# New Canadian guideline provides evidence-based approach to non-occupational HIV prophylaxis

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## ABSTRACT

The incidence of HIV infections in Canada has increased yearly since 2014. New cases of HIV have resulted almost exclusively from non-occupational exposures, including sexual contact and needle sharing. Appropriate HIV post-exposure prophylaxis is under-prescribed to patients who present to the emergency department after a high-risk exposure. In November of 2017, a Canadian guideline on HIV pre-exposure prophylaxis (PrEP) and non-occupational post-exposure prophylaxis (nPEP) was published. The guideline presents a standardized, evidence-based approach to assessing risk for HIV transmission and prescribing HIV prophylaxis. This summary highlights the key points from the guideline that are relevant to the practice of emergency medicine in Canada.

## RÉSUMÉ

L'incidence des infections à VIH au Canada croît sans cesse chaque année depuis 2014. La hausse du nombre de nouveaux cas d'infection s'explique presque exclusivement par des expositions non professionnelles au virus, attribuables par exemple à des contacts sexuels ou au partage de seringues. Toutefois, les médecins ne prescrivent pas suffisamment de mesures prophylactiques appropriées de postexposition aux patients qui consultent au service des urgences après une exposition à haut risque au VIH. Une nouvelle ligne directrice canadienne sur la prophylaxie préexposition au VIH et sur la prophylaxie postexposition non professionnelle a été publiée en novembre 2017. Elle porte sur une démarche uniforme et fondée sur des données probantes pour évaluer le risque de transmission du VIH et pour prescrire des mesures prophylactiques anti-VIH. Sera présenté dans l'article un résumé des principaux éléments de la ligne directrice, qui trouvent application dans la pratique de la médecine d'urgence au Canada.


## BACKGROUND

In the last decade, the number of new human immunodeficiency virus (HIV) infections in Canada decreased yearly from 2,599 in 2008 to 2,053 in 2014. Since 2014, however, there has been an uptick in the annual incidence, and in 2016, there were 2,344 new cases of HIV reported in Canada.[1] While it is theoretically possible to acquire HIV after occupational exposure (e.g., a needlestick injury in a health care setting), new HIV infections occur almost exclusively as a result of non-occupational exposures (e.g., sexual contact or needle sharing). Only one case of HIV transmission from an occupational exposure has been confirmed in the United States since 1999.[2]

New HIV infections are disproportionately concentrated among certain populations. Recent Canadian data revealed that nearly one-half of all new infections (44.1%) occur among men who have sex with men (MSM). Heterosexual contact represents the next most common route of transmission (32.3%), with one-third of these cases (10.5%) occurring in people from HIV-endemic countries. Finally, 15.1% of new HIV infections are identified in people who inject drugs (PWID), more than one-half of whom are indigenous. The remaining new infections result from a combination of injection drug use and sexual contact between MSM and from unspecified exposure routes.[1]

While emergency departments (ED) serve as an important resource for timely access to HIV post-exposure prophylaxis (PEP), the literature suggests that emergency physicians have not felt confident determining the need for PEP when patients present after sexual contact or the use of injection drugs.[3] Consistent with this finding, recent data show that emergency physicians under prescribe HIV PEP when indicated: in a review of patients presenting to a Vancouver ED, more than one-quarter of those who should have received HIV PEP after a high-risk non-occupational exposure (based on 2005 Centers for Disease Control and Prevention recommendations[4]) did not.[5]

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| Table 1. Risk that a person has transmissible HIV infection[15–17] | |
|---|---|
| Substantial | HIV positive and VL > 40 |
| | HIV unknown but high risk (from a population with a high HIV prevalence compared with the general population) |
| Low | HIV positive with VL < 40 but STI present |
| Negligible | HIV negative |
| | HIV positive with VL < 40 and no STI |
| | HIV unknown, the general population |

HIV = human immunodeficiency virus; STI = sexually transmitted infection; VL = viral load, copies/mL.

| Table 2. Risk of HIV transmission per act by exposure type from an HIV-positive source[14] | | |
|---|---|---|
| High | Receptive anal sex | 1.38% |
| | Needle sharing | 0.63% |
| Moderate | Insertive anal sex | 0.11% |
| | Receptive vaginal sex | 0.08% |
| | Insertive vaginal sex | 0.04% |
| Low | Oral sex | Precise estimates not available |
| | Oral-anal contact | |
| | Sharing sex toys | |
| | Blood on compromised skin | |

In 2017, a Canadian guideline on HIV pre-exposure prophylaxis (PrEP) and non-occupational post-exposure prophylaxis (nPEP)[6] was published to provide clinicians with an evidence-based approach for assessing the risk for HIV, providing antiretroviral medications as a preventative measure, conducting baseline and follow-up testing, and monitoring medication safety. The guideline[6] is the first of its kind in Canada and is broadly consistent with guidelines from Europe, the United Kingdom, the United States, and Australia.[7–10] In this article, we outline the key points that are relevant to the practice of emergency medicine in Canada, with a focus on determining which patients should be treated with nPEP.

## DESCRIPTION

The guideline was developed by a panel of 25 experts from across Canada, with representatives from infectious diseases, primary care, emergency medicine, public health, pharmacy, nursing, and the community. Funding for the work was provided by the Canadian Institutes of Health Research (CIHR; grant number PCS 142089), with in-kind support from the CIHR Canadian HIV Trials Network and a New Investigator Award from the CIHR/Ontario HIV Treatment Network (D.H.S.T.).

Methods for development of the guideline are described in detail.[6] The Grading of Recommendation, Assessment, Development and Evaluation (GRADE) system[11] was used to specify two categories of strength of recommendation and four categories of quality of evidence for each of the recommendations (Appendix 1).

### *Non-occupational post-exposure prophylaxis*

The guideline recommends that nPEP be started in patients who are HIV negative and present within 72 hours of an exposure that is of a moderate or high risk and involves a source person who is HIV positive or at risk for having transmissible HIV (see Table 1). HIV nPEP is not recommended in any other scenarios nor is it recommended beyond 72 hours from the exposure.[6]

The risk for a given exposure type is based on estimates of per-act HIV transmission risk from a known HIV positive source. Receptive anal sex carries the highest risk for transmission, followed (in decreasing order of risk) by needle sharing, insertive anal sex, receptive vaginal sex, and insertive vaginal sex. nPEP is not indicated after oral sex. (See Table 2).

Determining the involved source person's risk for having transmissible HIV in the ED is often difficult. Very rarely is the source person available for interviewing or HIV testing, and, often, the source is not known to the patient. In these cases, a determination of whether the source is at high epidemiologic risk for HIV must be made. In Canada, HIV prevalence is



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**Table 3. Preferred nPEP drug regimens***

| | | |
|---|---|---|
| NRTI backbone | Tenofovir fumarate/emtricitabine (TDF/FTC) 300/200 mg once daily (Grade 1C) | |
| Third drug | Darunavir 800 mg + ritonavir 100 mg once daily (Grade 1A) | Drug interactions common: ritonavir inhibits P450 enzyme system, and darunavir inhibits the CYP 3A4 enzyme system |
| | Or | |
| | Dolutegravir 50 mg once daily (Grade 1C) | Caution in women of childbearing age: may increase neural tube defects in pregnancies conceived while taking medication |
| | Or | |
| | Raltegravir 400 mg twice daily (Grade 1A) | Twice daily dosing<br>Myopathy, elevated CK, and rhabdomyolysis rarely reported |

CK = creatine kinase; NRTI = nucleoside reverse transcriptase inhibitors; nPEP = non-occupational post-exposure prophylaxis.
*A thorough medication history (including prescription drugs, supplements, and herbal preparations) should be taken prior to selecting an nPEP regimen because of the potential for drug-drug interactions.

elevated among MSM, PWID, individuals from HIV-endemic countries, and certain indigenous populations.[1] The HIV epidemic varies geographically across Canada, however, and clinicians should be aware of local epidemiology. In addition, caution is advised when applying epidemiologic constructs to individuals, as this may contribute to stigma and discrimination and may not apply to the source person in question.

The guideline[6] provides recommendations for nPEP after consensual exposures only and does not include specific directives for treating patients after a sexual assault. In centres where sexual assault services are available, patients should be referred accordingly.[6] If these services are not available, the ED physician should consider that circumstances often associated with assault (trauma or bleeding, multiple assailants, or possible presence of a sexually transmitted infection [STI] in the assailant) increase the risk for HIV transmission.

Another scenario not addressed in the guideline[6] is the patient who presents after a needlestick injury from a discarded or abandoned needle (found in a park or garbage). There have not been any documented cases of HIV infection from such injuries[12] and, in general, they are a very low risk for transmission of HIV because the needles in question are often small-bore needles, there is usually minimal blood in the syringe, and HIV does not survive outside the body for prolonged periods.

Certainly not all patient presentations fit neatly into the scenarios defined by the guideline,[6] and nPEP should involve shared decision making with the patient. Each case should be considered on an individualized basis, and if there is uncertainty about whether nPEP is indicated, the emergency physician should obtain subspecialty support.

In addition to HIV serology, baseline laboratory investigations in the ED should include thorough STI testing (urine and mucosal swabs for gonorrhea and chlamydia; serology for syphilis and hepatitis A, B, and C), complete blood count, creatinine, alanine aminotransferase, and pregnancy testing as applicable. Emergency physicians should make onward referrals to other providers who can conduct follow-up testing 12 weeks after the exposure and manage other considerations regarding special populations, ongoing monitoring while on nPEP, and indications for stopping nPEP.[6]

When indicated, medications should be started as soon as possible. When patients are dispensed the full 28-day course of nPEP rather than a starter pack of medications, PEP completion rates are better and there are fewer PEP refusals.[13] However, if the need for continued prophylaxis will be reassessed pending source testing, if there is a concern for drug resistance, or if drug coverage does not include nPEP, starter packs dispensed in the ED are recommended.[6]

Twenty-eight-day nPEP regimens include two nucleoside reverse transcriptase inhibitors (tenofovir disoproxil fumarate [TDF]/emtricitabine [FTC] 300/200 mg orally once daily), plus a third drug (darunavir 800 mg orally once daily plus ritonavir 100 mg orally once daily, Grade 1A) dolutegravir 50 mg orally once daily, Grade 1C; or raltegravir 400 mg orally twice daily, Grade 1A).[6] See Table 3.

### *Pre-exposure prophylaxis*

PrEP is the use of TDF/FTC 300/200 mg orally either once daily or "on demand" on the days surrounding sexual encounters to prevent transmission of HIV. The guideline[6] lists indications for the use of PrEP by MSM



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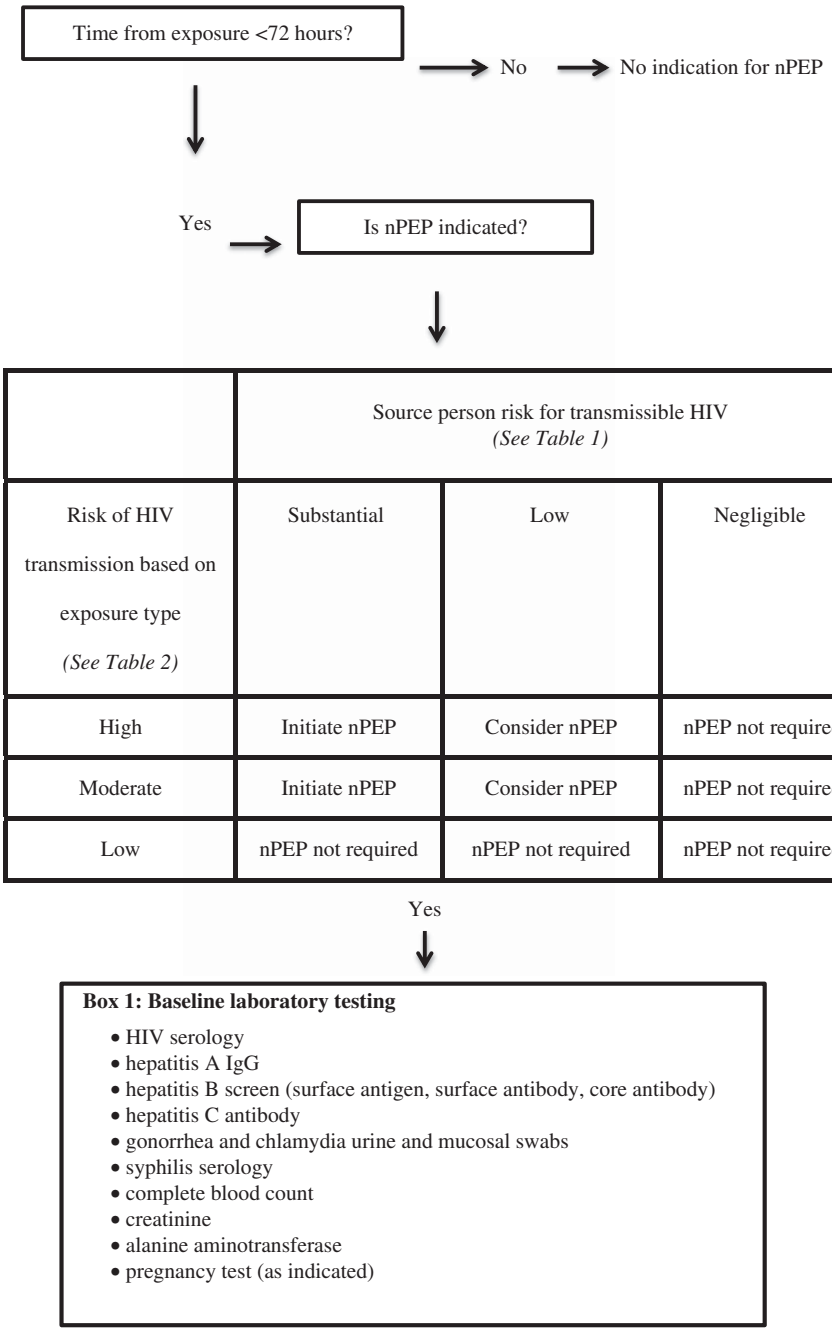


**Figure 1.** Algorithm for HIV nPEP assessment

and transgender women at high risk for infection, as well as at-risk HIV-negative partners in heterosexual serodiscordant relationships, and certain PWID.

Because individuals taking PrEP should be assessed clinically at regular intervals, the ED is not the appropriate setting for initiation of PrEP. It is important, however, that emergency physicians be able to recognize patients who may be candidates for PrEP (for instance, gay, bisexual, or other MSM with recurrent use of nPEP, rectal bacterial STIs, or early syphilis) and refer these patients to their primary care physician or another suitably trained provider for consideration of PrEP initiation.

## SUMMARY

Patients with non-occupational exposures to HIV often present to the ED and are cared for by emergency physicians. Preventing the transmission of HIV is of social



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and economic importance, given the high cost of treating HIV and the young age at which most infections occur (age 30–39 years[1]). Canadian research has shown that there are patients who have had high-risk exposures and were discharged without appropriate treatment.[5] The goal of this article was to update emergency physicians on the new Canadian guideline for nPEP and PrEP to enable the highest standard of care possible. (Figure 1)

**Keywords:** human immunodeficiency virus, non-occupational post-exposure prophylaxis, pre-exposure prophylaxis

**Competing interests:** None declared.

## SUPPLEMENTARY MATERIALS

To view supplementary material for this article, please visit https://doi.org/10.1017/cem.2018.462

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