HIV LEGAL NETWORK
RÉSEAU JURIDIQUE VIH

PROSECUTING HIV-RELATED CRIMINAL CASES IN CANADA:

A MODEL POLICY

Contents

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Introduction

> [C]riminalization of HIV non-disclosure has grave consequences on the lives of the people affected by it and clearly acts as an impediment to achieving our public health objectives.[1]
>
> — **House of Commons Standing Committee on Justice and Human Rights, *Criminalization of Non-Disclosure of HIV Status* (June 2019)**

Canada has been identified as a global hotspot of HIV-related prosecutions. As of 2022, there have been well over 200 prosecutions for alleged HIV non-disclosure in Canada. Canada's use of the criminal law in relation to HIV has been recognized as overly broad and punitive by a wide range of stakeholders including the federal government, the House of Commons Standing Committee on Justice and Human Rights, international health agencies and human rights bodies, Canada's HIV and scientific communities, and women's rights advocates.[2]

In keeping with basic principles governing the prosecutorial function, prosecutors can and should ensure that any prosecutions involving allegations of HIV non-disclosure, exposure, or transmission are conducted in a fair and objective manner, are based on the soundest and most recent medical and scientific evidence, guarantee the rights and dignity of all those involved in a proceeding, and are grounded in the public interest.[3] Sound guidance for handling HIV-related criminal prosecutions can help in this regard, preventing inconsistency and unfairness in the application of the law and avoiding prosecutions that do not reflect these basic principles or stand little prospect of succeeding.[4]

> "Police and prosecutorial guidelines can ensure the protection of individuals against overly broad, uninformed and/or unfair investigations and prosecutions. These guidelines can help to ensure that any police investigation or prosecution is based on the best available scientific evidence relating to HIV, upholds legal and human rights principles, treats like harms alike, and aligns with public health strategies."
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> — UNAIDS, ***Ending overly broad criminalisation of HIV non-disclosure, exposure and transmission: critical scientific, medical and legal considerations*** (2013)

To date, the federal government and some provincial governments have developed prosecutorial policy on HIV-related cases. However, as the House of Commons Standing Committee on Justice and Human Rights recognized in its 2019 report, "[e]xisting prosecutorial directives creating different standards for prosecution of HIV non-disclosure in the provinces results in inconsistent applications of the law in Canada. The Committee believes that this situation urgently needs to be rectified to ensure that all people who have committed similar acts in Canada are treated in the same manner."[5] As such, the Committee recommended the development of a Canada-wide common prosecutorial directive that would notably:

- "end criminal prosecutions of HIV non-disclosure, except in cases where there is actual transmission of the virus;
- ensure that the factors to be respected for criminal prosecutions of HIV non-disclosure reflect the most recent medical science regarding HIV and its modes of transmission and only applies when there is actual transmission having regard to the realistic possibility of transmission. At this point of time, HIV non-disclosure should never be prosecuted if (1) the infected individual has an undetectable viral load (less than 200 copies per millilitre of blood); (2) condoms are used; (3) the infected individual's partner is on PrEP [pre-exposure prophylaxis]; or (4) the type of sexual act (such as oral sex) is one where there is a negligible risk of transmission."[6]

This document is intended to assist prosecution authorities in developing such guidance to avoid the harmful use of the criminal law in relation to HIV and ensure the wise use of scarce prosecutorial resources. Although other sexually transmitted infections may raise similar concerns to HIV, it has overwhelmingly been cases involving HIV that have attracted prosecution and judicial commentary. As such, HIV-related prosecutions are the focus of this document.

Model prosecutorial policy

Below is a model policy for Canadian prosecutorial authorities to adopt to limit the use of the criminal law in cases involving allegations of HIV non-disclosure, exposure, or transmission. The language of this model policy was informed by various sources and draws liberally — and sometimes verbatim — on them. These include:

- the wording of prosecutorial policy already adopted in some jurisdictions in Canada;
- case law, primarily in Canada but occasionally from other jurisdictions where relevant;
- the conclusions of scientific experts in the field of HIV;
- recommendations from Justice Canada and Parliament;
- guidance from international agencies with expertise in law and policy related to HIV, including UNAIDS and the *Guidance for Prosecutors on HIV-related Criminal Cases* issued by UNDP in 2021;[7] and
- recommendations from HIV sector organizations in Canada.[8]

A. Restraint in prosecution

Human immunodeficiency virus (HIV) is first and foremost a public health issue; public health authorities' efforts to detect and treat HIV have resulted in significantly improved health outcomes for those living with HIV in Canada, as well as prevention of its transmission.

Cases involving an allegation of non-disclosure of HIV to a sexual partner are sensitive and complex. The HIV epidemic has disproportionately affected people who are socially and economically marginalized; HIV-related prosecutions are also likely to disproportionately affect these groups. People living with HIV face significant and ongoing stigma, and often discrimination, related to their HIV status. Misinformation about HIV and its transmission contribute to stigma and prejudice against people living with HIV, impeding an effective public health response.

Crown counsel must take care not to prosecute cases in a manner that would undermine public health efforts, discriminate against people living with HIV, or reinforce societal prejudices, preconceptions, and irrational fears about HIV. Prosecutions in relation to HIV should therefore be conducted with restraint and caution and always be informed by the most recent and reliable medical and scientific evidence regarding HIV.

Crown prosecutors should consider the availability and efficacy of interventions by public health authorities under public health statutes as an alternative to criminal prosecution, especially where such interventions with an accused have not been tried. Ensuring complainants have access to support, including counselling and medical care if needed, should be a priority rather than prosecuting alleged non-disclosure.

Cases not warranting prosecution

In keeping with international guidance, Crown counsel should, at minimum, refrain from prosecution in absence of credible evidence that the accused person intentionally transmitted HIV.[9]

Crown counsel shall not proceed with a prosecution for alleged non-disclosure, exposure, or transmission of HIV to a sexual partner if, at the time of the sexual encounter in question,

(a) there was, or the accused person honestly believed there was, no realistic possibility of transmission associated with the activity in question (see below); or

(b) the accused person:

- did not know they were HIV-positive
- was unaware of, or did not understand, how HIV is transmitted;
- reasonably believed their sexual partner was aware of their HIV-positive status and that HIV is a transmissible infection;
- reasonably believed that, given the circumstances of the sexual encounter, their sexual partner was aware of, and consenting to assume, the risks associated with sex with a person of unknown serostatus;
- did not disclose their infection because they had a reasonable fear of violence or other serious negative consequence as a result;
- was forced or coerced into the sexual activity in question; or
- used or ensured practical means to prevent transmission (e.g. antiretroviral treatment, use of a condom, or avoiding certain sexual acts) or was not in a position to do so (e.g. because they did not have reasonable access to treatment, or they reasonably feared violence or other serious negative consequence) or offered to take practical means but their sexual partner rejected that offer.

Use of non-sexual offences

Sexual offences involving coercion, force, and violence should not be equated with cases based on allegations of HIV non-disclosure. HIV non-disclosure prosecutions are distinct from other sexual assault prosecutions because the sexual activity involved is consensual but for the alleged non-disclosure. There are significant concerns that prosecuting HIV non-disclosure in the context of an otherwise consensual sexual encounter as sexual assault is both overly punitive (including the result of mandatory lifetime designation as a sex offender following conviction) and undermines the law of sexual assault as a means of addressing sexual violence.

In exceptional cases where prosecutions are pursued, Crown prosecutors should prioritize non-sexual offences, instead of sexual offences, where non-sexual offences more appropriately reflect the wrongdoing committed. This will permit Crown counsel greater flexibility — including a wider range of resolution and sentencing options — to best ensure protection of the public and fairness to the accused and complainant.

B. Evidentiary test: reasonable prospect of conviction

Understanding the best available science regarding HIV and other STIs

Prosecutions should be informed at all stages by the most reliable evidence. Crown counsel must ensure they have *a correct working understanding* of the current, relevant science about transmission and treatment of HIV. At a minimum, prosecutors should be aware that:

- HIV is not easily transmitted. It is a relatively fragile virus that is transmitted through specific, well-described routes. It is not passed through airborne, droplet, fomite, contact, or vector-borne transmission routes and cannot penetrate intact human skin.
- The possibility of HIV transmission during a single act of oral sex ranges from negligible (in very unusual and extreme circumstances) to none.
- The possibility of HIV transmission during a single act of vaginal or anal sex ranges from low to none, depending on the circumstances. For instance, even in the absence of condom use or a suppressed viral load, the likelihood of transmission during one act of vaginal sex is estimated at 8 in 10,000.
- There is no possibility of HIV transmission during a single act of vaginal, anal, or oral sex when the HIV-positive partner has an undetectable (or "suppressed") viral load.
- There is no possibility of HIV transmission where a latex or polyurethane condom is used correctly, meaning its integrity is not compromised and it was worn throughout the sex act in question.
- The possibility of HIV transmission from vaginal-penile intercourse when the HIV-positive partner has a low viral load or uses a condom, or the HIV-negative partner is taking PrEP varies from none to negligible depending on the context.The possibility of HIV transmission through anal-penile intercourse when the HIV-positive partner has a low viral load or uses a condom, or the HIV-negative partner is taking PrEP varies from none to negligible depending on the context. The likelihood is similar whether the receptive partner is male or female.
- There is no possibility of HIV transmission through saliva, even when it contains small quantities of blood. The possibility of HIV transmission from biting ranges from negligible (in very unusual and extreme circumstances) to none.
- Modern antiretroviral therapies have improved the life expectancy of most people living with HIV who have regular access to them, to the point that their life expectancy is similar to that of HIV-negative people, thereby transforming HIV infection into a chronic manageable health condition.
- Phylogenetic analysis can be compatible with, but cannot conclusively prove, the claim that a defendant has infected a complainant with HIV. Importantly, phylogenetic results can exonerate a defendant when the results rule out the defendant as the source of a complainant's HIV infection.

Such information can be found in the *Expert Consensus Statement on the Science of HIV in the Context of Criminal Law*, which should be consulted by Crown prosecutors dealing with HIV-related criminal cases.[10] In some cases, consulting such a source and other reliable resources (such as those listed in Annex B) can establish quickly and conclusively that there is no scientific basis for a criminal charge or prosecution in a given circumstance, thereby avoiding unnecessary prosecution and the misuse of resources.

Seeking expert scientific opinion

In other, more complex circumstances, Crown counsel should seek an opinion from a qualified scientific expert at the earliest possible occasion and seek further expert opinion as necessary during a prosecution. Such expert opinion should address matters such as the possibility of transmission of HIV associated with the act(s) alleged as the basis for a possible prosecution, and the bodily harm associated with HIV infection.

If transmission from the accused person to the complainant is alleged, then a suitable expert should advise whether the evidence could establish transmission with the legally required degree of certainty. An expert forensic virologist familiar with the complexity and limitations of phylogenetic analysis should be retained if such scientific evidence is being contemplated as part of proving actual transmission.

To facilitate early resolution of cases, Crown counsel should disclose the expert scientific/medical report (or summary opinion and grounds for such opinion) as soon as possible.

Assaults in non-sexual context

As noted above, in cases of **biting, spitting, or otherwise dispersing a bodily fluid** toward or onto another person, the possibility of HIV transmission ranges from negligible (in very unusual and extreme circumstances) to none. Therefore, while such acts may constitute an assault in law, the HIV-positive status of a person accused of such conduct is irrelevant. Crown counsel shall not pursue any prosecution for such conduct based on the HIV-positive status of the accused, nor shall they enhance the charges laid or the sentence sought in the event of a conviction, on this basis.

Sexual assault charges

As noted above, even in instances of **non-disclosure to a sexual partner,** if a prosecution proceeds, Crown counsel should generally prefer the use of non-sexual offences. In the event a prosecution for (sexual) assault proceeds, Crown counsel must keep in mind the following necessary elements of proof (pursuant to *R v Cuerrier,* [1998] 2 SCR 371, *R v Mabior,* 2012 SCC 47):

- the accused person must have known they were living with HIV before the sexual act;
- the accused person did not disclose they were living with HIV before the sexual act;
- the sexual act involved an actual transmission, or realistic possibility of transmission, of HIV;
- the complainant would not have consented to the sexual act had they known the accused was living with HIV.

Where the complainant knew of the accused person's HIV status prior to the sexual act and consented to the sexual act, there is no "fraud" and no offence.

Where there was no actual transmission or realistic possibility of transmission, there is no "fraud" and no offence.

Significant risk of serious bodily harm / Realistic possibility of HIV transmission

The current application of the law of sexual assault to HIV non-disclosure requires that the Crown prove a "significant risk of serious bodily harm" before non-disclosure of HIV may constitute "fraud" vitiating consent to sex: *R v Cuerrier,* [1998] 2 SCR 371. Crown counsel should consult a qualified scientific expert as to whether, in the circumstances of a given case, there is credible evidence to meet this evidentiary requirement.

In the specific context of HIV, a significant risk of serious bodily harm means a "realistic possibility of HIV transmission": *R v Mabior,* 2012 SCC 47. For greater clarity, in a case involving HIV, a prosecution will not proceed:

- in the case of vaginal or anal sex,
  - if the accused person had a viral load that was **suppressed** (e.g. under 200 copies per ml of blood) or **low** (e.g. under 1500 copies per ml of blood), or likely had a low or suppressed viral load because they were **taking treatment** as prescribed; or
  - if there was the **use of a condom** made of latex, polyurethane, or other material that the evidence establishes is equally as effective in impeding the transmission of HIV; or
  - if the accused person was advised or aware that their sexual partner was following a course of pre-exposure prophylaxis **(PrEP)** with anti-retroviral medication;
- in the case of **oral sex**.

Presence or absence of *mens rea*

Mens rea — including an intent to transmit HIV — cannot be presumed or established simply because a person did not disclose their HIV/STI-positive status or engaged in certain activity (e.g. sex without a condom). There are various reasons a person might misrepresent or not disclose their status or might not be in a position to use precautions to prevent HIV. It does not mean they intended to cause harm to their partners or disregarded their partner's health. The context and circumstances in which the alleged misrepresentation or non-disclosure occurred — including the mental state of the person living with HIV and the reasons for the alleged behaviour — should be taken into consideration.

To establish intent to transmit, it is necessary to prove an accused took active steps to transmit the virus to their partner, either for the specific purpose of doing so or knowing with virtual certainty that transmission would result.

Conversely, taking precautions to prevent or reduce the possibility of transmission of HIV would be a factor negating the existence of any intent to cause harm and could, depending on the circumstances, also negate the existence of recklessness or criminal negligence. So, too, could be an honest belief that a partner was taking effective precautions to prevent HIV transmission (e.g. using a condom, taking pre-exposure prophylaxis).

Crown counsel should consider such factors in assessing whether the evidence establishes the *mens rea* required for the potential charge.

C. Public interest considerations

In the specific context of HIV/STI-related prosecutions, Crown counsel shall consider the following factors in assessing whether a proposed prosecution is in the public interest:

- whether non-disclosure of HIV-positive status was an isolated or infrequent incident, or whether there is credible evidence of a history of non-disclosure repeatedly placing sexual partners at a significant risk of infection
- whether there was mere non-disclosure of HIV status or whether the accused person took active steps to deceive or mislead the complainant about their HIV status
- the possible power imbalance in intimate or other relationships — i.e. whether the accused person took advantage of the complainant's vulnerable or subordinate position, but also whether the accused person was in a vulnerable or subordinate position to the complainant
- if a condom was used but slipped or broke during the sexual encounter, the person living with HIV immediately disclosed their HIV status to their partner, making it possible for their partner to seek immediate medical advice and, if appropriate, start on a course of anti-HIV medications (post-exposure prophylaxis)
- whether interventions by public health authorities have been attempted and exhausted, including options available under applicable public health legislation to reduce a well-founded concern about ongoing risk to the health of others
- the potentially unduly harsh or oppressive consequences of prosecutions and a conviction for the defendant, including the health and safety risks that incarceration poses for a defendant living with HIV, potential impact on a person's immigration status, and any ancillary sentencing provisions that may come into play in cases of conviction, including when sexual offence charges are used to prosecute a person living with HIV (e.g. mandatory designation as a sex offender, and the requirement to complete sex offender programming in prison as a condition of release) the impact of prosecution and, in the event of a conviction, of a likely or possible sentence (e.g. incarceration) on others, such as children or other dependants of the defendant
- whether a criminal proceeding offers a realistic prospect of achieving some meaningful remedy or acknowledgment of a complainant's legitimate grievance (e.g. recognition of harm experienced)
- whether alternatives to prosecution, including diversionary measures and possible restorative justice programs, may offer a satisfactory resolution.

D. Bail (judicial interim release)

There is a constitutional presumption in favour of judicial interim release. Detention in custody can have disproportionate health consequences for people living with HIV or AIDS, including potential interruptions of HIV antiretrovirals or other medical care. Both HIV and sexual offences are heavily stigmatized in detention facilities, which means a greater risk of threats and violence toward person living with HIV who is detained pending trial for a sexual offence. In addition, measures for preventing HIV transmission in custodial settings are far from equivalent to those available in the community.

Crown counsel should generally consent to the release of people charged with offences involving HIV non-disclosure; only in rare cases should the Crown oppose bail. Crown counsel should ask for bail conditions that are proportionate and rationally linked to the alleged offence. Bail conditions should not disproportionately violate an accused person's right to privacy and their sexual and physical integrity.

E. Conduct of the prosecution

Crown counsel must take care not to prosecute cases in a manner that would reinforce societal prejudices, preconceptions, and irrational fears regarding HIV, or undermine public health efforts to prevent the spread of HIV and other STIs.

Protecting privacy of complainants and accused persons

Prosecutions of alleged sexual offences can attract significant publicity, even more if they involve allegations of non-disclosure or transmission of HIV, which remains a highly stigmatized health condition. The Supreme Court of Canada has recognized that the loss of privacy related to a stigmatized medical condition can pose a serious risk to the dignity of a person involved in a legal proceeding; depending on the facts of a case, this can be sufficient grounds to limit court openness and grant privacy protections in a legal proceeding: *Sherman Estate v. Donovan,* 2021 SCC 25. In particular, the Court noted that it must be considered whether the information reveals something intimate and personal about the individual, their lifestyle, or their experiences.

Both a complainant who is compelled by the process of the prosecution to share intimate personal information such as sexual activity, and a defendant who by definition is facing an allegation (not a proven set of facts), have strong privacy interests. Aside from its inherent value, protecting privacy may enable witnesses to give a fuller and more candid account when testifying. It may also help protect witnesses against intimidation or retaliation in some cases. Crown counsel should also keep in mind the negative impacts of publicly disclosing a person's HIV-positive status given the high level of stigma experienced by people living with HIV.

At every stage of the prosecution, Crown counsel should ensure that the privacy interests of both the accused and complainant(s) are considered, including maintaining the confidentiality of their identity and their HIV status to the greatest extent possible. To this end, Crown counsel (along with defence counsel and the court) should consider taking or requesting various measures to protect privacy, at trial but also before trial and in any related preliminary or subsequent proceedings. Such measures could include court orders that:

- permit receiving evidence from specific witnesses *in camera*;
- protect the identity of participants in the proceeding by redacting documents and/or requiring the use of initials only or pseudonyms in the proceeding and any court records accessible to the public;
- limit the introduction of information from confidential medical records to that which is strictly related to the facts at issue in the proceeding;
- restrict access to documents filed in the court proceeding to prevent broader public disclosure of such information;
- prevent the broader publication, via any document, media broadcast, or other transmission (including releases by police forces, for example), of the identities of the complainant and defendant or any information that could identify them; or
- exclude the public from the courtroom, restricting access to close family, friends, or supporters of the complainant and defendant, and perhaps access to news media subject to a publication ban such as that described above.

Avoiding prejudicial or inflammatory commentary

In addition, given the stigma surrounding HIV and common societal prejudices attached to the discussion of HIV (including issues of gender, sex, sexuality, and drug use), Crown counsel should avoid arguments or comments — to the jury and/or judge at trial, and to media before, during, or after trial — that are inaccurate, misleading, inflammatory, or prejudicial, and could therefore lead to an unfair trial or appeal. These include such conduct as appealing to fear, emotion, or prejudice, including using inflammatory or stigmatizing language (e.g. referring to HIV as "a death sentence" or referring to people with HIV, such as a defendant, with terms such as "AIDS carrier").

F. Sentencing

Crown counsel should ensure there is neither discrimination nor disproportionality in sentencing. In the context of HIV-related criminal prosecutions, experience suggests that this is a serious concern, with the potential for HIV-related stigma and prejudices of various kinds to taint the sentencing process, as with other stages of a prosecution.

A person's HIV-positive status is never justification for the imposition of a custodial sentence, nor is a person's sexual orientation, gender identity, migrant status, substance use, or their sale or purchase of sex. Nor are these grounds for harsher or more stringent sentences, or for conditions of parole or probation following release from custody. Crown counsel should assist the court in considering gender and other potentially relevant factors. Among other things, this means evaluating the effects of gender-based or other violence that a defendant may have experienced, or a defendant's pregnancy or care responsibilities (and impact of the defendant's incarceration on any dependants). Similarly, a defendant's other circumstances (e.g. health status, sexual orientation or gender identity, migrant status) that may play into the burden of incarceration or other, non-custodial sentence must be considered at sentencing, to avoid undue hardship and avoid undermining prospects for rehabilitation. As detailed in the discussion on bail above, a custodial sentence can have disproportionate health consequences for people living with HIV or AIDS.

Crown counsel must also consider the historic over-representation of certain communities, in particular Black and Indigenous people, in the criminal justice system and in federal and provincial correctional systems. In HIV-related prosecutions, as in other prosecutions, Crown counsel must have regard to the guidance provided by the courts (e.g. *R v. Gladue*, [1999] 1 S.C.R. 688; *R. v. Ipeelee,* 2012 SCC 13) and other applicable policy in relation to sentencing Indigenous or other racialized accused.

As with other prosecutions, Crown counsel should seek a custodial sentence only when no other penalty would be proportionate to the seriousness of the offence and how it was committed, considering any aggravating and mitigating factors. In the specific context of prosecutions related to HIV, these may include the following:

- factors contributing to the defendant's lack of access to appropriate medical information and treatment;
- a defendant's reasonable fear that disclosing their status to a sexual partner, or taking or proposing steps to reduce the possibility of transmission (e.g. condom use, refraining from certain sexual acts), could result in violence or other serious negative consequence;
- absence of transmission of HIV as a mitigating factor; and
- potential negative health and safety consequences of incarceration for a person living with HIV.

Even in cases where the HIV transmission or exposure in question arises in the context of a sexual encounter, HIV-related matters are not sexual offences *per se*. Therefore, in the exceptional circumstance where Crown counsel has proceeded with a sexual offence prosecution (e.g. sexual assault), counsel should, where possible, avoid invoking the various ancillary sentencing provisions that may come into play in cases of a conviction.

HIV and the criminal law in Canada

The *Criminal Code* does not include any offence specifically criminalizing HIV transmission, exposure, or non-disclosure; prosecutions to date have taken place under various provisions of the *Code*.

There have been at least a dozen instances in which criminal charges have been laid (or intensified) against a person living with HIV for biting or spitting, despite the long-established evidence that HIV is not transmitted through such means. However, the vast majority of prosecutions have arisen from allegations of non-disclosure of (known) HIV-positive status to a sexual partner.

As of December 2020, there had been at least 224 prosecutions related to non-disclosure documented, most of them involving alleged exposure to HIV rather than actual transmission.[11] The obligation to disclose one's HIV-positive status before sex has been established through judicial interpretation of *Criminal Code* provisions of general application. Importantly, HIV disclosure is not a blanket obligation. In 1998, the Supreme Court of Canada ruled that people living with HIV have a legal obligation to disclose to a sexual partner before sexual activity that poses a **"significant risk of serious bodily harm"**: *R v Cuerrier,* [1998] 2 SCR 371. The Court ruled that in such a circumstance, not disclosing or actively misrepresenting one's HIV-positive status could constitute "fraud" that vitiates consent to sex, transforming the otherwise-consensual sexual encounter into sexual assault (pursuant to *Criminal Code* s. 265). The Court ruled that the Crown must also establish that the complainant would not have consented to sex if they had known their partner's HIV-positive status. In 2012, the Court clarified that a "significant risk" exists when there is a **"realistic possibility of transmission of HIV"**: *R v Mabior,* 2012 SCC 47; *R v DC,* 2012 SCC 48.[12] Therefore, the interpretation and application of this standard is a key consideration for prosecutors (and for courts) and must be informed by the best available scientific evidence (see below).

Evolution in the law

In *Mabior,* the Supreme Court of Canada expressly concluded there is **no obligation to disclose** HIV-positive status when having vaginal or anal sex if a **condom** is used **and** the HIV-positive partner has a **"low" viral load** (which it defined, based on the evidence before it, as fewer than 1500 copies/ml). The Court concluded that, in such circumstances, there is no realistic possibility of transmission. This combination of two factors was the only circumstance in which the Supreme Court was prepared, based on the evidence before it in that case, to say clearly that there was no duty to disclose. However, the Court did say there might be other circumstances in which there would be no duty to disclose because there is no realistic possibility of transmission. The Court said that its ruling "*does not preclude the common law from adapting to future advances in treatment and to circumstances where risk factors other than those considered in this case are at play.*"[13]

Some have interpreted the Supreme Court's *Mabior* ruling as always requiring both condom use and a low viral load to negate the existence of a "realistic possibility of HIV transmission" in the case of vaginal or anal sex.[14] However, this interpretation is contested and is increasingly in doubt given the expert scientific consensus to the contrary and subsequent developments in the law. Some courts have expressly considered and rejected this interpretation as too narrow; they note that *Mabior* cannot be understood correctly as requiring the courts to ignore the scientific evidence before them in each case, especially regarding factors such as an accused's viral load and condom use. The Supreme Court itself has not yet revisited the matter. Note that in several jurisdictions, prosecutorial policy has also already moved beyond this narrower interpretation and application of *Mabior,* with respect to each of the factors of viral load and condom use.

Viral load

Since *Mabior,* the law relating to viral loads has evolved significantly — as has prosecutorial practice, and in some jurisdictions, prosecutorial policy. While some courts originally asserted that *Mabior* means an undetectable viral load alone was not enough to negate a realistic possibility of transmission,[15] more recent decisions have concluded the opposite. For example, judges in Nova Scotia trial courts have accepted, based on the scientific evidence before them, that an undetectable viral load is sufficient *per se* to preclude a realistic possibility of transmission: *R v JTC,* 2013 NSPC 88 (YJ Ct) and *R v JTC,* 2013 NSPC 105. Similarly, in Ontario, in *R v. CB,* 2017 ONCJ 545, the court acquitted the accused because his undetectable viral load meant there was no realistic possibility of transmission. In at least five other cases since *Mabior,* charges have been withdrawn based on the accused person's undetectable viral load. Finally, in a 2019 case in Ontario, the accused person had not used a condom for vaginal sex but was acquitted because his viral load, although not "undetectable," was "low" (under 1500 copies/mL); given the expert evidence, the trial judge concluded the Crown had not established a realistic possibility of transmission in such a circumstance: *R v Vatcher* (22 November 2019), Ottawa, Court File No. 0411-998-17-51-27 (OCJ.)

Viral load and HIV transmission

Viral load is a measure of the amount of HIV in a person's blood. Having a reduced viral load improves health and decreases, and can even eliminate, the risk of HIV transmission. With effective treatment, viral load drops to levels that are "undetectable."

Based on the most recent medical evidence, there is no possibility of HIV transmission through sex by someone with an "undetectable" viral load.[16] This has also been summarized in the "Undetectable = Untransmittable" consensus statement.[17] This scientific reality was recognized in 2017 by the Council of Chief Medical Officers of Health from across Canada,[18] and on World AIDS Day 2018, the Canadian government endorsed "U=U."[19]

For the purpose of the criminal law in Canada, so far, a "low" viral load has been defined as a viral load below 1500 copies/ml and an "undetectable" (or "suppressed") viral load has been defined as a viral load below 200 copies/ml, but these definitions might evolve depending on developments in the science.[20]

Condom use

The Supreme Court contemplated from the outset in *Cuerrier* that condoms *might* suffice to preclude criminal liability, and that this would be a live issue for proof and adjudication in a given case.[21] Applying *Cuerrier,* Canadian courts subsequently ruled on numerous occasions that the Crown must prove that sex had occurred without a condom in order to reach the threshold of a "significant risk" — meaning the law does not extend to criminalizing non-disclosure by people living with HIV who use condoms because the possibility of transmission was sufficiently low.[22] Courts in other Commonwealth jurisdictions have also expressly recognized that condom use *per se* can preclude criminal liability for HIV non-disclosure.[23]

Subsequently, in 2012, the Supreme Court of Canada declined in *Mabior* to "take judicial notice that condom use always negates a significant risk of serious bodily harm" (i.e. a realistic possibility of HIV transmission), in the absence of a scientific consensus on this point.[24] However, as several courts have expressly recognized since, this does not mean that condom use alone could never negate a realistic possibility of transmission; rather, courts must have regard to the evidence before them in a given case, and *Mabior* does not mandate otherwise: *R v JTC,* 2013 NSPC 88 (YJ Ct) and *R. v. J.T.C.,* 2013 NSPC 105; *R v. Thompson,* 2016 NSSC 134.

> "There must be a realistic possibility of transmission. It is negated by a low viral load and the use of a condom. The court [in *Mabior*] does not state that that is the only way in which it can be negated. It does not state that an expert opinion which establishes that the risk of transmission in a particular case is effectively zero is irrelevant. That would be tantamount to saying that the facts just don't matter and that a person with HIV is presumed to be infectious despite the facts... [*Mabior* and *D.C.*] were, in my view, not intended to substitute scientific facts with legal conclusions."
>
> **— *R v J.T.C.*, 2013 NSPC 105 at para 85, applied in *R v. Thompson*, 2016 NSSC 134**

The scientific consensus, from both Canadian and international HIV experts, is that the possibility of HIV transmission associated with vaginal sex with a condom varies from none to negligible depending on the context, because correct use of a condom during sex means HIV transmission is not possible, as HIV cannot pass through intact latex or polyurethane. Prosecutors and courts therefore have a sound basis on which to conclude that no prosecution or conviction is warranted in a case where condoms have been used for vaginal or anal sex; *Mabior* does not preclude this.

This has been reflected in some judicial commentary and prosecutorial guidance since *Mabior* but remains unsettled in the law. As was originally the case with the question of viral load, at least one court has interpreted *Mabior* as ruling that condom use alone does not negate the realistic possibility of transmission (and it must instead always be accompanied by a low viral load in the person living with HIV): *R v NG,* 2020 ONCA 494. In contrast, at least one court has ruled that, regardless of an accused's viral load, correct condom use was *per se* sufficient to preclude a realistic possibility of transmission, and acquitted a person accused of HIV non-disclosure on this basis: *R v. Thompson,* 2016 NSSC 134 (finding not disturbed on appeal, 2018 NSCA 13). The directive by the Attorney General of Canada to federal prosecutors notes that prosecution should generally not occur in cases where a condom has been used, and prosecutorial policy in at least one province notes that condom use is a factor that may weigh against prosecution (see Annex A).

Condom use and HIV transmission

Canadian consensus statement (2014)

"Condoms are a cornerstone of HIV prevention. Latex and polyurethane condoms act as an impermeable physical barrier through which HIV cannot pass. **When used correctly and no breakage occurs, condoms are 100% effective at stopping the transmission of HIV...** Where the present consensus statement discusses the possibility of HIV transmission in the context of condom use, it is assumed that the condom was applied to the penis and worn throughout sex, and that no condom breakage occurred."

"Where a condom is used or where the HIV-positive individual is on effective antiretroviral therapy, vaginal-penile intercourse poses a negligible possibility of transmitting HIV."

"Where a condom is used, anal-penile intercourse poses a negligible possibility of transmitting HIV regardless of the HIV-positive individual being on effective antiretroviral therapy."

Source: M. Loutfy, M. Tyndall et al., "Canadian Consensus Statement on HIV and its transmission in the context of the criminal law," *Canadian Journal of Infectious Diseases & Medical Microbiology* 2014; 25(3): 135-140.

International expert consensus statement (2018)

"Correct use of a condom (either male or female) prevents HIV transmission because the porosity of condoms is protective against even the smallest sexually transmissible pathogens, including HIV; **latex and polyurethane condoms act as an impermeable physical barrier through which HIV cannot pass.** Correct condom use means the integrity of the condom is not compromised and the condom is worn throughout the sex act in question. **Correct use of a condom during sex means HIV transmission is not possible."**

Source: F. Barré-Sinoussi et al., "Expert consensus statement on the science of HIV in the context of criminal law," *Journal of the International AIDS Society* 2018; 21: e25161 (25 July 2018), online: https://onlinelibrary.wiley.com/doi/full/10.1002/jia2.25161

Use of sexual assault charges

Concerns about prosecuting HIV non-disclosure as (aggravated) sexual assault have been increasingly identified by both the HIV sector and advocates for complainants (predominantly women) in sexual assault cases. Justice Canada has recommended the use of non-sexual offences in cases that are less blameworthy,[25] and the federal Attorney General has also directed the Public Prosecution Service of Canada to use non-sexual offences in such circumstances.[26] In addition to recommending reforms to limit the "overcriminalization of HIV" in various ways, the Standing Committee on Justice and Human Rights specifically urged an immediate end to the use of sexual assault charges:

"The Committee agrees with witnesses that the use of sexual assault provisions to deal with HIV non-disclosure is overly punitive, contributes to the stigmatisation and discrimination against people living with HIV, and acts as a significant impediment to the attainment of our public health objectives. The consequences of such a conviction are too harsh and the use of sexual assault provisions to deal with consensual sexual activities is simply not appropriate."[27]

Concerns with HIV criminalization

There is mounting evidence and concern that using the criminal law to address HIV non-disclosure, exposure, and/or transmission ("HIV criminalization") is not effective public health policy and can do more harm than good to human rights and to public health. The available evidence has not demonstrated that HIV criminalization has any significant HIV prevention benefit.[28] In fact, research shows that HIV criminalization damages HIV prevention efforts[29] in various ways, while also raising significant human rights concerns:

- To the extent that activities posing little or no risk of transmission are treated as crimes, criminalization perpetuates and exacerbates misinformation about the nature of HIV and its transmission.[30]
- In addition to often spreading misinformation, criminal prosecutions contribute to exaggerated fear of people living with HIV and to HIV-related stigma,[31] as well as to fear of prosecution on the part of people living with HIV.[32]
- A fear of prosecution, including for activities posing little or no risk of transmission, discourages HIV testing for some individuals.[33]
- Criminalization hinders access to, and erodes trust in, voluntary approaches to HIV prevention, including HIV counselling, with resulting harms to both individual and public health. It is routine in HIV-related prosecutions that a person's HIV and other test results and discussions with medical and other professionals are introduced as evidence against them, and doctors and nurses may be compelled to testify in courts against their patients. This discourages open discussion of risk activities and information about partners with testing providers and other health care providers, discussions that are essential for the provision of appropriate care and support and/or for contact tracing.[34]
- Women's rights advocates have highlighted that HIV criminalization does not address gender-based violence and other inequalities, factors that are intertwined with women's HIV risk,[35] and instead can exacerbate these risks for women living with HIV.[36] People living with HIV who are in abusive relationships — who are disproportionately women — face the possibility of being threatened with criminal accusations of HIV non-disclosure, exposure, or transmission as means of control and coercion.[37] HIV criminalization has also been found to undermine access to health care for women living with HIV.[38]
- Discriminatory application of the law is another concern. Available data shows that prosecutions — or the threat of prosecution — for alleged HIV non-disclosure, exposure, or transmission disproportionately affect particular communities, such as Black and Indigenous people and gay, bisexual, and other men who have sex with men, a concern noted by Justice Canada and the Standing Committee on Justice and Human Rights.[39] Meanwhile, media coverage of HIV-related criminal prosecutions has focused disproportionately on Black and/or migrant defendants, and reflected or contributed to troubling racist stereotypes.[40]

Annex A: Existing guidance for prosecutors on HIV-related criminal cases

Federal directive

In 2016, the Minister of Justice and Attorney General of Canada recognized the problem of the "overcriminalization of HIV" and said that "the criminal justice system must adapt to better reflect the current scientific evidence on the realities of this disease."[41] Justice Canada subsequently released its report on the Criminal Justice System's Response to the Non-Disclosure of HIV.[42] Informed by that report, in 2018 the Attorney General of Canada issued a directive to the Director of the Public Prosecution Service of Canada (PPSC).[43]

The Attorney General's directive recognizes that:

- "HIV is first and foremost a public health issue, and public health authorities' efforts to detect and treat HIV have resulted in significantly improved health outcomes for those living with HIV in Canada, as well as prevention of its onward transmission;"
- "persons from marginalized backgrounds such as, for example, Indigenous, gay and Black persons, are more likely than others to be living with HIV in Canada such that criminal laws that apply to HIV non-disclosure are likely to disproportionately impact these groups;"
- "the issue of whether sexual activity poses a realistic possibility of transmission is to be determined on the basis of the most recent medical science on HIV transmission", and "the most recent medical science shows that the risk of HIV transmission through sexual activity is significantly reduced where: the person living with HIV is on treatment; condoms are used; only oral sex is engaged in; the sexual activity is limited to an isolated act; or, the person exposed to HIV, for example as a result of a broken condom, receives post-exposure prophylaxis."

The operative provisions of the directive to the Director of the PPSC read as follows:

a) "The Director shall not prosecute HIV non-disclosure cases where the person living with HIV has maintained a **suppressed viral load,** i.e., under 200 copies per ml of blood, because there is no realistic possibility of transmission.

b) The Director shall generally not prosecute HIV non-disclosure cases where the person has not maintained a suppressed viral load but **used condoms** or engaged only in **oral sex** or was **taking treatment as prescribed,** unless other risk factors are present, because there is likely no realistic possibility of transmission.

c) The Director shall prosecute HIV non-disclosure cases using **non-sexual offences,** instead of sexual offences, where non-sexual offences more appropriately reflect the wrongdoing committed, such as cases involving lower levels of blameworthiness.

d) The Director shall consider whether **public health** authorities have provided services to a person living with HIV who has not disclosed their HIV status prior to sexual activity when determining whether it is in the public interest to pursue a prosecution against that person."

Provincial policies

Ontario

In December 2017, Ontario's Attorney General and Minister of Health and Long-Term Care issued a joint statement that they "believe strongly that HIV should be considered with a public health lens, rather than a criminal justice one, wherever possible."[44] The statement was accompanied by a short amendment to the policy on sexual offences in the *Crown Prosecution Manual* of the Ministry of the Attorney General.[45]

That policy states there is no realistic possibility of HIV transmission in any case where

- **a condom is used and there is a low viral load;**
- a person living with HIV is on antiretroviral therapy and has maintained a **suppressed viral load** for six months. (The term "suppressed viral load" is defined as meaning below 200 copies/ml.)

The policy states that, in such cases, a prosecution will not proceed in Ontario. The first circumstance is, evidently, based on the Supreme Court's ruling in *Mabior,* which accepted that the combination of a condom and a low viral load negates a realistic possibility of transmission. While the second circumstance goes beyond a narrow interpretation of *Mabior,* it is well founded on the scientific consensus that there is no realistic possibility of transmission when a person has a suppressed viral load.

Ontario's policy is silent as to prosecution in any other circumstances, including in cases of condom use alone or oral sex, and does not address any other matters, including any public interest factors to be considered.

British Columbia

In British Columbia, the BC Prosecution Service (BCPS) issued an updated policy in April 2019 regarding cases in which it is alleged that a sexual assault has occurred because of the "fraud" of HIV non-disclosure.[46] The BCPS policy underscores the need to pay careful attention to the best available scientific evidence and to public interest considerations, including human rights:

> "Scientific evidence shows that the possibility of HIV transmission varies depending on factors including the nature of sexual activity, viral load, and condom use. Crown Counsel assessing charges under this policy must ensure that current scientific knowledge informs their charge assessment decisions and must exercise caution when considering prosecution.
>
> Proposed charges that fall under this policy raise significant issues of individual and public health, equality, and autonomy. Crown Counsel must carefully balance the need to protect the general public and the individual and sexual autonomy of victims while also ensuring that persons living with HIV are not subject to criminalization or stigmatization solely based on their illness."

The BCPS policy also identifies the necessary elements of proof, based on the current state of the law in Canada regarding the application of the sexual assault provisions in cases of alleged HIV non-disclosure (*R v Cuerrier,* [1988] 2 SCR 371; *R v Mabior,* 2012 SCC 47):

- "the accused must have known they were living with HIV before the sexual act;
- the sexual act involved an actual transmission, or realistic possibility of transmission, of HIV;
- before the sexual act, the accused failed to disclose they were living with HIV; and,
- the complainant would not have consented to the sexual act had they known the accused was living with HIV."

In considering the "realistic possibility of HIV transmission" test established by the Supreme Court in *Mabior,* the BCPS policy states as follows:

> "In the following specific situations, there would be no realistic possibility of transmission and, therefore, charges should not be approved:
>
> - during each act of vaginal or anal sex **a condom was correctly used and the person living with HIV had a low viral load**[47]
> - the person living with HIV accepted and adhered to a regime of antiretroviral therapy and maintained a **suppressed viral load** of less than 200 copies/ml of consecutive measurement every four to six months
> - the parties to the sexual act only engaged in **oral sex,** and no other risk factors were present."

The BCPS policy also identifies various factors that may weigh in favour of, or against, a prosecution:

> "Public Interest Factors that Weigh in Favour of Prosecution
>
> - HIV was actually transmitted to the complainant through the sexual act(s)
> - the person living with HIV engaged in repeated sexual acts that significantly increased the opportunity for transmission to one or more complainants
> - the person living with HIV took active steps to deceive or mislead the complainant about their HIV status

Public Interest Factors that May Weigh Against Prosecution

- a medical health officer has imposed enforceable conditions under the Public Health Act upon the person living with HIV, which effectively address any public safety concerns
- the person living with HIV is taking appropriate steps under medical supervision to effectively address the risk to the public
- the person living with HIV is a marginalized or vulnerable person who lacked a support network or other means to access appropriate medical information and treatment
- the person living with HIV correctly used a condom during a single act of vaginal or anal sex and HIV was not transmitted despite having a low viral load and correctly using a condom during each act of vaginal or anal sex, if the condom slipped or broke during or after the sex act and the person living with HIV immediately disclosed their HIV status to their partner, making it possible for their partner to seek immediate medical advice and, if appropriate, start on a course of anti-HIV medications (post-exposure prophylaxis)"

Other provinces

In **Alberta,** the position of prosecution authorities appears to be the same as in Ontario. There is no official guideline or directive in place. However, in January 2019, the Assistant Deputy Minister of Justice responsible for the provincial prosecution service articulated its position in a letter to community advocates as follows:[48]

> "In response to the medical information provided by the Public Health Agency of Canada in Justice Canada's report, *Criminal Justice System's Response to Non-Disclosure of HIV,* Crown prosecutors have been advised that there is no realistic possibility of HIV transmission between sexual partners when someone living with HIV is taking treatment and has maintained a suppressed viral load on consecutive measurements taken four to six months apart. A prosecution will not occur in these circumstances.
>
> Crown prosecutors have also been advised that medical research in this area is ongoing and that a medical opinion should be sought when assessing realistic possibility of transmission to ensure the most up-to-date medical research and treatment is being considered."

In **Quebec,** there is no official guideline or directive in place. In a September 2019 letter to community advocates, the head of the provincial public prosecution service stated its position as follows:[49]

- a prosecution should not proceed in the event that a condom is used and the viral load of the person living with HIV is low (i.e., below 1500 copies/ml), and the accused person was taking treatment as prescribed and had a viral load below 200 copies/ml, as measured by consecutive laboratory tests every 4 to 6 months; and
- whether there is a "realistic possibility of transmission" of HIV is evaluated on a case-by-case basis based on the facts of the case and the most current scientific and medical evidence available, in the case of oral, vaginal or anal sex with a condom and in the case of oral sex without a condom, even in the absence of antiretroviral treatment.

No other provinces currently have any official, published policy address prosecutions in HIV-related criminal cases.

Parliamentary recommendation for consistent policy nation-wide

In 2019, following its study, the House of Commons Standing Committee on Justice and Human Rights noted as follows:

> "The Committee recognizes the limitation of a federal directive on HIV non-disclosure as it applies only to prosecutions in the three territories. The Committee agrees with witnesses that prosecutorial directives creating different standards for prosecution of HIV non-disclosure in the provinces results in inconsistent applications of the law in Canada. The Committee believes that this situation urgently needs to be rectified to ensure that all people who have committed similar acts in Canada are treated in the same manner.
>
> Given that the revisions to the *Criminal Code* that are needed to deal more appropriately with HIV non-disclosure will take some time and that the appropriate mental element for the new offence must be determined, the Committee recommends, in the interim:
>
> **Recommendation 2**
>
> That the Minister of Justice and Attorney General of Canada immediately establish a federal-provincial working group to develop a common prosecutorial directive to be in effect across Canada
>
> - to end criminal prosecutions of HIV non-disclosure, except in cases where there is actual transmission of the virus;
> - to ensure that the factors to be respected for criminal prosecutions of HIV non-disclosure reflect the most recent medical science regarding HIV and its modes of transmission and only applies when there is actual transmission having regard to the realistic possibility of transmission. At this point of time, HIV non-disclosure should never be prosecuted if (1) the infected individual has an **undetectable viral load** (less than 200 copies per millilitre of blood); (2) condoms are used; (3) the infected individual's partner is on **PrEP;** or (4) the type of sexual act (such as **oral sex**) is one where there is a negligible risk of transmission."

International guidance

In June 2021, the UN Development Programme (UNDP) issued its global *Guidance for prosecutors on HIV-related criminal cases*.[50] This document presents 10 key principles to assist prosecutors in handling cases involving an allegation of HIV non-disclosure, exposure, or transmission. Each principle and its accompanying commentary are grounded in a consideration of the best available scientific evidence, applicable international human rights standards, and the widely agreed professional standards governing the prosecutorial function within the criminal justice system. The guidance was informed by a review of relevant literature and consultations with people living with HIV, lawyers, prosecutors, judges, academics, human rights advocates, and representatives of international organizations.

UNDP, *Guidance for HIV-related criminal prosecutions* (2021):

General principles

1. Prosecutions should be informed at all stages by the most reliable evidence.
2. Prosecutors should ensure that the rights of the complainant, the defendant and witnesses are respected throughout every stage of the prosecution.

Deciding whether and how to prosecute

3. Prosecutors should pursue prosecutions in only limited circumstances, as HIV is most effectively addressed as a public health matter.
4. Prosecutors should establish a sufficient evidentiary basis for a prosecution.
5. Prosecutors should consider whether a prosecution in a given case is in the public interest.

Pre-trial and trial considerations

6. Prosecutors should generally consent to pre-trial release, absent exceptional circumstances.
7. Prosecutors should avoid arguments that could be inflammatory, prejudicial or contribute to public misinformation about HIV.
8. Prosecutors should ensure the correct interpretation of science and its limitations, if seeking to prove actual transmission of HIV.

Sentencing considerations

9. Prosecutors should ensure there is no discrimination in sentencing.
10. Prosecutors should ensure sentencing is not disproportionate.

"The International Association of Prosecutors welcomes this guidance for prosecutors. It highlights the serious responsibility of exercising prosecutorial discretion in a manner consistent with the high standards of impartiality and objectivity championed by the IAP. It will be of assistance to prosecutors in handling HIV-related criminal cases in keeping with the best available science and with a commitment to the human rights of all parties involved."

— Gary Balch, General Counsel, International Association of Prosecutors

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CONSENSUS STATEMENT

Expert consensus statement on the science of HIV in the context of criminal law

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Abstract

Introduction: Globally, prosecutions for non-disclosure, exposure or transmission of HIV frequently relate to sexual activity, biting, or spitting. This includes instances in which no harm was intended, HIV transmission did not occur, and HIV transmission was extremely unlikely or not possible. This suggests prosecutions are not always guided by the best available scientific and medical evidence.

Discussion: Twenty scientists from regions across the world developed this Expert Consensus Statement to address the use of HIV science by the criminal justice system. A detailed analysis of the best available scientific and medical research data on HIV transmission, treatment effectiveness and forensic phylogenetic evidence was performed and described so it may be better understood in criminal law contexts. Description of the possibility of HIV transmission was limited to acts most often at issue in criminal cases. The possibility of HIV transmission during a single, specific act was positioned along a continuum of risk, noting that the possibility of HIV transmission varies according to a range of intersecting factors including viral load, condom use, and other risk reduction practices. Current evidence suggests the possibility of HIV transmission during a single episode of sex, biting or spitting ranges from no possibility to low possibility. Further research considered the positive health impact of modern antiretroviral therapies that have improved the life expectancy of most people living with HIV to a point similar to their HIV-negative counterparts, transforming HIV infection into a chronic, manageable health condition. Lastly, consideration of the use of scientific evidence in court found that phylogenetic analysis alone cannot prove beyond reasonable doubt that one person infected another although it can be used to exonerate a defendant.

Conclusions: The application of up-to-date scientific evidence in criminal cases has the potential to limit unjust prosecutions and convictions. The authors recommend that caution be exercised when considering prosecution, and encourage governments and those working in legal and judicial systems to pay close attention to the significant advances in HIV science that have occurred over the last three decades to ensure current scientific knowledge informs application of the law in cases related to HIV.

Keywords: human rights; law and policy; risk factors; policy; criminalization; criminal law; prosecution

Additional Supporting Information may be found online in the Supporting information tab for this article.

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1 | INTRODUCTION

At least 68 countries have laws that specifically criminalize HIV non-disclosure, exposure, or transmission. Thirty-three countries are known to have applied other criminal law provisions in similar cases (Unpublished data, HIV Justice Network, 2018). Most prosecutions have related to perceived risk of HIV acquisition associated with sexual activity but prosecutions have also occurred for acts such as biting and spitting (Unpublished data, HIV Justice Network, 2018). These laws and prosecutions have not always been guided by the best available scientific and medical evidence [1], have not evolved to reflect advancements in knowledge of HIV and its treatment, and can be influenced by persistent societal stigma and fear associated with HIV [2]. HIV continues to be singled out, with prosecutions occurring in cases where no harm was intended; where HIV transmission did not occur, was not possible or was extremely unlikely; and where transmission was neither alleged nor proven [1,3].

In this context, 20 HIV scientists with expertise in scientific research, epidemiology, and patient care from regions across the world developed this Consensus Statement, prompted by concern that criminal law is sometimes applied in a manner inconsistent with contemporary medical and scientific evidence: including overstating both the risk of HIV transmission and also the potential for harm to a person's health and wellbeing. Such limited understanding of current HIV science reinforces stigma and may lead to miscarriages of justice. It may also undermine efforts to address the HIV epidemic [4]. The Consensus Statement has been endorsed by additional scientists from across the globe (See Supplementary Material S1), and by the International AIDS Society, the International Association of Providers of AIDS Care and the Joint United Nations Programme on HIV/AIDS. An Executive Summary of this Statement is included as Supplementary Material S2.

This Consensus Statement aims to assist scientific experts considering individual criminal cases in which HIV non-disclosure, (perceived or possible) exposure, or transmission has been alleged. It provides expert opinion regarding individual HIV transmission dynamics (i.e. the "possibility" of transmission), long-term impact of chronic HIV infection (i.e. the "harm" of HIV), and the application of phylogenetic analysis as evidence. It describes the possibility of HIV transmission between individuals who have engaged in a specific act at a specific time under specific circumstance, as that is usually the focus of criminal cases, and aims to communicate current scientific evidence relating to HIV in a manner understandable to a non-scientific audience. The Consensus Statement has been translated into French, Russian and Spanish (See Supplementary Material S3–S5).

2 | DISCUSSION

The first part of this Statement focuses on the possibility of HIV transmission during specific acts that are commonly considered in prosecutions: sexual activity, biting or spitting [3]. It does not reference other ways HIV may be transmitted, for example, through blood transfusion, needle stick injury, injecting drugs or breastfeeding.

An initial meeting in Seattle (February 2017) decided the contents and framing of this Consensus Statement. A detailed literature review was prepared based on a search for literature published in English using the PubMed online database up to April 2017. Specific search terms relating to the possibility of HIV transmission were used, including "HIV and viral load," "HIV sexual transmission risk per act," "oral sex HIV transmission," "anal sex HIV transmission," "vaginal sex HIV transmission condom per act," "anal sex HIV transmission condom per act," and "anal sex HIV transmission circumcision per act." Key articles were used to search for related articles. Preference was given to meta-analyses, reviews and important studies. Other sources were identified by the expert authors. Abstracts from scientific conferences were used as appropriate.

The authors next engaged in multiple rounds of drafting and review, considering the best available scientific and medical research data according to the following hierarchy: systematic review of randomized clinical trials; randomized clinical trials; and comparative studies (i.e. cohort studies, case–control studies and historical control studies). Two teleconferences were held to discuss a preliminary draft, followed by three rounds of redrafting via electronic correspondence by all authors. National and international legal experts, including UNAIDS staff members, were consulted on the application of the criminal law in cases involving HIV. A second face-to-face meeting was convened in Paris (July 2017) to resolve outstanding data analysis issues. Further rounds of comment and redrafting were undertaken by the authors to ensure agreement that the Consensus Statement accurately relayed current scientific research related to HIV transmission, harms and the use of scientific evidence in court.

The authors considered numerical findings and statistical estimates from all studies cited herein, including data summaries from reports presented in systematic or table form (for example, the works of Patel *et al.* [5]). Evidence establishing estimates of the possibility of HIV transmission through different acts varies in both type and quality; the authors factored these considerations into their assessment of the possibility associated with different acts. The authors considered that the evidence regarding transmission via different acts falls into three categories (Table 1).

When describing the evidence, the authors aimed to use scientific concepts in ways that are helpful in the context of criminal law. For example, the statistical concept of confidence intervals is designed to address uncertainty inherent in results derived from sampling a subset of a population. When dealing with probabilities that are or approach zero, confidence intervals take on special significance because the fact that something was not observed to happen during a study cannot prove that it could never happen. The larger the study, the more precisely the authors can estimate that the probability is zero. Consequently, a zero probability calculated from study data is associated with a confidence interval from zero to a small, positive probability. It is important that calculations of confidence intervals are not misinterpreted to exaggerate remote theoretical possibilities.

Table 1. Quality scale for evidence regarding the possibility of HIV transmission

Specific acts	Examples
Acts for which the transmission possibility can be estimated with some degree of certainty because multiple cohort studies have been undertaken.	Acts such as vaginal or anal sex.
Acts for which transmission possibility can be estimated with less certainty from isolated case reports, biological plausibility or mathematical models.	Acts such as oral sex or transmission via pre-ejaculate fluid.
Acts for which it is biologically implausible for transmission to occur as the conditions required for transmission are not present.	Acts such as spitting.

Table 2. Defining the possibility of HIV transmission during a single, specific act

Terminology for this statement	Possibility of transmission per act
Low possibility	Transmission during a single act is possible but the likelihood is low.
Negligible possibility	Transmission during a single act is extremely unlikely, rare or remote.
No possibility	The possibility of transmission during a single act is either biologically implausible or effectively zero.

Consideration of the methodology and results of studies cited in this Consensus Statement informed the development of three descriptors located along a continuum to describe the possibility of HIV transmission during a single, specific act (Table 2).

Importantly, this Consensus Statement is not intended as a public health document to inform HIV prevention, treatment and care messaging or programming. Its approach, based on individual-level risk which may be applied in criminal justice settings, differs from descriptions of population-level risks that are used in the context of public health, which often describe sexual acts as ranging from "low risk" to "high risk." The differences between the public health descriptors and those used in this Consensus Statement reflect both history and context. First, public health definitions used to describe HIV transmission risk were developed during the early days of the HIV epidemic, before the emergence of recent evidence on HIV transmission. Second, they describe relative risk (not absolute risk) as a means to help people reduce the possibility of HIV transmission by comparing different acts.

Although the simplicity of such public health terminology was originally intended to support effective, broad-based public health education campaigns for HIV prevention, its generalized categories now pose real problems for those developing current HIV health promotion messaging based on up-to-date scientific evidence [6], including evidence of the different variables that modify risk associated with specific acts, such as viral load. In some instances, understanding of the riskiness of certain sexual acts communicated by public health characterizations has also been misapplied in the context of criminal proceedings, for example, the Canadian case of Mabior [7,8]. Consequently, although sexual transmission is a common form of HIV transmission at a global population level, this Consensus Statement recognizes that the possibility of HIV transmission during a single sexual encounter ranges from no possibility to low possibility, while it ranges from no possibility to negligible possibility in cases of spitting or biting. This approach to the science of HIV in the context of criminal law is similar to that used in national scientific consensus statements from Australia [9], Canada [10], Sweden [11] and Switzerland [12].

2.1 | Possibility of transmission: overview

HIV is not easily transmitted from one person to another. It is a relatively fragile virus that is transmitted through specific well-described routes. It is not passed on through airborne, droplet, fomite, contact or vector-borne transmission routes and cannot penetrate intact human skin [13].

For HIV transmission to occur, certain basic conditions must exist:

- There must be a sufficient amount of the virus in particular bodily fluids (i.e. blood, semen, pre-seminal fluid, rectal fluids, vaginal fluids, or breast milk).
- A sufficient quantity of at least one of those bodily fluids must come into direct contact with sites in the body of an HIV-negative person where infection can be initiated. These are usually mucous membranes, damaged tissue or inflamed ulcers, but not intact skin.
- The virus must overcome the person's innate immune defences so that infection can be established and propagated.

Most everyday activities carry no risk of HIV transmission because these conditions are not met. Leaving aside parenteral or vertical transmission, intimate contact, such as sexual intercourse, is usually required for transmission. Even in those cases, the per-act chance of transmission is zero to low (with estimates ranging from 0% to 1.4% per act) [5].

2.2 | Factors influencing the possibility of HIV transmission

The possibility of HIV transmission associated with individual acts varies according to a range of intersecting factors. When multiple intersecting factors are present, their effect is minimized or amplified to various degrees [14].

- Correct use of a condom prevents HIV transmission

Correct use of a condom (either male or female) prevents HIV transmission because the porosity of condoms is protective against even the smallest sexually transmissible pathogens, including HIV [15]; latex and polyurethane condoms act as an impermeable physical barrier through which HIV cannot pass. Correct condom use means the integrity of the condom is not compromised and the condom is worn throughout the sex act in question. Correct use of a condom during sex means HIV transmission is not possible.

Population level studies have found that consistent condom use for anal or vaginal sex dramatically reduces the possibility of HIV transmission even when factoring in instances of incorrect use or breakage [16-21]. For example, a meta-analysis of 14 studies found that long periods of consistent use of male condoms during vaginal sex reduces the possibility of HIV transmission by at least 80% [22]. However, more recent research suggests that this may be an underestimate [23], with the meta-analysis described including non-standard data analysis methods which may have led to recruitment and other biases which could have lowered the level of prevention observed [22,23].

Population-level research is only relevant in cases where multiple sex acts have occurred and it is not known whether condoms were correctly used in each instance. The population level estimate of 80% condom effectiveness does not exist as a stand-alone estimate of HIV transmission risk but must be applied against risk associated with different sex acts. For example, if the estimated risk of HIV transmission from an HIV-positive man to a woman during a single episode of

condomless vaginal sex is 0.08% [5], then the risk of transmission when a condom is used can be understood as *at least* 80% lower, or 0.016% (less than 2 in 10,000) [5]. Importantly, when other risk reduction factors are present (e.g. low viral load or withdrawal before ejaculation) the possibility of HIV transmission, even in the event of incorrect condom use, is further reduced.

To reiterate, HIV cannot be transmitted in individual cases where a condom has been used correctly (i.e. it was worn through the sex act in question and its integrity was not compromised). The population-level estimates can only apply in situations where multiple instances of condom use have occurred, including occasional instances of incorrect use and breakage.

- Viral load that is low or "undetectable" significantly decreases or eliminates the possibility of HIV transmission

Soon after acquiring HIV, a person's viral load is very high but typically decreases over the first few weeks as their immune system responds. If a person does not commence treatment, their viral load remains fairly stable for some time, while the immune system is gradually depleted. In advanced HIV infection, viral load usually increases to higher levels again.

Antiretroviral therapy prevents HIV from replicating, thereby significantly reducing the viral load in a person's bodily fluids. When effective antiretroviral therapy is commenced, viral load usually drops to levels that are undetectable by current standard laboratory blood tests within a few weeks or months. Testing availability and lower limits of detection vary in different parts of the world, with lower limits of detection ranging from around 20 viral copies/mL to 400 copies/mL. A small percentage of people living with HIV (often referred to as long-term non-progressors) have a low viral load without taking antiretroviral therapy because their immune systems are able to control HIV [24-28].

Reduced viral load improves immune function and dramatically decreases the long-term likelihood of illness and death. It also greatly reduces the possibility of HIV transmission [29-31]. Decreases in viral load are associated with concomitant decreases in the likelihood of HIV transmission [32-35], meaning that many people on treatment cannot transmit HIV.

Recent analyses from key studies (namely, HPTN052, PARTNER and Opposites Attract) involving both heterosexual and male couples of different HIV status have not identified any cases of sexual transmission from a person with an undetectable viral load [29,30,36,37]. These findings have transformed public health messaging. For example, the United States Centers for Disease Control and Prevention now describes the estimated possibility of HIV transmission from an HIV-positive person with an undetectable viral load (as a result of effective antiretroviral treatment) as "effectively no risk" [6].

In 2011, the HPTN052 trial (conducted in Botswana, Brazil, India, Kenya, Malawi, South Africa, Thailand, the United States and Zimbabwe), which investigated the impact of early treatment initiation, observed no HIV transmission from 1763 people on antiretroviral therapy who had a stable viral load below 400 copies/mL. Partners of HIV-positive participants were followed for the equivalent of 8509 person-years. The only transmission from people on treatment occurred either early in treatment (before viral load was stabilized below 400 copies) or when viral load was above 1000 copies/mL on two consecutive visits [29,37].

The PARTNER and Opposites Attract studies found no HIV transmission from people with a viral load below 200 copies/mL after more than 75,000 acts of condomless vaginal or anal sex [18,30,38]. In the PARTNER study, heterosexual couples reported approximately 36,000 condomless sex acts and homosexual male couples reported about 22,000 condomless sex acts [30]. No HIV transmission occurred between partners in the study. Eleven cases of new HIV infection did occur, however, phylogenetic analysis found that in all cases, the infection resulted from sexual contact with someone other than the person's regular sexual partner. The Opposites Attract study included nearly 17,000 condomless sex acts among men. No HIV transmission was reported between partners involved in the study, while three cases of new HIV infection resulted from sexual contact with someone other than the person's regular sexual partner [18].

A 2013 systematic review and meta-analysis also found no transmission where viral load fell below a threshold of between 50 and 500 copies/mL (depending on the study) [39]. Another study reported no transmission when viral load was lower than 400 copies/mL [40]. A number of other studies have provided evidence that low (but detectable) viral load dramatically decreases (and may eliminate) the possibility of transmission. For example, early studies involving participants who were not taking antiretroviral therapy identified no instances of transmission among couples where one partner was living with HIV and had a low but detectable viral load: below 1500 copies/mL (Uganda) [32], below 1094 copies/mL (Thailand) [33] and below 1000 copies/mL (Zambia) [34]. The Ugandan study found that the probability of transmission through vaginal intercourse where viral load was lower than 1700 copies/mL was 1 in 10,000 [41].

While short-lived, small-magnitude increases in viral load, known as "blips," occur among many individuals adhering to their antiretroviral therapy [42,43], they are not an indication that HIV therapy is "failing;" are not considered to be clinically significant; and have not been shown to increase the possibility of HIV transmission during sex [44,45]. Large-scale studies among couples of different HIV status have included many HIV-positive participants who experienced blips in their viral load during the course of the study. Consequently, such blips have been factored into the observed reduction in transmissions.

- Pre-exposure Prophylaxis (PrEP) significantly decreases the possibility of HIV acquisition

PrEP describes the use of antiretroviral medication by HIV-negative people prior to HIV exposure to prevent HIV acquisition [46-50]. One recent study has found PrEP to be up to 95% effective among adherent users [50], however, only a handful of cases of PrEP failures in adherent individuals have ever been described suggesting that it is likely that PrEP is more than 95% effective.

- Post-exposure Prophylaxis (PEP) significantly decreases the possibility of HIV acquisition

PEP describes short-term use of antiretroviral treatment by an HIV-negative person after an exposure to HIV. If

started within 72 hours of exposure and taken for 28 days with good adherence, PEP significantly reduces the likelihood of the person becoming HIV-positive because it can stop HIV from establishing itself in a person's immune cells even after the virus has entered a person's body [51,52]. Although PEP is not 100% effective, high rates of success have been reported [51,53-67] (e.g. 81% among patients using older-style treatments [67] and up to 100% among patients using newer treatments [68]). The effectiveness of PEP appears to be influenced by a number of factors, with effectiveness generally increasing the sooner PEP is commenced and as the amount of HIV entering a person's body decreases [68].

- Medical Male Circumcision decreases the possibility of HIV transmission from women to men

Medical male circumcision reduces the possibility of HIV transmission from HIV-positive women to HIV-negative men by approximately 50% [69]. Circumcision may also decrease sexual transmission of HIV among men who have sex with men for HIV-negative men who are exclusively the insertive partner, although studies are not conclusive [70].

- Risk reduction practices such as withdrawal or strategic positioning decrease the possibility of HIV transmission

Some people living with HIV use risk reduction practices such as withdrawal prior to ejaculation or strategic positioning (i.e. receptive-only anal intercourse) when engaging in condomless sex with an HIV-negative person or person of unknown serostatus [71-73]. Such actions decrease the possibility of HIV transmission during sex where a possibility exists [71]. For example, a 2010 study found that the likelihood of transmission during anal sex reduced by approximately two-thirds when the HIV-positive insertive partner did not ejaculate [73]. The possibility of transmission is also known to be lower when an HIV-positive partner is the receptive, rather than insertive, partner during anal sex [73-75].

- Sexually Transmitted Infections (STIs) can increase the possibility of HIV transmission in some circumstances

The presence of some untreated STIs, particularly ulcerative STIs, in either partner has been associated with an increased likelihood of HIV transmission during sexual activity when the person living with HIV does not have a low viral load [76]. When genital ulcers are present in both partners, the risk is further increased [14]. However, the presence of an STI does not increase the possibility of transmission if the HIV-positive person is on effective antiretroviral therapy [30], *or* if the HIV-negative person is taking PrEP [48,49].

2.3 | The possibility of HIV transmission through sex

HIV transmission through sex usually occurs as a result of bodily fluids containing enough HIV coming into contact with mucous membranes located in: the foreskin or urethra of the penis; the cervix or vagina; the anus; or the rectum. HIV transmission is also possible through contact with oral mucous membranes but these are much less vulnerable to HIV transmission [58].

2.3.1 | Oral sex, including oral-penile sex and oral-vaginal sex

- The possibility of HIV transmission from oral sex performed on an HIV-positive person, including when the person does not have a low viral load and/or a condom is not used, varies from none to negligible depending on the context [77,78].

Oral sex is promoted as a safer sex option for partners of different HIV status wanting to engage in intimate sexual acts, with its practice reportedly very common.

Oral sex is known to involve a much lower possibility of HIV transmission than vaginal or anal intercourse [79,80]. In fact, the risk of HIV transmission as a result of oral sex is so low that scientists have been unable to establish a statistically sound estimate.

The few clinical studies investigating transmission through oral sex have failed to find any cases of HIV transmission [74,81,82]. A study of heterosexual couples and a study of lesbian couples found no transmission resulting from oral sex [81,82]. A third study involving men who have sex with men showed no seroconversions among participants who reported performing only fellatio (with ejaculation) on men who were HIV-positive or of unknown HIV status [74]. A statistical model applied to these findings concluded that the per-contact risk from oral sex was between zero and 0.04% (4 in 10,000) [78] and these values are used in some reports [79,80,83]. Given the study found no seroconversions, the upper bound of 0.04% can be understood as an upper boundary of possibility.

- There is no possibility of HIV transmission from oral sex performed on an HIV-positive person when the HIV-positive partner has a low viral load, **or** a condom is properly used, **or** the HIV-negative partner is taking PrEP [78].

While there are no studies investigating the impact of antiretroviral therapy or PrEP on the possibility of transmission during oral sex, it is our expert opinion that there is no possibility of HIV transmission associated with oral sex performed on an HIV-positive individual on antiretroviral therapy, or performed by a person taking PrEP. Similarly, correct condom use reduces the likelihood of HIV transmission to zero.

2.3.2 | Vaginal-penile intercourse

- The possibility of HIV transmission from vaginal-penile intercourse when the HIV-positive partner does not have a low viral load **and** a condom is not used is low [84]. The likelihood of transmission decreases further if no ejaculation occurs inside the HIV-negative partner's body.

Two meta-analyses of heterosexual couples [14,84] found the likelihood of HIV transmission during one act of vaginal intercourse is low: 0.08% (8 in 10,000) in the absence of risk cofactors [5,14,41,84]. It is not clear whether the likelihood of transmitting HIV from a man to a woman during vaginal intercourse is higher than transmission from a woman to a man. Some studies have found no difference, while others suggest

the possibility of HIV transmission from a man to a woman is about twice that of transmission from a woman to a man [14,35,83,84].

- The possibility of HIV transmission from vaginal-penile intercourse when the HIV-positive partner has a low viral load **or** uses a condom **or** the HIV-negative partner is taking PrEP varies from none to negligible depending on the context [29,38].

Numerous studies, as discussed above, have shown that the possibility of HIV transmission from an HIV-positive partner who has a low viral load during vaginal-penile intercourse is none to negligible [29,37-39,85]. There has not been a reported case of transmission through vaginal-penile intercourse from a person with an undetectable viral load in any clinical trial.

HIV cannot be transmitted when a condom is used correctly because HIV cannot pass through intact latex or polyurethane. Similarly, there is no possibility of HIV transmission when a person has an undetectable viral load.

2.3.3 | Anal-penile intercourse

- The possibility of HIV transmission when a condom is not used **and** the HIV-positive partner does not have a low viral load is low, whether the receptive partner is male or female [86]. The likelihood is lower where the HIV-positive partner takes the receptive, rather than the insertive, role. It is also lower if the HIV-positive insertive partner does not ejaculate inside the receptive partner.

Studies show that receptive condomless anal intercourse by heterosexual or same-sex couples is associated with a higher likelihood of HIV transmission than receptive condomless vaginal intercourse [5,87,88]. Individual studies have produced estimates of per-act likelihood of HIV transmission for anal sex from 0.01% (1 in 10,000) to more than 3% (300 in 10,000) [20,75,84,88-91]. The likelihood of transmitting from the insertive to the receptive partner is higher than the reverse [18,75,84].

Two systematic reviews (2010 and 2014) report a per-act estimate of approximately 1.4% (140 in 10,000) for receptive anal sex (i.e. when the HIV-positive person is the insertive partner) [5,86]. A 2010 prospective cohort study found that the likelihood fell from 1.43% (143 per 10,000) with ejaculation to 0.54% (54 per 10,000) with no ejaculation [89]. Per-act likelihood of transmission was estimated to be 0.11% (11 in 10,000) when the HIV-negative person is the insertive partner [5].

- The possibility of HIV transmission through anal-penile intercourse when the HIV-positive partner has a low viral load, **or** uses a condom, **or** the HIV-negative partner is taking PrEP varies from none to negligible depending on the context The likelihood is similar whether the receptive partner is male or female [85,86].

There is negligible possibility of HIV transmission from an HIV-positive partner who has a low viral load during anal-penile intercourse. As discussed above, both the PARTNER study and the Opposites Attract study observed no transmission after approximately 39,000 acts of condomless anal sex when viral load was below 200 copies/mL [30,92]. In fact, there has not been a reported case of transmission from a person with an undetectable viral load in any clinical trial.

HIV cannot be transmitted when a condom is used correctly because HIV cannot pass through intact latex or polyurethane. Similarly, there is no possibility of HIV transmission when a person has an undetectable viral load.

2.4 | The possibility of HIV transmission from casual contact, spitting and biting

2.4.1 | Casual contact

HIV cannot be transmitted via contact with an environmental surface such as a chair, bench or toilet; from food or drink; or from casual human contact such as hugging, sharing household objects or eating together.

HIV cannot survive long in air and is unable to penetrate intact skin. No case of HIV infection from contact with an environmental surface, food or drink or through casual human contact has ever been identified despite many scientific studies considering this possibility [93-98].

2.4.2 | Biting and spitting

- There is no possibility of HIV transmission via contact with the saliva of an HIV-positive person, including through kissing, biting or spiting.

Numerous studies have considered the possibility of HIV transmission via saliva but none has found any evidence, including a 1997 study of 34,000 cases in the UK [99]. The absence of HIV transmission via saliva is attributed to two factors: saliva contains a very small amount of HIV [100], and several inhibitory components in oral secretions mean saliva acts to protect susceptible cells from HIV infection [101-106].

- There is no possibility of HIV transmission from biting or spitting where the HIV-positive person's saliva contains no, or a small quantity of, blood.

Current evidence suggests HIV cannot be transmitted even when saliva contains small quantities of blood. Despite early research suggesting a theoretical risk of transmission if saliva-containing blood enters a person's body through contact with mucosal tissue (for example, landing in an eye or mouth), no cases of HIV transmission resulting from the spitting of blood have been reported [107]. Consequently, it is our expert opinion that there is no possibility of HIV transmission from saliva containing small quantities of blood.

- The possibility of HIV transmission from biting where the HIV-positive person's saliva contains a significant quantity of blood, **and** their blood comes into contact with a mucous membrane or open wound, **and** their viral load is not low or undetectable varies from none to negligible.

Many studies have detailed a large number of cases where bites have not resulted in HIV transmission [108-112] or found transmission to be unlikely [107,109,113,114].

For transmission to be plausible in the case of biting, the HIV-positive person must have blood in their mouth at the time of the bite, a sufficient amount of HIV must be present in the blood of the HIV-positive person, and the bite must be deep enough to penetrate the HIV-negative person's skin causing trauma and tissue damage [106,107,115]. Even when all these conditions are present, the possibility of transmission during a single bite is negligible at most.

2.5 | Significant improvements in life expectancy and quality of life for people living with HIV

The second section of this Consensus Statement considers the harms of HIV because persistent misconceptions exaggerating the harms of HIV infection appear to influence application of the criminal law [3]. Criminal law takes into account the possible harms caused by a potential offence as well as the likelihood of the offence itself, thus, for example, definitions of bodily harm are distinct from grievous bodily harm, which are distinct from manslaughter or murder. Consequently, it is important to emphasize the huge changes in the outlook for people living with HIV that have been achieved over the past decades.

The natural course of untreated HIV infection varies widely from person to person [116]. If untreated, most people experience an asymptomatic phase that lasts from two to 15 years, during which the virus replicates, gradually undermining their immune system. A small percentage of people with HIV have immune systems that block replication of the virus for an indefinite period [117], but the large majority of people eventually develop AIDS if untreated (approximately half within 10 years [118]). AIDS is defined as the presence of specific laboratory markers and/or opportunistic infections and specific diseases which, if antiretroviral therapy is not commenced, eventually result in a person's death.

Antiretroviral therapies dramatically reduce HIV-associated disease progression. Globally, treatment guidelines have been revised to recommend initiation of antiretroviral treatment immediately following diagnosis of HIV infection because most people on treatment will achieve an undetectable viral load and maintain a healthy immune system, will remain in good health, and will avoid the complications of long-term HIV infection [119,120]. Even those who start treatment with a high viral load and adhere to therapy can expect a dramatic reduction in viral load, to a point where significant immune system recovery occurs so that they can enjoy good long-term health [121]. For many, effective treatment requires taking a single pill each day.

Studies from many countries have consistently shown that antiretroviral therapies have radically increased life expectancy, that life expectancy has continued to improve over time, and that the long-term health and quality of life of people living with HIV has drastically improved [122-141]. Life expectancy for young people with HIV commencing antiretroviral therapy now approaches that of a young person in the general population [45,132,134,135,137]. Furthermore, use of antiretroviral therapies has shifted cause of death of people living with HIV from traditional AIDS-defining illnesses to non-HIV-related causes [142,143] similar to those affecting the general population [144]. Similarly, clinical management has shifted to include management and treatment of health issues associated with aging, including menopause and cardiovascular disease [143-150], and interventions to influence "lifestyle choices" such as tobacco smoking [151]. In some sub-populations, ongoing clinical care has the potential to increase life expectancy of people living with HIV beyond that of their HIV-negative counterparts [135].

Although HIV causes an infection that requires continuous treatment with antiretroviral therapy, people living with HIV can live long, productive lives including working, studying, travelling, having relationships, having and raising children, and contributing to society in various other ways.

2.6 | Establishing proof of HIV transmission

The final section of this Consensus Statement recognizes the importance of the correct use of scientific and medical evidence in HIV-related prosecutions where proof of actual transmission from one person to another is at issue.

International guidance on HIV in the context of the criminal law recommends that "proof of causation, in relation to HIV transmission, should always be based on evidence derived from a number of relevant sources, including medical records, rigorous scientific methods and sexual history" [1].

- Medical records can provide contextual information but cannot establish transmission between a complainant and a defendant.

The circumstances of the nature and timing of a sexual relationship or other potential sources of a person's HIV infection must be central to any case where sexual transmission of HIV is alleged. When available and lawfully obtained, medical records are valuable for identifying the last HIV-negative and first HIV-positive test of the complainant and the defendant. Considering the diagnostic window period of each test, this information can be used to establish the period during which the complainant acquired HIV and whether the defendant was HIV-positive during this time. Importantly, whether the complainant or defendant was infected first cannot be based on who tested HIV-positive first or which person brought charges against the other.

Information related to HIV viral load and CD4 counts included in medical records has sometimes been presented as evidence establishing the timing of HIV infection. However, viral loads and CD4 counts show considerable inter- and intra-individual variation and therefore cannot be used to determine exactly when someone acquired HIV [152].

- Phylogenetic analysis can be used as a forensic tool. The results can be compatible with, but cannot conclusively prove, the claim that a defendant has infected a complainant. Importantly, phylogenetic results can exonerate a defendant when the results are not compatible with the allegation that the defendant infected the complainant.

Phylogenetic analysis compares the evolutionary relationship between different persons' HIV, but results must be interpreted cautiously alongside other factual and medical evidence when used in criminal cases [153]. The complexity of

phylogenetic analysis arises, in part, from the fact that HIV is a fast-evolving virus. Mutations of the virus occur repeatedly so that every person living with HIV has more than one virus variant [154]. During transmission, a limited number of virus variants (one to a few) are transmitted, but these will also mutate to form new variants so that no two persons' HIV is identical [155].

Phylogenetic analysis of HIV involves estimating the evolutionary relationships of HIV variants, for example, to investigate HIV transmission networks for public health purposes. In criminal cases, phylogenetic analysis involves investigating whether the complainant(s) and the defendant(s) are part of the same transmission network. The network is represented as a phylogenetic "tree." Notably, the phylogenetic tree must be understood as an HIV gene tree, which may differ from the transmission history, because HIV variants may predate transmission or disappear after transmission [156] and because some persons in the transmission network may not have been diagnosed and/or sampled before constructing the tree.

HIV phylogenetics is very different from profiling of human DNA as, given the ongoing evolution of each person's HIV variants, phylogenetics cannot obtain an "exact match." When there appears to be a "phylogenetic match" between two individuals' HIV it means two or more variants are epidemiologically "linked", not that they are the same [155,157]. HIV phylogenetic evidence *can* exonerate a defendant accused of transmitting HIV to a complainant because if the virus strains detected in the defendant and complainant are unrelated, the phylogenetic evidence conclusively contradicts the claim that the defendant was the source of the complainant's virus. [155,158].

Recent advances in DNA sequencing and phylogenetics allow some consideration of direction and timing of transmission [159-162], but these methods are currently neither precise nor accurate enough to prove who infected whom [155,163]. This is partly because there may always be unknown and undiagnosed individuals from the transmission network [155]. Consequently, currently phylogenetic analysis cannot eliminate the possibilities that the complainant infected the defendant, that both were infected by a third party [158,163], or more complex scenarios of transmission that have resulted in the defendant and complainant having HIV variants that are epidemiologically linked. The fact that having HIV does not protect against a subsequent "super"-infection with a different variant adds complexity [158]. In particular, confidence about the direction of infection is undermined when a defendant and complainant have engaged in numerous sexual acts which may have facilitated multiple transmission events back and forth [155].

Phylogenetic analysis is complex, and consequently it is important that HIV phylogenetics for forensic purposes is performed and interpreted by experts who fully understand the limitations of the technique and explicitly state these limitations in written reports and oral testimony. Interpretation of phylogenetic results for forensic purposes requires expertise about phylogenetics and the distinction between virus evolutionary trees and transmission histories. This is not straightforward and methodologies have not yet been standardized [155]. The reliability of evidence derived from phylogenetic analysis depends on a number of methodological factors including use of adequate "local controls" [164-166] and database sequences [167-169] which must be selected using consistent selection criteria [155]. International research shows that phylogenetic evidence used in criminal trials has not always satisfied these requirements [155].

3 | CONCLUSIONS

Given the evidence presented in this document, we strongly recommend that more caution be exercised when considering criminal prosecution, including careful appraisal of current scientific evidence on HIV-related risks and harms. This is instrumental to reduce stigma and discrimination and to avoid miscarriages of justice.

In this context, we hope this Consensus Statement will encourage governments and those working in the legal and judicial system to pay close attention to the significant advances in HIV science that have occurred over the last three decades, and make all efforts to ensure that a correct and complete understanding of current scientific knowledge informs any application of the criminal law in cases related to HIV.

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHORS' CONTRIBUTIONS

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REFERENCES

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). UNAIDS guidance note on ending overly broad HIV criminalisation. Geneva: UNAIDS; 2013
2. Global Commission on HIV and the Law. HIV and the law: risks, rights & health. Geneva: UNDP; 2012.
3. Bernard EJ, Cameron S. Advancing HIV Justice 2: building momentum in global advocacy against HIV criminalization. HIV Justice Network, Global Network of People Living with HIV; 2016.
4. World Health Organization. Sexual health, human rights and the law. Geneva: World Health Organization; 2015.
5. Patel P, Borkowf CB, Brooks JT, Lasry A, Lansky A, Mermin J. Estimating per-act HIV transmission risk: a systematic review. AIDS. 2014;28(10):1509–19.
6. Centers for Disease Control and Prevention. CDC Information Undetectable Viral Load and HIV Transmission Risk. October 2017 [cited 30 June 2018]. Available from https://www.cdc.gov/hiv/pdf/risk/art/cdc-hiv-uvl-transmission.pdf
7. 2008 MBQB 201;Canada.
8. R v Mabior. SCC 47. 2012; Canada.
9. Boyd M, Cooper D, Crock E, Crooks L, Giles M, Grulich A, *et al*. Sexual transmission of HIV and the law: an Australian medical consensus statement. Med J Aust. 2016;205(9):409–12.
10. Loutfy M, Tyndall M, Baril J-G, Montaner J, Kaul R, Hankins C. Canadian consensus statement on HIV and its transmission in the context of the criminal law. Can J Infect Dis Med Microbiol. 2014;25(3):135–40.
11. Albert J, Berglund T, Gisslén M, Gröön P, Sönnerborg A, Tegnell A, *et al*. Risk of HIV transmission from patients on antiretroviral therapy: a position statement from the Public Health Agency of Sweden and the Swedish Reference Group for Antiviral Therapy. Scand J Infect Dis. 2014;46(10):673–7.
12. Vernazza P, Hirschel B, Bernasconi E, Flepp M. Les personnes séropositives ne souffrant d'aucune autre MST et suivant un traitment antirétroviral efficace ne transmettent pas le VIH par voie sexuelle. Bulletin des médecins suisses. 2008;5:165–9. French.
13. Vandamme A-M, Van Laethem K, Schmit J-C, Van Wijngaerden E, Reynders M, Debyser Z, *et al*. Long-term stability of human immunodeficiency virus viral load and infectivity in whole blood. Eur J Clin Invest. 1999;29:445–52.
14. Powers K, Poole C, Pettifor A, Cohen M. Rethinking the heterosexual infectivity of HIV-1: a systematic review and meta-analysis. Lancet Infect Dis. 2008;8(9):553–63.
15. Lytle CD. An in vitro evaluation of condoms as barriers to a small virus. Sex Transm Dis. 1997;24:161–4.
16. Vittinghoff E, Douglas J, Judson F, McKirnan D, MacQueen K, Buchbinder SP. Per-contact risk of human immunodeficiency virus transmission between male sexual partners. Am J Epidemiol. 1999;150(3):306–11.
17. Weller S, Davis K. Condom effectiveness in reducing heterosexual HIV transmission. Cochrane Database Syst Rev.[internet]. 2001 [cited 2018 June 6]. Available from: http://onlinelibrary.wiley.com
18. Macdonald N, Elam G, Hickson F, Imrie J, McGarrigle CA, Fenton KA, *et al*. Factors associated with HIV seroconversion in gay men in England at the start of the 21st century. Sex Transm Infect. 2008;84(1):8–13.
19. Lavoie E, Alary M, Remis RS, Otis J, Vincelette J, Turmel B, *et al*. Determinants of HIV seroconversion among men who have sex with men living in a low HIV incidence population in the era of highly active antiretroviral therapies. Sex Transm Dis. 2008;35(1):25–9.
20. Scott HM, Vittinghoff E, Irvin R, Sachdev D, Liu A, Gurwith M, *et al*. Age, race/ethnicity, and behavioral risk factors associated with per-contact risk of HIV infection among men who have sex with men in the United States. J Acquir Immune Defic Syndr. 2014;65(1):115–21.
21. Smith DK, Herbst JH, Zhang X, Rose CE. Condom effectiveness for HIV prevention by consistency of use among men who have sex with men in the United States. J Acquir Immune Defic Syndr. 2015;68(3):337–44. Referenced in https://doi.org/10.1097/qai.0000000000000461.
22. Weller S, Davis-Beaty K. Condom effectiveness in reducing heterosexual HIV transmission. Cochrane Database Syst Rev. 2002;(1):CD003255.
23. Crosby R, Bounse S. Condom effectiveness: where are we now? Sex Health. 2012;9:10–7.
24. Buchbinder S, Katz M, Hessol N, O'Malley P, Homberg S. Long-term HIV-1 infection without immunologic progression. AIDS. 1994;8:1123–8.
25. Madec Y, Boufassa F, Avettand-Fenoel V, Hendou S, Melard A, Boucherit S, *et al*. Early control of HIV-1 infection in long-term nonprogressors followed since diagnosis in the ANRS SEROCO/HEMOCO cohort. J Acquir Immune Defic Syndr. 2009;50:19–26.
26. Poropatich K, Sullivan DJ. Human immunodeficiency virus type 1 long-term non-progressors: the viral, genetic and immunological basis for disease non-progression. J Gen Virol. 2010;2(2):247–68.
27. Learmont J, Geczy A, Mills J, Ashton L, Raynes-Greenow C, Garsia R, *et al*. Immunologic and virologic status after 14 to 18 years of infection with an attenuated strain of HIV-1. A report from the Sydney Blood Bank Cohort. N Engl J Med. 1999;340:1715–22.
28. Rhodes DI, Ashton L, Solomon A, Carr A, Cooper D, Kaldor J, *et al*. Characterization of three nef-defective human immunodeficiency virus type 1 strains associated with long-term nonprogression. Australian Long-Term Nonprogressor Study Group. J Virol. 2000;74(22):10581–8.
29. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, *et al*. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med. 2011;11(365):493–505.
30. Rodger AJ, Cambiano V, Bruun T, Vernazza P, Collins S, van Lunzen J, *et al*. Sexual activity without condoms and risk of HIV transmission in serodifferent couples when the HIV-positive partner is using suppressive antiretroviral therapy. JAMA. 2016;316:171–81.
31. Montaner JS, Hogg R, Wood E, Kerr T, Tyndall M, Levy AR, *et al*. The case for expanding access to highly active antiretroviral therapy to curb the growth of the HIV epidemic. Lancet. 2006;368(9534):531–6.
32. Quinn TC, Wawer MJ, Sewankambo N, Serwadda D, Li C, Wabwire-Mangen F, *et al*. Viral load and heterosexual transmission of human immunodeficiency virus type 1. Rakai Project Study Group. N Engl J Med. 2000;342(13):921–9.
33. Tovanabutra S, Robison V, Wongtrakul J, Sennum S, Suriyanon V, Kingkeow D, *et al*. Male viral load and heterosexual transmission of HIV-1 subtype E in northern Thailand. J Acquir Immune Defic Syndr. 2002;29(3):275–83.
34. Fideli US, Allen SA, Musonda R, Trask S, Hahn BH, Weiss H, *et al*. Virologic and immunologic determinants of heterosexual transmission of human immunodeficiency virus type 1 in Africa. AIDS Res Hum Retroviruses. 2001;17(10):901–10.
35. Hughes JP, Baeten JM, Lingappa JR, Magaret AS, Wald A, de Bruyn G. Determinants of per-coital-act HIV-1 infectivity among African HIV-1-serodiscordant couples. J Infect Dis. 2012;205(3):358–65.
36. Grulich A, Bavinton B, Jin F, Prestage G, Zablotska I, Grinsztejn B, *et al*. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. Abstract for 2015 Conference on Retroviruses and Opportunistic Infections, Seattle, USA, 2015.
37. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour M, Kumarasamy N, *et al*. Antiretroviral therapy for the prevention of HIV-1 transmission. N Engl J Med. 2016;375(9):830–9.
38. Supervie V, Viard J-P, Costagliola D, Breban R. Heterosexual risk of HIV transmission per sexual act under combined antiretroviral therapy: systematic review and Bayesian modeling. Clin Infect Dis Off Publ Infect Dis Soc Am. 2014;59(1):115–22.
39. Loutfy MR, Wu W, Letchumanan L, Bondy L, Antoniou T, Margolese S, *et al*. Systematic review of HIV transmission between heterosexual serodiscordant couples where the HIV positive partner is fully suppressed on antiretroviral therapy. PLoS ONE. 2012;8(2):e55747.
40. Anglemyer A, Horvath T, Rutherford G. Antiretroviral therapy for prevention of HIV transmission in HIV-discordant couples. JAMA. 2013;310(15):1619–20.
41. Mastro TD, De Vincenzi I. Probabilities of sexual HIV-1 transmission. AIDS. 1996;10:S75–82.
42. Gray RH, Wawer MJ, Brookmeyer R, Sewankambo NK, Serwadda D, Wabwire-Mangen F, *et al*. Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1-discordant couples in Rakai, Uganda. Lancet. 2001;357(9263):1149–53.
43. Young J, Rickenbach M, Calmy A, Bernasconi E, Staehelin C, Schmid P, *et al*. Transient detectable viremia and the risk of viral rebound in patients from the Swiss HIV Cohort Study. BMC Infect Dis. 2015;15(1):382.
44. Sörstedt E, Nilsson S, Blaxhult A, Gisslén M, Flamholc L, Sönnerborg A, *et al*. Viral blips during suppressive antiretroviral treatment are associated with high baseline HIV-1 RNA levels. BMC Infect Dis. 2016;16:305.

45. Van Sighem A, Zhang S, Reiss P, Gras L, van der Ende M, Kroon F, *et al*. Immunologic, virologic, and clinical consequences of episodes of transient viremia during suppressive combination antiretroviral therapy. J Acquir Immune Defic Syndr. 2008;1(48):104–8.
46. Teira R, Vidal F, Muñoz-Sánchez P, Geijo P, Viciana P, Ribera E, *et al*. Very low level viraemia and risk of virological faxilure in treated HIV-1-infected patients. HIV Medicine, online edition. HIV Med. 2017;18(3):196–203.
47. Fonner V, Dalglish S, Kennedya C, Baggaley R, O'Reilly K, Koechlinb F, *et al*. Effectiveness and safety of oral HIV preexposure prophylaxis for all populations. AIDS. 2016;30:1973–83.
48. Molina J-M, Capitant C, Spire B, Pialoux G, Cotte L, Charreau I, *et al*. On-demand preexposure prophylaxis in men at high risk for HIV-1 infection. N Engl J Med. 2015;3(373):2237–46.
49. McCormack S, Dunn D, Desai M, Dolling D, Gafos M, Gilson R, *et al*. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. Lancet. 2015;387(10013):53–60.
50. Grant RM, Liegler T, Defechereux P, Kashuba AD, Taylor D, Abdel-Mohsen M, *et al*. Drug resistance and plasma viral RNA level after ineffective use of oral pre-exposure prophylaxis in women. AIDS. 2015;29:331–7.
51. Schechter M, do Lago R, Mendelsohn A, Moreira R, Moulton L, Harrison L, *et al*. Behavioral impact, acceptability, and HIV incidence among homosexual men with access to postexposure chemoprophylaxis for HIV. JAIDS. 2004;35 (5):519–25.
52. Pinkerton SD, Martin J, Roland M, Katz M, Coates T, Kahn J, *et al*. Cost-effectiveness of postexposure prophylaxis after sexual or injection-drug use exposure to human immunodeficiency virus. Arch Intern Med. 2004;164:46–54.
53. Jochimsen EM. Failures of zidovudine postexposure prophylaxis. Am J Med. 1997;102(5):52–5.
54. Lot F, Abiteboul D. Occupational infections with HIV in France among health-care personnel. Bull Epi Hebdom. 1999;18:69–70. French.
55. Beltrami EM, Luo C-C, de la Torre N, Cardo DM. Transmission of drug-resistant HIV after an occupational exposure despite postexposure prophylaxis with a combination drug regimen. Infect Control Hosp Epidemiols. 2002;2002 (23):345–8.
56. Hawkins DA, Asboe D, Barlow K, Evans B. Seroconversion to HIV-1 following a needlestick injury despite combination post-exposure prophylaxis. J Infect. 2001;43:12–5.
57. Wulfsohn A, Venter WDF, Schultze D, Levey M, Sanne IM. Post-exposure prophylaxis after sexual assault in South Africa. Proceedings of the Tenth Conference on Retroviruses and Opportunistic Infections; 2003 Feb; Boston, U.S.: abstract 42.
58. Lunding S, Katzenstein TL, Kronborg G, Lindberg JA, Jensen J, Nielsen HI, *et al*. The Danish PEP registry: experience with the use of postexposure prophylaxis (PEP) following sexual exposure to HIV from 1998 to 2006. Sex Transm Dis. 2010;37(1):49–52.
59. Donnell D, Mimiaga MJ, Mayer K, Chesney M, Koblin B, Coates T. Use of non-occupational post-exposure prophylaxis does not lead to an increase in high risk sex behaviors in men who have sex with men participating in the EXPLORE trial. AIDS Behav. 2010;14(5):1182–9.
60. Sonder GJ, Prins JM, Regez RM, Brinkman K, Mulder JW, Veenstra J, *et al*. Comparison of two HIV postexposure prophylaxis regimens among men who have sex with men in Amsterdam: adverse effects do not influence compliance. Sex Transm Dis. 2010;37(11):681–6.
61. McAllister J, Read P, McNulty A, Tong WW, Ingersoll A, Carr A. Raltegravir-emtricitabine-tenofovir as HIV nonoccupational post-exposure prophylaxis in men who have sex with men: safety, tolerability and adherence. HIV Med. 2014;15(1):13–22.
62. Jain S, Oldenburg CE, Mimiaga MJ, Mayer KH. Subsequent HIV infection among men who have sex with men who used non-occupational post-exposure prophylaxis at a Boston community health center: 1997-2013. AIDS Patient Care STDS. 2015;29(1):20–5.
63. Foster R, McAllister J, Read TR, Pierce AB, Richardson R, McNulty A, *et al*. Single-tablet emtricitabine-rilpivirine-tenofovir as HIV postexposure prophylaxis in men who have sex with men. Clin Infect Dis. 2015;61(8):1336–41.
64. Linden JA, Oldeg P, Mehta SD, McCabe KK, LaBelle C. HIV postexposure prophylaxis in sexual assault: current practice and patient adherence to treatment recommendations in a large urban teaching hospital. Acad Emerg Med. 2005;12(7):640–6.
65. Griffith WF, Ackerman GE, Zoellner CL, Sheffield JS. Sexual assault: a report on human immunodeficiency virus postexposure prophylaxis. Obstet Gynecol Int. 2010;196963:1–6.
66. Olshen E, Hsu K, Woods ER, Harper M, Harnisch B, Samples CL. Use of human immunodeficiency virus postexposure prophylaxis in adolescent sexual assault victims. Arch of Pediat Adolesc Med. 2006;160(7):674–80.
67. Cardo D, Culver D, Ciesielski C, Srivastava P, Marcus R, Abiteboul D, *et al*. A case-control study of HIV seroconversion in health care workers after percutaneous exposure. N Engl J Med. 1997;20(337):1485–90.
68. Poynten IM, Smith DE, Cooper DA, Kaldor JM, Grulich AE. The public health impact of widespread availability of nonoccupational postexposure prophylaxis against HIV. HIV Medicine. 2007;8(6):374–81.
69. Siegfried N, Muller M, Deeks JJ, Volmink J. Male circumcision for prevention of heterosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2009;(2):CD003362.
70. Millett GA, Flores SA, Marks G, Reed JB, Herbst JH. Circumcision status and risk of HIV and sexually transmitted infections among men who have sex with men: a meta-analysis. JAMA. 2008;300(14):1674–84. Erratum in: JAMA. 2009 Mar 18;301(11):1126–9.
71. Crepaz N, Marks G, Liau A, Mullins MM, Aupont LW, Marshall KJ, *et al*. Prevalence of unprotected anal intercourse among HIV-diagnosed MSM in the United States: a meta-analysis. AIDS. 2009;23(13):1617–29.
72. Van De Ven P, Kippax S, Crawford J, Rawstorne P, Prestage G, Grulich A, *et al*. In a minority of gay men, sexual risk practice indicates strategic positioning for perceived risk reduction rather than unbridled sex. AIDS Care. 2002;14 (4):471–80.
73. Jin F, Crawford J, Prestage GP, Zablotska I, Imrie J, Kippax SC, *et al*. Unprotected anal intercourse, risk reduction behaviours, and subsequent HIV infection in a cohort of homosexual men. AIDS. 2009;23(2):243–52.
74. Baggaley RF, Boily M-C, White RG, Alary M. Risk of HIV-1 transmission for parenteral exposure and blood transfusion: a systematic review and meta-analysis. AIDS. 2006;20:805–12.
75. Vittinghoff E, Douglas J, Judson F, McKirnan D, MacQueen K, Buchbinder SP. Per-contact risk of human immunodeficiency virus transmission between male sexual partners. Am J Epidemiol. 1999;1(150):306–11.
76. Sexton J, Garnett G, Røttingen J-A. Metaanalysis and metaregression in interpreting study variability in the impact of sexually transmitted diseases on susceptibility to HIV infection. Sex Transm Dis. 2005;32(6):351–7.
77. Campo J, Perea MA, del Romero J, Cano J, Hernando V, Bascones A. Oral transmission of HIV, reality or fiction? An update Oral Dis. 2006;12(3): 219–28.
78. Baggaley RF, White RG, Boily MC. Systematic review of orogenital HIV 1 transmission probabilities. Int J Epidemiol. 2008;37(6):1255–65.
79. Morrow G, Vachot L, Vagenas P, Robbiani M. Current concepts of HIV transmission. Curr HIV/AIDS Rep. 2007;4(1):29–35.
80. Centers for Disease Control and Prevention. Oral sex and HIV Risk. CDC HIV/AIDS Facts, June 2009.
81. del Romero J, Marincovich B, Castilla J, Garcia S, Campo J, Hernando V, *et al*. Evaluating the risk of HIV transmission through unprotected orogenital sex. AIDS. 2002;16(9):1296–7.
82. Raiteri R, Fora R, Sinicco A. No HIV-1 transmission through lesbian sex. Lancet. 1994;344:270.
83. European Study Group on Heterosexual Transmission of HIV. Comparison of female to male and male to female transmission of HIV in 563 stable couples. BMJ. 1992;304(6830):809–13.
84. Boily M-C, Baggaley RF, Wang L, Masse B, White RG, Hayes RJ, *et al*. Heterosexual risk of HIV-1 infection per sexual act: systematic review and meta-analysis of observational studies. Lancet Infect Dis. 2009;9(2):118–29.
85. Rodger A, Cambiano V, Bruun T, Vernazza P, Collins S, Estrada V, *et al*. HIV transmission risk through condomless sex if the HIV positive partner is on suppressive ART: PARTNER study. Presentation at CROI, 2014 Mar 3–6;Boston, U.S.
86. Baggaley RF, White RG, Boily M-C. HIV transmission risk through anal intercourse: systematic review, meta-analysis and implications for HIV prevention. Int J Epidemiol. 2010;39(4):1048–63.
87. Halperin DT, Shiboski SC, Palefsky JM, Padian NS. High level of HIV-1 infection from anal intercourse: a neglected risk factor in heterosexual AIDS prevention. Paper presented at XIV International AIDS Conference. 2002; Barcelona, Spain.
88. Leynaert B, Downs AM, de Vincenzi I. Heterosexual transmission of human immunodeficiency virus: variability of infectivity throughout the course of infection. European Study Group on Heterosexual Transmission of HIV. Am J Epidemiol. 1998;148(1):88–96.
89. Jin F, Jansson J, Law M, Prestage GP, Zablotska I, Imrie JC, *et al*. Per-contact probability of HIV transmission in homosexual men in Sydney in the era of HAART. AIDS. 2010;24(6):907–13.

90. DeGruttola V, Seage GR 3rd, Mayer KH, Horsburgh CR Jr. Infectiousness of HIV between male homosexual partners. J Clin Epidemiol. 1989;42(9):849–56.
91. Jacquez JA, Koopman JS, Simon CP, Longini IM Jr. Role of the primary infection in epidemics of HIV infection in gay cohorts. J Acquir Immune Defic Syndr. 1994;7(11):1169–84.
92. Bavinton B, Grinsztejn B, Phanuphak N, Jin F, Zablotska I, Prestage G, *et al*. HIV treatment prevents HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. 9th International AIDS Society Conference on HIV Science, Paris, abstract no TUAC0506LB, July 2017.
93. Berthier A, Fauchet R, Genetet N, Fonlupt J, Genetet N, Gueguen M, *et al*. Transmissibility of human immunodeficiency virus in haemophilic an non-haemophilic children living in a private school in France. Lancet. 1986;2(8507):598–601.
94. Fischl MA, Dickinson GM, Scott GB, Klimas N, Fletcher MA, Parks W. Evaluation of heterosexual partners, children and household contacts of adults with AIDS. JAMA. 1987;257:640–4.
95. Friedland G, Kahl P, Saltzman B, Rogers M, Feiner C, Mayers M, *et al*. Additional evidence for lack of transmission of HIV infection by close interpersonal (casual) contact. AIDS. 1990;4(7):639–44.
96. Rogers MF, White CR, Sanders R, Schable C, Ksell TE, Wasserman RL, *et al*. Lack of transmission of human immunodeficiency virus from infected children to their household contacts. Pediatrics. 1990;85(2):210–4.
97. Courville TM, Caldwell B, Brunell P. Lack of evidence of transmission of HIV-1 to family contacts of H1V-1 infected children. Clin Pediatr. 1998;37(3):175–8.
98. Lusher JM, Operskalski EA, Lee H, Mosley JW, Aledort LM, Dietrich SL, *et al*. Risk of human immunodeficiency virus type 1 infection among sexual and nonsexual household contacts of persons with congenital clotting disorders. Pediatrics. 1991;88:242–9.
99. Gilbart VL. Unusual HIV transmissions through blood contact: analysis of cases reported in the United Kingdom to December 1997. Commun Dis Public Health. 1998;1(2):108–13.
100. Yeung SC, Kazazi F, Randle CG, Howard RC, Rizvi N, Downie JC, *et al*. Patients infected with human immunodeficiency virus type 1 have low levels of virus in saliva even in the presence of periodontal disease. J Infect Dis. 1993;167(4):803–9.
101. Shine N, Konopka K, Düzgüneş N. The anti-HIV-1 activity associated with saliva. J Dent Res. 1997;76(2):634–40.
102. Shugars DC, Schock DC, Patton J. HIV-1 RNA load in blood plasma, saliva and crevicular fluid. J Dent Res. 1998;77(Special Issue A):285.
103. Shugars DC, Wahl S. The role of the oral environment in HIV-1 transmission. JADA. 1998;129(7):851–8.
104. Malamud D, Friedman HM. HIV in the oral cavity: virus, viral inhibitory activity, and antiviral antibodies. Crit Rev Oral Biol Med. 1993;4(3–4):461–6.
105. Archibald DW, Cole GA. In vitro inhibition of HIV-1 infectivity by human salivas. AIDS Res Hum Retroviruses. 1990;6(12):1425–32.
106. Yeh CK, Handelman B, Fox PC, Baum BJ. Further studies of salivary inhibition of HIV-1 infectivity. J Acquir Immune Defic Syndr. 1992;5(9):898–903.
107. Cresswell FV, Ellis J, Hartley J, Sabin CA, Orkin C, Churchill DR. A systematic review of risk of HIV transmission through biting or spitting: implications for policy. HIV Med. 2018;1–9. Available from https://onlinelibrary.wiley.com/doi/abs/10.1111/hiv.12625
108. Tsoukas CM, Hadjis T, Shuster J, Theberge L, Feorino P, O'Shaughnessy M. Lack of transmission of HIV through human bites and scratches. JAIDS. 1988;1(5):505–7.
109. Richman KM, Richman LS. The potential for transmission of human immunodeficiency virus through human bites. J Acquir Immune Defic Syndr. 1993;64:40–6.
110. Shirley LR, Ross SA. Risk of transmission of human immunodeficiency virus by bite of an infected toddler. J Pediatr. 1989;114(3):425–7.
111. Drummond R. Seronegative 18 months after being bitten by a patient with AIDS. JAMA. 1986;256(17):2342–3.
112. Romea S, Alkiza ME, Ramon JM, Oromí J. Risk for occupational transmission of HIV infection among health care workers. Eur J Epidemiol. 1995;11(2):225–9.
113. Verrusio AC. Risk of transmission of the human immunodeficiency virus to health care workers exposed to HIV-infected patients: a review. JADS. 1989;118(3):339–42.
114. Henderson DK, Fahey BJ, Willy M, Schmitt JM, Carey K, Koziol DE, *et al*. Risk for occupational transmission of human immunodeficiency virus type 1 (HIV-1) associated with clinical exposures: a prospective evaluation. Ann Intern Med. 1990;113(10):740–6.
115. Tereskerz PM, Bentley M, Jagger J. Risk of HIV-1 infection after human bites. Lancet. 1996;348(9040):1512.
116. Sabin CA, Lundgren JD. The natural history of HIV infection. Curr Opin HIV AIDS. 2013;8(4):311–7.
117. Okulicz JF, Marconi VC, Landrum ML, Wegner S, Weintrob A, Ganesan A, *et al*. Clinical outcomes of elite controllers, viremic controllers, and long-term nonprogressors in the US Department of Defense HIV Natural History Study. J Infect Dis. 2009;200(11):1714–23.
118. McManus H, O'Connor CC, Boyd M, Broom J, Russell D, Watson K, *et al*. Long-term survival in HIV positive patients with up to 15 years of antiretroviral therapy. PLoS ONE. 2012;7(11):e48839.
119. Lee FJ, Amin J, Carr A. Efficacy of initial antiretroviral therapy for HIV-1 infection in adults: a systematic review and meta-analysis of 114 studies with up to 144 weeks' follow-up. PLoS ONE. 2014;9(5):e97482.
120. The INSIGHT START Study Group. Initiation of antiretroviral therapy in early asymptomatic HIV infection. N Engl J Med. 2015;373(9):795–807.
121. Stephan C, Hill A, Sawyer W, van Delft Y, Moecklinghoff C. Impact of baseline HIV-1 RNA levels on initial highly active antiretroviral therapy outcome: a meta-analysis of 12,370 patients in 21 clinical trials. HIV Med. 2013;14(5):284–92.
122. Trickey A, May M, Vehreschild J-J, Obel N, Gill MJ, Crane H, *et al*. Survival of HIV-positive patients starting antiretroviral therapy between 1996 and 2013: a collaborative analysis of cohort studies. Lancet HIV. 2017;4(8):e349–56.
123. Patterson S, Cescon A, Samji H, Chan K, Zhang W, Raboud J, *et al*. Life expectancy of HIV-positive individuals on combination antiretroviral therapy in Canada. BMC Infect Dis. 2015;17(15):274.
124. Zhu H, Napravnik S, Eron JJ, Cole SR, Ma Y, Wohl DA, *et al*. Decreasing excess mortality of HIV-infected patients initiating antiretroviral therapy: comparison with mortality in general population in China, 2003-2009. J Acquir Immune Defic Syndr. 2013;63(5):e150–7.
125. Teeraananchai S, Kerr SJ, Amin J, Ruxrungtham K, Law MG. Life expectancy of HIV-positive people after starting combination antiretroviral therapy: a meta-analysis. HIV Med. 2017;18(4):256–66.
126. Lohse N, Obel N. Update of survival for persons with HIV infection in Denmark. Ann Intern Med. 2016;165(10):749–50.
127. Price AJ, Glynn J, Chihana M, Kayuni N, Floyd S, Slaymaker E, *et al*. Sustained 10-year gain in adult life expectancy following antiretroviral therapy roll-out in rural Malawi: July 2005 to June 2014. Int J Epidemiol. 2017;46(2):479–91.
128. Nsanzimana S, Remera E, Kanters S, Chan K, Forrest JI, Ford N, *et al*. Life expectancy among HIV-positive patients in Rwanda: a retrospective observational cohort study. Lancet Glob Health. 2015;3(3):e169–77.
129. Johnson LF, Mossong J, Dorrington RE, Schomaker M, Hoffmann CJ, Keiser O, *et al*. International Epidemiologic Databases to Evaluate AIDS Southern Africa Collaboration. Life expectancies of South African adults starting antiretroviral treatment: collaborative analysis of cohort studies. PLoS Med. 2013;10(4):e1001418.
130. Reniers G, Blom S, Calvert C, Martin-Onraet A, Herbst AJ, Eaton JW, *et al*. Trends in the burden of HIV mortality after roll-out of antiretroviral therapy in KwaZulu-Natal, South Africa: an observational community cohort study. Lancet HIV. 2017;4(3):e113–21.
131. Gueler A, Moser A, Calmy A, Günthard HF, Bernasconi E, Furrer H, *et al*. Life expectancy in HIV-positive persons in Switzerland: matched comparison with general population. AIDS. 2017;31(3):427–36.
132. Teeraananchai S, Chaivooth S, Kerr SJ, Bhakeecheep S, Avihingsanon A, Teeraratkul A, *et al*. Life expectancy after initiation of combination antiretroviral therapy in Thailand. Antivir Ther. 2017;22:393–402.
133. Asiki G, Reniers G, Newton R, Baisley K, Nakiyingi-Miiro J, Slaymaker E, *et al*. Adult life expectancy trends in the era of antiretroviral treatment in rural Uganda (1991-2012). AIDS. 2016;30(3):487–93.
134. May MT, Gompels M, Delpech V, Porter K, Orkin C, Kegg S, *et al*. Impact on life expectancy of HIV-1 positive individuals of CD4+ cell count and viral load response to antiretroviral therapy. AIDS. 2014;28(8):1193–202.
135. Samji H, Cescon A, Hogg RS, Modur SP, Althoff KN, Buchacz K, *et al*. Closing the gap: increases in life expectancy among treated HIV-positive individuals in the United States and Canada. PLoS ONE. 2013;8(12):e81355.
136. Siddiqi AE, Hall HI, Hu X, Song R. Population-based estimates of life expectancy after HIV diagnosis: United States 2008–2011. J Acquir Immune Defic Syndr. 2016;72(2):230–6.
137. Marcus JL, Chao CR, Leyden WA, Xu L, Quesenberry CP Jr, Klein DB, *et al*. Narrowing the gap in life expectancy between HIV-infected and HIV-uninfected individuals with access to care. J Acquir Immune Defic Syndr. 2016;73(1):39–46.

138. Furuya-Kanamori L, Kelly MD, McKenzie SJ. Co-morbidity, ageing and predicted mortality in antiretroviral treated Australian men: a quantitative analysis. PLoS ONE. 2013;8(10):e78403.
139. van Sighem AI, Gras LA, Reiss P, Brinkman K, de Wolf F. Life expectancy of recently diagnosed asymptomatic HIV-infected patients approaches that of uninfected individuals. AIDS. 2010;24(10):1527–35.
140. Nglazi M, West S, Dave J, Levitt N, Lambert E. Quality of life in individuals living with HIV/AIDS attending a public sector antiretroviral service in Cape Town, South Africa. BMC Public Health. 2014;3(14):676.
141. Wandeler G, Johnson LF, Egger M. Trends in life expectancy of HIV-positive adults on antiretroviral therapy across the globe: comparisons with general population. Curr Opin HIV AIDS. 2016;11(5):492–500.
142. Palella FJ Jr, Baker RK, Moorman AC, Chmiel JS, Wood KC, Brooks JT, *et al*. Mortality in the highly active antiretroviral therapy era: changing causes of death and disease in the HIV outpatient study. J Acquir Immune Defic Syndr. 2006;43(1):27–34.
143. Crum NF, Riffenburgh RH, Wegner S, Agan BK, Tasker SA, Spooner KM, *et al*. Comparisons of causes of death and mortality rates among HIV-infected persons: analysis of the pre-, early, and late HAART (highly active antiretroviral therapy) eras. J Acquir Immune Defic Syndr. 2006;41(2):194–200.
144. Deeks SG, Phillips AN. HIV infection, antiretroviral treatment, ageing, and non-AIDS related morbidity. BMJ. 2009;31(338):288–92.
145. Kojic EM, Wang CC, Cu-Uvin S. HIV and menopause: a review. J Womens Health (Larchmt). 2007;16(10):1402–11.
146. Manfredi R. HIV disease and advanced age: an increasing therapeutic challenge. Drugs Aging. 2002;19(9):647–69.
147. Manfredi R. HIV infection and advanced age emerging epidemiological, clinical, and management issues. Ageing Res Rev. 2004;3(1):31–54.
148. Serrano-Villar S, Gutiérrez F, Miralles C, Berenguer J, Rivero A, Martínez E, *et al*. Human immunodeficiency virus as a chronic disease: evaluation and management of nonacquired immune deficiency syndrome-defining conditions. Open Forum Infect Dis. 2016;3(2):ofw097.
149. Narayan KM, Miotti PG, Anand NP, Kline LM, Harmston C, Gulakowski R 3rd, *et al*. HIV and noncommunicable disease comorbidities in the era of antiretroviral therapy: a vital agenda for research in low- and middle-income country settings. J Acquir Immune Defic Syndr. 2014;1(67 Suppl 1):S2–7.
150. Bloomfield GS, Khazanie P, Morris A, Rabadán-Diehl C, Benjamin LA, Murdoch D, *et al*. HIV and noncommunicable cardiovascular and pulmonary diseases in low- and middle-income countries in the ART era: what we know and best directions for future research. J Acquir Immune Defic Syndr. 2014;1(67 Suppl 1):S40–53.
151. Helleberg M, Afzal S, Kronborg G, Larsen CS, Pedersen G, Pedersen C, *et al*. Mortality attributable to smoking among HIV-1-infected individuals: a nationwide. Population-Based Cohort Study. Clin Infect Dis. 2013;56(5):727–34.
152. Rodriguez B, Sethi AK, Cheruvu VK, Mackay W, Bosch RJ, Kitahata M, *et al*. Predictive value of plasma HIV RNA level on rate of CD4 T-cell decline in untreated HIV infection. J Am Med Assoc. 2006;296(12):1498–506.
153. Bernard E, Azad Y, Delpech V, Geretti AM. HIV Forensics II: estimating the likelihood of recent HIV infection: implications for criminal prosecution. London: National AIDS Trust; 2011.
154. Goodenow M, Huet T, Saurin W, Kwok S, Sninsky J, Wain-Hobson S. HIV-1 isolates are rapidly evolving quasispecies: evidence for viral mixtures and preferred nucleotide substitutions. J Acquir Immune Defic Syndr. 1989;2:344–52.
155. Abecasis A, Pingarilho M, Vandamme A-M. Phylogenetic analysis as a forensic tool in HIV transmission investigations: a literature review. AIDS. 2017;26(31):2017.
156. Romero-Severson E, Skar H, Bulla I, Albert J, Leitner T. Timing and order of transmission events is not directly reflected in a pathogen phylogeny. Mol Biol Evol. 2014;31:2472–82.
157. Rambaut A, Posada D, Crandall KA, Holmes EC. The causes and consequences of HIV evolution. Nat Rev Genet. 2004;5:52–61.
158. Bernard EJ, Azad Y, Vandamme AM, Weait M, Geretti AM. HIV forensics: pitfalls and acceptable standards in the use of phylogenetic analysis as evidence in criminal investigations of HIV transmission. HIV Med. 2007;8(6):382–7.
159. Romero-Severson EO, Bulla I, Leitner T. Phylogenetically resolving epidemiologic linkage. Proc Natl Acad Sci USA. 2016;113(10):2690–5.
160. Huelsenbeck J, Hillis DM. Success of phylogenetic methods in the four-taxon case. Syst Biol. 1993;42(3):247–64.
161. Wertheim JO, Sanderson MJ, Worobey M, Bjork A. Relaxed molecular clocks, the bias-variance trade-off, and the quality of phylogenetic inference. Syst Biol. 2010;59:1–8.
162. González-Candelas F, Bracho MA, Wróbel B, Moya A. Molecular evolution in court: analysis of a large hepatitis C virus outbreak from an evolving source. BMC Biol. 2013;11:76.
163. Abecasis AB, Geretti AM, Albert J, Power L, Weait M, Vandamme A-M. Science in court: the myth of HIV fingerprinting. Lancet Infect Dis. 2011;11(2):78–9.
164. Ou CY, Ciesielski CA, Myers G, Bandea CI, Luo CC, Korber BT, *et al*. Molecular epidemiology of HIV transmission in a dental practice. Science. 1992;256:1165–71.
165. Smith TF, Waterman MS. The continuing case of the Florida dentist. Science. 1992;256:1155–6.
166. DeBry RW, Abele LG, Weiss SH, Hill MD, Bouzas M, Lorenzo E, *et al*. Dental HIV transmission? Nature. 1993;361:691.
167. Lemey P, Van Dooren S, Van Laethem K, Schrooten Y, Derdelinckx I, Goubau P, *et al*. Molecular testing of multiple HIV-1 transmissions in a criminal case. AIDS Lond Engl. 2005;19:1649–58.
168. Goedhals D, Rossouw I, Hallbauer U, Mamabolo M, de Oliveira T. The tainted milk of human kindness. Lancet Lond Engl. 2012;380:702.
169. Paraschiv S, Banica L, Nicolae I, Niculescu I, Abagiu A, Jipa R, *et al*. Epidemic dispersion of HIV and HCV in a population of co-infected Romanian injecting drug users. PLoS ONE. 2017;12:e0185866.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Supplementary Material S1. Endorsers of the Expert Consensus Statement.

Supplementary Material S2. Executive Summary Expert Consensus Statement.

Supplementary Material S3. Expert Consensus Statement FRENCH Translation.

Supplementary Material S4. Expert Consensus Statement RUSSIAN Translation.

Supplementary Material S5. Expert Consensus Statement SPANISH Translation.

Annex C: Useful resources

Science of HIV

M. Loutfy, M. Tyndall et al., "Canadian Consensus Statement on HIV and its transmission in the context of the criminal law," *Canadian Journal of Infectious Diseases & Medical Microbiology*, 25(3) (2014): pp. 135-140.

F. Barré-Sinoussi et al., "Expert consensus statement on the science of HIV in the context of criminal law," *Journal of the International AIDS Society* July 2018, 21:e25161, https://doi.org/10.1002/jia2.25161.

E.J. Bernard et al., "HIV forensics: pitfalls and acceptable standards in the use of phylogenetic analysis as evidence in criminal investigations of HIV transmission," *HIV Medicine* 2007; 8(6): 382–387, https://onlinelibrary.wiley.com/doi/full/10.1111/j.1468-1293.2007.00486.x.

E.J. Bernard et al., *HIV Forensics II*: *Estimate the likelihood of recent HIV infection – Implications for criminal prosecution* (London: National AIDS Trust, July 2011), www.nat.org.uk/publication/hiv-forensics-ii-estimating-likelihood-recent-hiv-infection-implications-criminal.

Existing prosecutorial policies

Attorney General of Canada, Directive to Director of the Public Prosecution Service, *Canada Gazette*, Part I, Vol. 152, December 8, 2018, online: http://gazette.gc.ca/rp-pr/p1/2018/2018-12-08/html/notice-avis-eng.html#nl4, also reproduced in the *Deskbook* of the Public Prosecution Service of Canada (Section 5.12: "Prosecutions involving non-disclosure of HIV status"), www.ppsc-sppc.gc.ca/eng/pub/fpsd-sfpg/index.html).

[Ontario] Ministry of the Attorney General, *Crown Prosecution Manual – D. 33*: *Sexual Offences against Adults,* updated December 1, 2017. Available at www.ontario.ca/document/crown-prosecution-manual/d-33-sexual-offences-against-adults.

BC Prosecution Service, "Sexual Transmission, or Realistic Possibility of Transmission, of HIV," Policy Code SEX-2, effective April 16, 2019, online: https://www2.gov.bc.ca/assets/gov/law-crime-and-justice/criminal-justice/prosecution-service/crown-counsel-policy-manual/sex-2.pdf.

Reports and recommendations

Justice Canada, *Criminal Justice System's Response to Non-Disclosure of HIV*, 1 December 2017, http://www.justice.gc.ca/eng/rp-pr/other-autre/hivnd-vihnd/index.html.

House of Commons Standing Committee on Justice and Human Rights. *Criminalization of Non-Disclosure of HIV Status* (June 2019), https://www.ourcommons.ca/DocumentViewer/en/42-1/JUST/report-28/.

International guidance

UNDP. *Guidance for prosecutors on HIV-related criminal cases* (2021), https://www.undp.org/publications/undp-guidance-prosecutors-hiv-related-criminal-cases.

UNAIDS. *Ending overly broad criminalisation of HIV non-disclosure, exposure and transmission: Critical scientific, medical and legal considerations* (2013), www.unaids.org/en/resources/documents/2013/20130530_Guidance_Ending_Criminalisation.

Global Commission on HIV and the Law. *HIV and the Law: Risks, Rights and Health* (2012) and *Supplement* (2018), online via www.hivlawcommission.org. (See key recommendations on HIV and criminal law in Annex A.)

UNAIDS & UNDP. *Policy Brief: Criminalisation of HIV Transmission* (2008), www.unaids.org/en/resources/documents/2008/20081110_jc1601_policy_brief_criminalization_long_en.pdf.

Other resources

HIV Legal Network. *Covering Risk: HIV Criminalization and Condoms* (2021), https://www.hivlegalnetwork.ca/site/covering-risk-hiv-criminalization-and-condoms/?lang=en.

HIV Legal Network. *Harms of Sex Offender Registries in Canada among people living with HIV* (2021), https://www.hivlegalnetwork.ca/site/harms-of-sex-offender-registries-in-canada-among-people-living-with-hiv/?lang=en.

References

1 House of Commons Standing Committee on Justice and Human Rights. *Criminalization of Non-Disclosure of HIV Status* (June 2019), https://www.ourcommons.ca/DocumentViewer/en/42-1/JUST/report-28/.

2 E.g. Government of Canada, "Minister Wilson-Raybould Issues Statement on World AIDS Day," December 1, 2016; Department of Justice Canada, *Criminal Justice System's Response to Non-Disclosure of HIV* (2017); House of Commons Standing Committee on Justice and Human Rights, *Criminalization of Non-Disclosure of HIV Status* (June 2019); UN Committee on the Elimination of Discrimination against Women, *Concluding observations on the combined eighth and ninth periodic reports of Canada*, UN Doc. CEDAW/C/CAN/CO/8-9, November 18, 2016; M. Loutfy, M. Tyndall et al., "Canadian Consensus Statement on HIV and its transmission in the context of the criminal law," *Canadian Journal of Infectious Diseases & Medical Microbiology* 2014; 25(3): 135-140; Canadian Coalition to Reform HIV Criminalization, *Ending unjust HIV criminalization: Community consensus statement*, November 2017 (updated March 2019); Women's Legal Education and Action Fund, *A Feminist Approach to Law Reform on HIV Non-Disclosure*, January 2019.

3 *Guidelines on the Role of Prosecutors*, adopted by the Eighth United Nations Congress on the Prevention of Crime and the Treatment of Offenders (1990), www.ohchr.org/EN/ProfessionalInterest/Pages/RoleOfProsecutors.aspx; International Association of Prosecutors, *Standards of Professional Responsibility and Statement of the Essential Duties and Rights of Prosecutors* (1999), www.iap-association.org/Resources-Documentation/IAP-Standards-(1) ["IAP Standards"]; UNODC and International Association of Prosecutors, *The Status and Role of Prosecutors* (2014), www.unodc.org/documents/justice-and-prison-reform/14-07304_ebook.pdf.

4 L. Power, *Understanding Criminal Prosecutions for Sexual Transmission of Infection: A report on charges of grievous bodily harm via sexual transmission of infection handled by the Crown Prosecution Service in England and Wales between 2008-2012, their management and outcomes* (London: Terrence Higgins Trust, undated), available at www.tht.org.uk/hiv-and-sexual-health/living-well-hiv/legal-issues/views-prosecutions. This appears to be the only published report to date attempting to systematically assess the impact of official prosecutorial guidance on the handling of HIV-related criminal prosecutions. Other, anecdotal evidence from Canada confirms that clear policy can reduce the number of prosecutions that are not well-grounded in science or that, for other reasons, may not warrant proceeding.

5 House of Commons Standing Committee on Justice and Human Rights, at p. 24.

6 Ibid., p. 25.

7 UNDP, *Guidance for Prosecutors on HIV-related Criminal Cases* (2021).

8 This includes the extensive recommendations previously made by the Ontario Working Group on Criminal Law and HIV Exposure (CLHE): *Consultation on Prosecutorial Guidelines for Ontario Cases Involving Non-disclosure of Sexually Transmitted Infections: Community Report and Recommendations to the Attorney General of Ontario (June 2011)*, http://clhe.ca/owg-criminal-law-hiv-exposure/wp-content/uploads/2018/04/CHLE-guidelines-report.pdf; CHLE, *Ending Overcriminalization of People Living with HIV in Ontario*, Brief for Ministerial Roundtable on April 12, 2018; and Canadian HIV/AIDS Legal Network, *Ending Unjust HIV Prosecutions in British Columbia: Modernizing prosecutorial policy – Submission to the Attorney General of British Columbia* (January 2019), https://www.hivlegalnetwork.ca/site/ending-unjust-hiv-prosecutions-in-british-columbia/?lang=en.

9 UNAIDS, *Ending overly broad criminalisation of HIV non-disclosure, exposure and transmission: Critical scientific, medical and legal considerations* (2013); Global Commission on HIV and the Law, *HIV and the Law: Risks, Rights and Health* (2012) and *Supplement* (2018), online via www.hivlawcommission.org; UNAIDS & UNDP, *Policy Brief: Criminalisation of HIV Transmission* (2008); UNDP, *Guidance for Prosecutors on HIV-related Criminal Cases* (2021).

10 F. Barré-Sinoussi et al., "Expert consensus statement on the science of HIV in the context of criminal law," *Journal of the International AIDS Society* 2018, 21:e25161, https://doi.org/10.1002/jia2.25161.

11 C. Hastings et al. *HIV Criminalization in Canada: Key Trends and Patterns, 1989-2020* (HIV Legal Network, 2022).

12 In 2018, the Court of Appeal of Nova Scotia confirmed that psychological harm alone resulting from a partner's non-disclosure (e.g. emotional stress) is not sufficient to trigger the application of the criminal law in the absence of a realistic possibility of transmission: *R v Thompson*, 2018 NSCA 13.

[13] *R v Mabior,* 2012 SCC 47 (para. 95).

[14] There are few instances in which courts have considered criminal liability for oral sex without HIV disclosure, but two known cases have confirmed that, regardless of condom use or viral load, the risk of transmission is not significant enough to warrant prosecution or conviction: *R v Edwards*, 2001 NSSC 80; *R v Murphy*, 2013 CanLII 54139 (ON SC). This is consistent with the scientific consensus that the possibility of transmission through oral sex ranges from negligible (in very unusual and extreme circumstances) to none: Barré-Sinoussi et al., supra note 10; Loutfy et al., supra note 2. It is also consistent with the statements in both the federal directive to the PPSC and the BCPS policy in British Columbia suggesting that oral sex is unlikely to warrant prosecution.

[15] E.g. *R v Felix*, 2013 ONCA 415; *R v Mekonnen*, 2013 ONCA 414. But see also *R v. NG*, 2020 ONCA 494, in which the same court signalled it would likely conclude the contrary in a future case in which this question were before it.

[16] F. Barré-Sinoussi et al., supra note 10.

[17] Prevention Access Campaign, "Undetectable = Untransmittable," available at www.preventionaccess.org/.

[18] Statement on behalf of the Council of Chief Medical Officers of Health, November 30, 2017, available at www.canada.ca/en/public-health/news/2017/11/statement_on_behalfofthecouncilofchiefmedicalofficersofhealth.html.

[19] Public Health Agency of Canada, "Canada's Minister of Health calls for end to stigma on World AIDS Day," December 1st, 2018, https://www.canada.ca/en/public-health/news/2018/11/canadas-minister-of-health-calls-for-end-to-stigma-on-world-aids-day.html.

[20] The definition of a "suppressed" viral load as below 200 copies/ml originates from the Department of Justice Canada's report released in 2017, *Criminal Justice System's Response to Non-Disclosure of HIV,* which refers to a 2017 scientific study by the Public Health Agency Canada. In *Mabior*, the SCC characterized a viral load below 1500 copies/ml as "low" based on the scientific evidence before it.

[21] *Cuerrier*, at para. 129 (per Cory J. for the majority) [emphasis added].

[22] E.g. see: *R. v. Edwards*, 2001 NSSC 80 at paras. 14-15, 17, 19 22 (Crown bore burden throughout to prove beyond a reasonable doubt that the accused's conduct had created a "significant risk," meaning in this case "unprotected anal intercourse" with the complainant); *R v. Agnatuk-Mercier* [2001] O.J. No. 4729 (Ont. S.CJ.) (QL) at paras. 6-7 (condoms used for the acts of vaginal sex in question; trial judged noted that "both counsel agree that in order for this court to convict him, it must be established by the Crown beyond a reasonable doubt that unprotected sex with him, took place between the parties as alleged"); *R. v. Nduwayo*, 2006 BCSC 1972 at paras. 7-8 (instruction to jury that accused had a legal duty to disclose his HIV-positive status to his sexual partner in the event of unprotected sexual intercourse, but that there was no legal duty to disclose his HIV-positive status if he used condoms at all times); *R. v. Smith*, [2007] S.J. No. 166 (Sask. P.C.) (QL) at para. 59 (trial judge instructed himself that he had to be satisfied beyond a reasonable doubt that the sex was unprotected to convict the accused in relation to HIV non-disclosure).

[23] E.g. in *New Zealand Police* v. *Dalley*, [2005] 22 CRNZ 495, the court, having considered the evidence regarding risk of transmission, acquitted a man living with HIV of charges of "criminal nuisance" in relation to both condomless oral sex and vaginal sex with a condom: at paras. 46-48.

[24] *Mabior*, at paras. 70-71 [emphasis added].

[25] Justice Canada, *Criminal Justice System's Response to Non-Disclosure of HIV*, 1 December 2017, http://www.justice.gc.ca/eng/rp-pr/other-autre/hivnd-vihnd/index.html.

[26] Attorney General of Canada, Directive to Director of the Public Prosecution Service, *Canada Gazette*, Part I, Vol. 152, December 8, 2018, online: http://gazette.gc.ca/rp-pr/p1/2018/2018-12-08/html/notice-avis-eng.html#nl4.

[27] House of Commons Standing Committee on Justice and Human Rights. *Criminalization of Non-Disclosure of HIV Status* (June 2019), https://www.ourcommons.ca/DocumentViewer/en/42-1/JUST/report-28/.

[28] P. Sweeney et al., "Association of HIV diagnosis rates and laws criminalizing HIV exposure in the United States," AIDS 2017, 31: 1483–1488; S. Burris et al., "Do Criminal Laws Influence HIV Risk Behavior? An Empirical Trial," (2007) 39 *Ariz. St. L.J.* 467; Z. Lazzarini et al., "Evaluating the Impact of Criminal Laws on HIV Risk Behavior," *Journal of Law, Medicine & Ethics*, 30 (2002): 239–253; K.J. Horvath et al., "Men Who have Sex with Men Who Believe that Their State has a HIV Criminal Law Report Higher Condomless Anal Sex than Those Who are Unsure of the Law in Their State," *AIDS Behav* 2017; 21(1): 51-58, doi: 10.1007/s10461-016-1286-0.

[29] P. O'Byrne et al., "HIV criminal prosecutions and public health: an examination of the empirical research," *Medical Humanities* 2013; 39(2): 85, doi: http://dx.doi.org/10.1136/medhum-2013-010366; P. O'Byrne et al., "Nondisclosure prosecutions and population health outcomes: examining HIV testing, HIV diagnoses, and the attitudes of men who have sex with men following nondisclosure prosecution media releases in Ottawa, Canada," *BMC Public Health* 2013; 13: 94, http://www.biomedcentral.com/1471-2458/13/94.

[30] E. Mykhalovskiy, "The public health implications of HIV criminalization: past, current, and future research directions," *Critical Public Health* 25,4 (2015), pp. 373–385; C.L. Galletly & S.D. Pinkerton, "Conflicting Messages: How Criminal HIV Disclosure Laws Undermine Public Health Efforts to Control the Spread of HIV," *AIDS Behav* (2006) 10:451–46, doi: 10.1007/s10461-006-9117-3.

[31] Justice Edwin Cameron (Constitutional Court of South Africa), "Stigma and the Role of Courts: The Disquieting Case of AIDS," The Honourable Mr. Justice Michael O'Byrne Lecture on Law, Medicine and Ethics, University of Calgary, Cumming School of Medicine, 20 March 2018, online: http://www.seroproject.com/wp-content/uploads/2018/04/OByrne-Lecture-Calgary-Stigma-and-the-Role-of-Courts-Tuesday-20-March-2018.pdf.

[32] B. Adam et al., "HIV Positive People's Perspectives on Canadian Criminal Law and Non-Disclosure," (2016) 31(1) *Canadian Journal of Law and Society* 1-23, DOI: 10.1017/cls.2016.3; B. Adam et al., "Impacts of Criminalization on the Everyday Lives of People Living with HIV in Canada," *Sex Res Soc Policy* 2014 11:39–49, DOI 10.1007/s13178-013-0131-8; L. Sprague & S. Strub, "The Sero Project: National criminalization survey—preliminary results," 25 July 2011; C.L. Galletly & J. Dickson-Gomez, "HIV seropositive status disclosure to prospective sex partners and criminal laws that require it: perspectives of persons living with HIV, *International Journal of STD & AIDS* 2009; 20(9): 613-618, https://doi.org/10.1258/ijsa.2008.008417; C. Dodds & P. Keogh, "Criminal prosecutions for HIV transmission: people living with HIV respond, *Int J STD AIDS* 2006; 17: 315–8.

[33] P. O'Byrne et al, "Nondisclosure Prosecutions and HIV Prevention: Results From an Ottawa-Based Gay Men's Sex Survey," *Journal of the Association of Nurses in AIDS Care* 2013; 24(1): 81-87; P. Byrne et al., "Sexual practices and STI/HIV testing among gay, bisexual, and men who have sex with men in Ottawa, Canada: examining nondisclosure prosecutions and HIV prevention," *Critical Public Health* 2013; 23:2: 225-236, DOI: 10.1080/09581596.2012.752070; P O'Byrne et al., Nondisclosure prosecutions and population health outcomes: examining HIV testing, HIV diagnoses, and the attitudes of men who have sex with men following nondisclosure prosecution media releases in Ottawa, Canada. *BMC Public Health* 2013;13:94. A modelling study using Ontario data has suggested that the fear of prosecution over HIV non-disclosure reported by (undiagnosed) gay men "has the potential to significantly increase HIV transmission at the community level which has important public health implications": M.A. Kesler et al., "Prosecution of non-disclosure of HIV status: Potential impact on HIV testing and transmission among HIV-negative men who have sex with men," *PLoS One* 2018; 13(2): e0193269.

[34] S.E. Patterson et al., "The impact of criminalization of HIV non-disclosure on the health care engagement of women living with HIV in Canada: a comprehensive review of the evidence," *Journal of the International AIDS Society* 18, 1 (2015): 20572; P. O'Byrne, "Criminal Law and Public Health Practice: Are the Canadian HIV Disclosure Laws an Effective HIV Prevention Strategy?," *Sex Res Soc Policy* (2012) 9: 70; C. Sanders, "Discussing the Limits of Confidentiality: The Impact of Criminalizing HIV Nondisclosure on Public Health Nurses' Counseling Practices," *Public Health Ethics* 2014; 7(3): 253-260; C. Dodds et al., "Keeping confidence: HIV and the criminal law from HIV service providers' perspectives, " *Crit Public Health* 2015; 25(4): 410–426; E. Mykhalovskiy, "The problem of 'significant risk': Exploring the public health impact of criminalizing HIV non-disclosure," *Social Science & Medicine* 2011; 73: 668-675.

[35] World Health Organization, *Violence against women*: *Intimate partner and sexual violence against women - Evidence brief* (2019), https://www.who.int/reproductivehealth/publications/vaw-evidence-brief/en/; KJ Marshall et al., "Interventions that address intimate partner violence and HIV among women: a systematic review," *AIDS Behav.* 2018; 22(10): 3244-3263.

[36] Women's Legal Education and Action Fund, *A Feminist Approach to Law Reform on HIV Non-Disclosure*, January 2019; ATHENA Network, *10 Reasons Why Criminalisation of HIV Exposure or Transmission Harms Women* (2009), available via https://athenanetwork.org/resources.html; International Community of Women Living with HIV (ICW), *Position Statement*: *Criminalisation of Women Living with HIV*: *Non-disclosure, Exposure and Transmission* (2015), https://www.scribd.com/document/267526864/ICW-Position-Statement-2015-CRIMINALIZATION-OF-WOMEN-LIVING-WITH-HIV-NON-DISCLOSURE-EXPOSURE-AND-TRANSMISSION.

[37] See, e.g., S Green et al., "How women living with HIV react and respond to learning about Canadian law that criminalises HIV non-disclosure: 'How do you prove that you told?'" *Culture, Health & Sexuality* (2019).

[38] SE Patterson et al., "The impact of criminalisation of HIV non-disclosure on the healthcare engagement of women living with HIV in Canada: a comprehensive review of the evidence," *Journal of the International AIDS Society* 2015; 18: 20572, http://dx.doi.org/10.7448/IAS.18.1.20572.

[39] E.g. C Hastings et al., *HIV Criminalization in Canada*: *Key Trends and Patterns, 1989-2020* (HIV Legal Network, 2022); House of Commons Standing Committee on Justice and Human Rights, *Criminalization of Non-Disclosure of HIV Status* (June 2019), https://www.ourcommons.ca/DocumentViewer/en/42-1/JUST/report-28/; Justice Canada, *Criminal Justice System's Response to Non-Disclosure of HIV*, 1 December 2017, http://www.justice.gc.ca/eng/rp-pr/other-autre/hivnd-vihnd/index.html.

[40] E.g. E Mykhalovskiy et al., "'Callous, Cold and Deliberately Duplicitous': Racialization, Immigration and the Representation of HIV Criminalization in Canadian Mainstream Newspapers," (November 22, 2016), http://dx.doi.org/10.2139/ssrn.2874409.

[41] Government of Canada, Statement: "Minister Wilson-Raybould Issues Statement on World AIDS Day," 1 December 2016, online: https://www.canada.ca/en/department-justice/news/2016/12/minister-wilson-raybould-issues-statement-world-aids.html.

[42] Justice Canada, *Criminal Justice System's Response to Non-Disclosure of HIV*, 1 December 2017, online: http://www.justice.gc.ca/eng/rp-pr/other-autre/hivnd-vihnd/index.html.

[43] Attorney General of Canada, Directive to Director of the Public Prosecution Service, *Canada Gazette*, Part I, Vol. 152, December 8, 2018, online: http://gazette.gc.ca/rp-pr/p1/2018/2018-12-08/html/notice-avis-eng.html#nl4.

[44] Attorney General of Ontario and Minister of Health and Long-term Care, *World AIDS Day 2017 Statement,* December 1, 2017, http://clhe.ca/wp-content/uploads/Ontario-AG-and-MOHLTC-WorldAIDSDay2017statement.pdf.

[45] [Ontario] Ministry of the Attorney General, *Crown Prosecution Manual – D. 33*: *Sexual Offences against Adults,* updated December 1, 2017. Available at www.ontario.ca/document/crown-prosecution-manual/d-33-sexual-offences-against-adults.

[46] BC Prosecution Service, "Sexual Transmission, or Realistic Possibility of Transmission, of HIV," Policy Code SEX-2, effective April 16, 2019, online: https://www2.gov.bc.ca/assets/gov/law-crime-and-justice/criminal-justice/prosecution-service/crown-counsel-policy-manual/sex-2.pdf.

[47] The policy adds that, per *Mabior*, 2012 SCC 47 (para. 100), "low viral load" is defined as less than 1,500 copies of the virus per ml of blood.

[48] Letter from Eric Tolppannen, Assistant Deputy Minister, Alberta Crown Prosecution Service Division, Alberta Ministry of Justice and Solicitor General, to Richard Elliott, Executive Director, Canadian HIV/AIDS Legal Network, January 18, 2019, on file.

[49] Letter from Annick Murphy, Directrice, Directeur des poursuites criminelles et pénales (DPCP), to Léa Pelletier-Marcotte, Coordonnatrice du Programme Droits de la personne et VIH/SIDA, Coalition des organismes communautaires québécois de lutte contre le sida (COCQ-sida), September 17, 2019, on file [unofficial translation].

[50] UN Development Programme (UNDP) issued *Guidance for prosecutors on HIV-related criminal cases* (2021), https://www.undp.org/publications/undp-guidance-prosecutors-hiv-related-criminal-cases.

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