An observational study[43] of a routine HIV testing program in an emergency department was conducted in the Brooklyn borough of New York City. The emergency department used an opt-out approach and a lab test, which was offered by medical assistants and triage nurses. Between August 2013 and July 2014, 26% of patients (8,229 of 31,423) accepted a test when it was offered.

A quasi-experimental study[53] examined a routine opt-out HIV testing approach used in an emergency department in Denver, Colorado. Rapid HIV tests were offered by existing healthcare staff. This approach was compared to physician-directed, targeted rapid HIV testing. In this approach, HIV tests were offered to patients who had symptoms of HIV infection or who were assessed by the doctor to be at high risk for HIV infection. Approaches alternated every four-months from April 2007 to April 2009. Using the opt-out approach, 24% of patients (6,762 of 28,043) accepted an HIV test. The study did not report on the acceptance rate using the physician-directed

approach.

Testing rates in routine HIV testing programs

Testing rates can be calculated in two different ways:

- Percentage tested of all patients in the study (some of whom were not offered testing)
- Percentage tested of all patients who were offered testing

For consistency, reported below is the percentage tested of all patients who were in the study.

Overview

There is moderate evidence that people who attended sites with routine testing were actually tested for HIV. Testing rates of patients ranged from 4% to 85% across two randomized controlled trials,[38,50] four quasi-experimental studies[39,52,53,62] and 10 observational studies.[40,41,43,45,56,57,58,59,61,63] There were four studies with testing rates of 50% or greater[38,39,56,58] and 13 studies with testing rates lower than 50%.[38,40,41,43,45,50,52,53,57,59,61,62,63]

Evidence

Testing rates 50% or greater

An observational study[58] examined data from a program in Atlanta, Georgia, that routinely offered HIV testing to emergency department patients between May 2008 and March 2010. Designated HIV testing counsellors offered patients an opt-out rapid HIV test. During the study, 85% of patients (7,616 of 8,922) were tested.

A quasi-experimental study[39] compared routine opt-in HIV testing to routine opt-out HIV testing in an emergency department in Oakland, California, between January and April 2010. Some days were opt-in days, while others were opt-out. Rapid HIV tests were offered by designated HIV testing counsellors. In the opt-out arm, 78% of all the patients (931 of 1,200) were tested; in the opt-in arm, 63% were tested (767 of 1,209).

An observational study[56] reported findings from an opt-out routine HIV testing program in an emergency department in Birmingham, Alabama. Nurses offered patients HIV tests; designated HIV testing assistants performed rapid HIV tests. Between September 2011 and December 2013, 59% of patients (44,635 of 75,261) were tested for HIV.

A randomized controlled trial[38] compared the routine offer of HIV testing in an emergency department when a designated HIV testing counsellor offered testing to when a nursing assistant offered testing. The trial took place in Boston between February 2007 and July 2008. Opt-in rapid HIV tests were offered to patients. Significantly more tests were performed on all patients in the counsellor arm compared to tests performed in the nursing assistant arm. In the counsellor arm, 57% of patients (1,382 of 2,446) were tested, compared to 27% of patients (643 of 2,409) randomized to the nursing assistant arm.

Testing rates less than 50%

A randomized controlled trial[50] compared routine HIV testing to targeted HIV testing in an emergency department in Cincinnati, Ohio, from January 2008 to December 2010. In the routine arm, opt-in lab testing was offered by designated HIV testing counsellors. Patients were targeted for the offer of an HIV test if they had an HIV risk factor or a symptom of HIV infection. In the routine testing arm, 41% of all patients (1,911 of 4,692) were tested and in the targeted testing arm 30% were tested (1,451 of 4,880).

An observational study[59] reported on findings from a routine testing program in an emergency department in Washington, DC. Opt-in rapid HIV tests were offered by designated HIV testing counsellors. Between October 2006 and October 2007, 36% of patients (4,601 of 12,836) were tested.

An observational study[57] reported on data from an opt-out HIV testing program in an emergency department in the United Kingdom. HIV lab tests were offered by nurses or doctors. Between July 2011 and March 2013, 33% of all

patients were tested for HIV.

As already reviewed above, a randomized controlled trial[38] compared the routine offer of HIV testing in an emergency department when a designated HIV testing counsellor offered testing to when a nursing assistant offered testing. In the counsellor arm of the study, 57% of patients (1,382 of 2,446) were tested, compared to 27% in the nursing assistant arm (643 of 2,409).

An observational study reviewed data from the “Going Viral” campaign, an HIV testing campaign in nine emergency departments in the United Kingdom.[63] Between October 13 and 19, 2014, patients who were already having blood tests were routinely offered opt-out lab testing for HIV. Overall, 27% of patients (2,118 of 7,807) were tested for HIV.

A quasi-experimental study[53] examined a routine opt-out HIV testing approach used in an emergency department in Denver, Colorado. Rapid HIV tests were offered by existing healthcare staff. This approach was compared to physician-directed, targeted rapid HIV testing. In this approach, HIV tests were offered to patients who had symptoms of HIV infection or who were assessed by the doctor to be at high risk for HIV infection. Approaches alternated every four months from April 2007 to April 2009. Using the opt-out approach, 24% of patients (6,933 of 28,043) were tested. Using the targeted approach, 0.8% of all pateints (243 of 29,925) were tested.

A quasi-experimental study[52] reported on findings from a pilot project in an emergency department in London, England. Patients were offered routine opt-in rapid HIV testing by designated HIV testing counsellors between January and May 2010. The designated HIV testing counsellors offered HIV testing with an educational video available in four languages. Overall, 23% of patients were tested for HIV.

A quasi-experimental study[62] compared two approaches to HIV testing in an emergency department in Baltimore, Maryland. In Program One, which ran from July 2012 to June 2013, designated HIV testing counsellors offered patients rapid HIV testing. In Program Two, which ran from August 2013 to July 2014, routine testing was integrated into triage, and lab and rapid tests were offered by nurses. Program One and Program Two used an opt-in testing approach. During Program One, 15% of all patients (6,832 of 46,818) received a rapid test. In Program Two, 17% of all patients (8,233of 49,697) received an HIV test.

An observational study[61] reported on data from a pilot study in Boston, Massachusetts, in which routine HIV testing was offered to emergency department patients over four months. Healthcare providers offered opt-in lab tests to patients. During the pilot, 10% of patients (514 of 5,164) who accepted testing were tested.

An observational study[41] compared an opt-in and an opt-out approach to routine HIV testing in an emergency department in Oakland, California, between February 2007 and January 2008. Designated HIV testing counsellors offered testing in both phases of the study. During the opt-in phase, patients were referred to testers by nurses; during the opt-out phase, they were referred to testers by medical assistants. Rapid tests were used in both phases. In both phases 17% of patients were tested, with 30% of patients (7,066 of 23,236) tested in the opt-in phase and 17% of patients (4,657 of 26,767) tested in the opt-out phase .

An observational study[43] of a routine HIV testing program was conducted in an emergency department in the Brooklyn borough of New York City. Medical assistants and triage nurses offered an opt-out approach using a lab test. Between August 2013 and July 2014, 11% of patients (6,114 of 57,852) were tested.

An observational study[45] reported data from a routine HIV testing program based in an emergency department in London, England. Existing staff routinely offered opt-in lab testing to patients. Over 30 months, starting in January 2011, 10% of all patients (4,327 of 44,582) were tested for HIV.

An observational study[40] reported findings from a pilot project in six emergency departments in Paris, France. Between December 2009 and March 2010, patients were offered an opt-in rapid HIV test. Overall, 4% of patients (7,215 of 183,957) were tested.

HIV seropositivity rates in routine HIV testing programs

The routine offer of an HIV test gives patients an opportunity to learn their HIV status.

One way to measure whether routine HIV testing programs are reaching people with HIV is through positivity rates. The positivity rate of a testing program is determined by the number of people who are diagnosed with HIV divided by the overall number of people tested by the program. The U.S. Centers for Disease Control and Prevention (CDC) has determined that a positivity rate equal to or greater than 0.1% is cost-effective.[64]

Overview

There is strong evidence that routine HIV testing programs in emergency departments identify people with HIV at rates above the 0.1% cost-effectiveness threshold. Positivity rates ranged from 0.06% to 2.2% across one systematic review and meta-analysis,[49] two randomized controlled trials,[38,50] four quasi-experimental studies,[39,52,53,62] and 10 observational studies.[27,42,44,45,55,56,57,58,65,66] There were 16 studies with positivity rates above the cost-effectiveness threshold[27,38,39,42,45,49,50,52,53,54,55,56,57,58,62,65,66] and one study below the cost-effectiveness threshold.[44]

Evidence

Positivity rates above the cost-effectiveness threshold

A systematic review and meta-analysis[49] that reported on routine opt-out and opt-in HIV testing strategies in emergency departments found a positivity rate of 0.4% in opt-out programs compared to 0.52% in opt-in programs.

A quasi-experimental study[52] reported on findings from a pilot project in an emergency department in London, England. Patients were offered routine opt-in rapid HIV testing by designated HIV testing counsellors between January and May 2010. The designated HIV testing counsellors offered HIV testing with an educational video available in four languages. The positivity rate was 2.2% in this pilot program (3 of 135 patients).

An observational study[55] reported data from an opt-out routine HIV testing program in an emergency department in Houston, Texas. Healthcare providers offered lab tests to patients who were already having lab tests between October 2008 and April 2009. Overall, the positivity rate was 2% (262 of 14,093).

An observational study[58] examined data from a program in Atlanta, Georgia, that routinely offered HIV testing to emergency department patients between May 2008 and March 2010. Designated HIV testing counsellors offered patients an opt-out rapid HIV test. The positivity rate in this program was 1.7% (126 of 7,616 patients).

An observational study[65] reported findings from a routine opt-out HIV, and hepatitis B and C testing pilot program conducted between March 2014 and January 2015 in Dublin, Ireland. Patients in the emergency department who were already getting lab tests were offered an HIV test by their healthcare provider. In this program, the positivity rate was 1% (97 of 8,839).

An observational study[66] reported data from a routine HIV testing program in an emergency department and an urgent care centre in New Orleans, Louisiana, affiliated with the Interim Louisiana Hospital. Data from March to December 2013 were reported. Before March 2013, patients in both emergency departments were offered opt-in rapid HIV testing by designated HIV testing counsellors. After March 2013, opt-out lab tests were offered by staff at triage, in both emergency departments. Overall, between March and December 2013, positivity rates were 0.81% (102 of 12,568) compared to 0.94% in 2012 (106 of 11,257).

An observational study[56] reported findings from an opt-out routine HIV testing program in an emergency department in Birmingham, Alabama. Nurses offered patients HIV tests, and designated HIV testing assistants performed them using a rapid test. Between September 2011 and December 2013, the positivity rate was 0.54% (243 of 44,635).

A randomized controlled trial[38] compared the routine offer of HIV testing in an emergency department by a designated HIV testing counsellor to an offer of testing by a nursing assistant. The trial took place in Boston

between February 2007 and July 2008. In both arms of the study, opt-in rapid HIV tests were offered to patients. The positivity rate overall was 0.35% (7 of 2,025 patients).

A randomized controlled trial[50] compared routine HIV testing to targeted HIV testing in an emergency department in Cincinnati, Ohio, from January 2008 to December 2010. In the routine arm, opt-in lab testing was offered by designated HIV testing counsellors. In the targeted arm, patients were targeted for the offer of an HIV test if they had an HIV risk factor or a symptom of HIV infection. In the routine testing arm, the positivity rate was 0.31% (six of 1,911), compared to 0.22% in the targeted arm (three of 1,451).

An observational study[57] reported on data from an opt-out HIV testing program in an emergency department in the United Kingdom. HIV lab tests were offered by nurses or doctors. Between July 2011 and March 2013, the positivity rate was 0.48% (20 of 4,122).

An observational study[42] reported findings from a routine HIV testing program in an emergency department in Augusta, Georgia. Patients, who were from urban and rural areas, were offered a rapid test by designated HIV testing counsellors through an opt-out approach. Between March 2008 and August 2009, the positivity rate was 0.41% (35 of 8,504).

An observational study[45] reported data from a routine HIV testing program based in an emergency department in London, England. Existing staff routinely offered opt-in lab testing to patients. Over 30 months, starting in January 2011, the positivity rate was 0.30% (13 of 4,327).

A quasi-experimental study[39] compared routine opt-in HIV testing to routine opt-out HIV testing in an emergency department in Oakland, California, between January and April 2010. Some days were opt-in days, while others were opt-out. Rapid HIV tests were offered by designated HIV testing counsellors. The positivity rates were similar, with 0.11% on opt-out days (one of 931), compared to 0.13% on opt-in days (one of 767).

A quasi-experimental study[53] examined a routine, opt-out HIV testing approach used in an emergency department in Denver, Colorado. Rapid HIV tests were offered by existing healthcare staff. This approach was compared to physician-directed, targeted rapid HIV testing. In this approach, HIV tests were offered to patients who had symptoms of HIV infection or who were assessed by the doctor to be at high risk for HIV infection. Approaches alternated every four months from April 2007 to April 2009. Using the opt-out approach, the positivity rate was 0.24% (16 of 6,702) compared to 2.1% using the physician-directed approach (5 of 243).

A quasi-experimental study[62] compared two approaches to HIV testing in an emergency department in Baltimore, Maryland. In Program One, which ran from July 2012 to June 2013, designated HIV testing counsellors offered patients rapid HIV testing. In Program Two, which ran from August 2013 to July 2014, routine testing was integrated into triage, and lab and rapid tests were offered by nurses. Program One and Program Two used an opt-in testing approach. During Program One, the positivity rate was 0.2% (16 of 6,832) compared to 0.35% in Program Two (29 of 8,233).

An observational study[27] was conducted at four sites in London, England, including an emergency department, between August and November, 2009. Patients were offered routine opt-in HIV testing. Rapid testing was offered by designated HIV testing counsellors. Over the three months of the study, the positivity rate was 0.18% (four of 2,121).

Positivity rates below the cost-effectiveness threshold

An observational study[44] conducted in an emergency department in London, England, reported findings from an opt-in routine HIV testing program. Lab tests were offered by clinical staff. Between March and May 2012, the positivity rate was 0.06% (1 of 1,747).

Are clients linked to HIV care from routine HIV testing programs in emergency departments?

Once diagnosed with HIV, a person should see an HIV care provider so that their health can be monitored, and they

can be offered treatment. Early entry into care and treatment can have significant positive health outcomes for people with HIV.[1,2]

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.

Overview

There is moderate evidence on whether people diagnosed with HIV in emergency departments are linked to care from two quasi-experimental studies[52,62] and 10 observational studies.[27,42,43,45,46,54,55,58,60,66] Linkage to care rates ranged from 43% to 100%.

Evidence

A quasi-experimental study[52] reported on findings from a pilot project in an emergency department in London, England. Patients were offered routine opt-in rapid HIV testing by designated HIV testing counsellors between January and May 2010. The designated HIV testing counsellors offered HIV testing with an educational video available in four languages. All patients (three of three) who were diagnosed with HIV were linked to care.

A quasi-experimental study[62] compared two approaches to HIV testing in an emergency department in Baltimore, Maryland. In Program One, which ran from July 2012 to June 2013, designated HIV testing counsellors offered patients rapid HIV testing. In Program Two, which ran from August 2013 to July 2014, routine testing was integrated into triage, and lab and rapid tests were offered by nurses. Program One and Program Two used an opt-in testing approach. In Program One 81% of patients (13 of 16) were linked to care, compared to 93% of patients (27 of 29) in Program Two.

An observational study[45] reported data from a routine HIV testing program based in an emergency department in London, England. Existing staff routinely offered opt-in lab testing to patients. Over 30 months, starting in January 2011, 100% of patients (13 of 13) were linked to HIV care.

An observational study[27] was conducted at four sites in London, England, including an emergency department, between August and November, 2009. Patients were offered routine opt-in HIV testing. Rapid testing was offered by designated HIV testing counsellors. Over the three months of the study, 100% of patients (four of four) diagnosed with HIV in the emergency department were linked to care.

An observational study[43] reported findings from a routine HIV testing program in an emergency department in Augusta, Georgia. Patients, who were from urban and rural areas, were offered a rapid test by designated HIV testing counsellors through an opt-out approach. Between March 2008 and August 2009, 93% of HIV-positive patients (26 of 28) who received their results were linked to care.

An observational study[46] reported data from three routine HIV testing programs in emergency departments in Los Angeles, California; Oakland, California; and New York City. All three offered rapid opt-in HIV testing between January 2005 and March 2006. In Los Angeles and New York, designated HIV testing counsellors offered tests to patients; in Oakland, nurses offered HIV tests. Overall, 88% of patients (85 of 97) with HIV were linked to care.

An observational study[43] of a routine HIV testing program was conducted in an emergency department in the Brooklyn borough of New York City. The emergency department used an opt-out approach and a lab test, which was offered by medical assistants and triage nurses. Between August 2013 and July 2014, 92% of patients (24 of 26) were linked to HIV care.

An observational study[66] reported data from routine HIV testing programs in an emergency department and an urgent care centre in New Orleans, Louisiana, affiliated with the Interim Louisiana Hospital. Data from March to December 2013 were reported. Before March 2013, patients in both emergency departments were offered opt-in rapid HIV testing by designated HIV testing counsellors. After March 2013, opt-out lab tests were offered by staff at triage, in both emergency departments. In total 74% of patients (67 of 91) were linked to care.

An observational study[58] examined data from a program in Atlanta, Georgia, that routinely offered HIV testing to emergency department patients between May 2008 and March 2010. Designated HIV testing counsellors offered patients an opt-out rapid HIV test. During the study 75% of patients (95 of 126) were linked to care and attended their initial HIV clinic visit.

An observational study[60] reported findings from a pilot study in which opt-out routine HIV testing was offered to patients already receiving lab tests in an emergency department in London, England. Between March and July 2013, 93% of patients (13 of 14) with HIV were linked to care.

An observational study[54] reported findings from a routine HIV testing program in an emergency department in Minneapolis, Minnesota, from October 2009 to October 2010. Research associates that were not integrated into the flow of the emergency department offered patients rapid HIV tests. During the study 56% of patients (five of nine) newly diagnosed with HIV were linked to care.

An observational study[55] reported data from an opt-out routine HIV testing program in an emergency department in Houston, Texas. Healthcare providers offered lab tests to patients who were already having lab tests between October 2008 and April 2009. During the study 43% of people newly diagnosed with HIV (34 of 80) were linked to care.

What factors facilitate establishing routine HIV testing programs in emergency departments?

The literature identified six facilitators to implementing routine HIV testing in emergency departments that may have helped to make the routine testing programs successful, including:

- Providing supportive institutional programs[59,66]
- Providing clear testing recommendations[67]
- Identifying a champion to provide ongoing encouragement and guidance to staff[45,59]
- Providing training for staff[54,57,66,67]
- Providing ongoing engagement and feedback on the success of the program[45,67]
- Defining a workflow that is easy to implement and includes prompts to offer a test[56,66]

What factors hinder routine HIV testing programs in emergency departments?

An observational study conducted in an Illinois emergency department between November 2014 and July 2015 identified patient and system factors related to missed opportunities for screening.[68] In this emergency department, routine offer of an opt out strategy was evaluated. The study identified that patients between the ages of 13 and 19 were less likely to be informed about screening, to consent to testing, and to have a blood draw compared to older age groups. In addition, emergency department crowding and the urgency of the reason for the visit also decreased the odds of patients being informed of HIV screening or having a blood draw.

What does this mean for hospitals considering routine testing programs for their emergency departments?

There is moderate evidence to support that routine testing programs in emergency departments result in testing offers, patient acceptance of testing and HIV testing. In addition, there is strong evidence that the positivity rates are above the cost-effectiveness threshold of 0.1%. Finally, there is moderate evidence that people who test HIV positive through routine testing programs in emergency departments are linked to care.

The routine offer of HIV testing is supported by PHAC and the U.S. CDC. Currently, routine HIV testing is policy in British Columbia and Saskatchewan. Saskatchewan has many routine testing program resources available. A case study of a routine testing program in an acute care facility in Vancouver is available through CATIE's *Programming Connection*.

There are a number of facilitators to the implementation of routine testing programs. Before implementing a program, consider how these can be operationalized in your program.

Methodology

This review is based on a search that included the use of PubMed, Embase and CINAHL. MeSH search terms included HIV infections/diagnosis. Embase subject headings included HIV test. Keyword search terms included HIV; testing; screening; routine; opt-in; opt-out; targeted; and universal. The reference lists of relevant articles were reviewed for additional citations. All searches focused on research relevant to health care delivery in Canada.

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Disclaimer

Decisions about particular medical treatments should always be made in consultation with a qualified medical practitioner knowledgeable about HIV- and hepatitis C-related illness and the treatments in question.

CATIE provides information resources to help people living with HIV and/or hepatitis C who wish to manage their own health care in partnership with their care providers. Information accessed through or published or provided by CATIE, however, is not to be considered medical advice. We do not recommend or advocate particular treatments and we urge users to consult as broad a range of sources as possible. We strongly urge users to consult with a qualified medical practitioner prior to undertaking any decision, use or action of a medical nature.

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