

**STIs AMONG YMSM IN CANADA:  
IMPLICATIONS FOR PUBLIC HEALTH POLICIES, PROGRAMS, AND ACTIVITIES**

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### **List of acronyms**

AIDS: Acquired immunodeficiency virus  
BCCDC: British Columbia Centre for Disease Control  
CDC: United States Centers for Disease Control and Prevention  
CATIE: Canadian AIDS Treatment Information Exchange  
CIHR: Canadian Institutes of Health Research  
CNDSS: Canadian Notifiable Disease Surveillance System  
CSC: Correctional Service Canada  
HBV: Hepatitis B virus  
HCV: Hepatitis C virus  
HIV: Human immunodeficiency virus  
HPV: Genital human papillomavirus  
HSV: Genital herpes simplex virus  
IDU: Injection drug use  
LVG: Lymphogranuloma venereum  
MSM: Men who have sex with men  
PHAC: Public Health Agency of Canada  
PHO: Public Health Ontario  
RCT: Randomized control trial  
STI: Sexually transmitted infection  
WHO: World Health Organization  
YMSM: Young men who have sex with men

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## Abstract

Men who have sex with men (MSM) experience a disproportionate burden of sexually transmitted infections (STIs) in Canada and the United States. Since the beginning of national HIV surveillance in Canada in 1985, MSM have accounted for more than 54.1 % (n = 22,500) of total positive HIV diagnoses up to 2012, and have been estimated to carry the greatest number of diagnosed and undiagnosed HIV infections (46.7%; n = 33,330).<sup>1</sup>

In recent years, STIs among younger MSM (known as young men who have sex with men or YMSM) has emerged as a field of research for those with an interest in sexually transmitted infectious diseases. This paper uses YMSM in Canada as a case study, and applies a systematic review approach to provide evidence on current epidemiologic trends relating to STIs among YMSM in Canada, as well as related policy implications.

The systematic approach was selected for a variety of reasons; it was selected to report transparently on how the conclusions were generated, to reduce bias in findings, and to draw upon the most relevant (but also hard to find) information. Additionally, systematic reviews, such as Cochrane systematic reviews and meta-analyses, are increasingly the preferred method for conducting literature reviews in the fields of the biomedical and social sciences, and are becoming more prominent in a world that increasingly privileges evidence in decision-making.

Using systematic review methods, this paper finds that in Canada, the incidence of reported HIV infections among YMSM has been increasing since 1999 and YMSM are considered to be at risk for a variety of other STIs. It further finds that the burden of some STIs is concentrated among

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<sup>1</sup> “HIV and AIDS in Canada: Surveillance Report to December 31 2012”, Public Health Agency of Canada, 2013, accessed December 15 2013, [online]: <http://www.catie.ca/en/resources/hiv-and-aids-canada-surveillance-report-december-31-2012>.

older MSM as opposed to YMSM. Furthermore, there are a variety of proposed public health policies (primary and secondary prevention activities) that might address the burden of HIV infections and STI risk behaviour among YMSM; these include a comprehensive approach to determinants of sexual health; continued sexual health education targeting YMSM; new, novel approaches for reaching YMSM; better capacity to address young men's health needs; increased STI screening and testing, in particular point of care and rapid testing for HIV; and increased data collection on YMSM. These policy implications would affect all levels of government in Canada (national, provincial, and territorial, and municipal), as well as non-governmental organizations (NGOs).

## Part 1: Introduction

Men who have sex with men (MSM) experience a disproportionate burden of sexually transmitted infections (STIs) in Canada and the United States. Since the beginning of national HIV surveillance in Canada in 1985, MSM have accounted for more than 54.1 % (n = 22,500) of total positive HIV diagnoses up to 2012, and have been estimated to carry the greatest number of diagnosed and undiagnosed HIV infections (46.7%; n = 33,330).<sup>2</sup> According to the Public Health Agency of Canada (PHAC), MSM are also targeted as groups at high risk for other STIs, including gonorrhea, chlamydia, syphilis, and the human papillomavirus (HPV), as well as less common STIs such as lymphogranuloma venereum (LGV).<sup>3,4</sup>

Over the past two decades, STIs among younger MSM (known as young men who have sex with men or YMSM) in Canada and the United States has emerged as a field of research for those with an interest in sexually transmitted infectious diseases. Differences in epidemiologic, as well as socio-behavioural trends (known as risk factors) between younger and older MSM have been observed; these predominantly include variations in patterns of disease (e.g. younger and older MSM experience different reported incidence rates of STIs) and sexual behaviours. These findings have not fully been translated into public health activities for YMSM by governments and non-governmental organizations (NGOs), however academics and researchers have proposed a variety of recommendations for public health policy- and decision-makers.

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<sup>2</sup> “HIV and AIDS in Canada: Surveillance Report to December 31 2012”, Public Health Agency of Canada, 2013.

<sup>3</sup> “Men Who Have Sex with Men (MSM) / Women Who Have Sex with Women (WSW), Canadian Guidelines on Sexually Transmitted Infections”, Public Health Agency of Canada, 2010, accessed November 15 2013 [online]: <http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-6-3-eng.php>.

<sup>4</sup> “The Syphilis Outbreak in Alberta”, Office of the Chief Medical Officer of Health, Alberta Health and Wellness, December 2010, accessed November 10, 2013 [online]: <http://www.health.alberta.ca/documents/STI-Syphilis-Report-2010.pdf>.

In order to understand how STIs affect YMSM in Canada, as well as how these trends may inform public health policies, programs, and activities, this project applies a systematic review approach to answer three key research questions. This approach was selected to report transparently on how the conclusions were generated, to reduce bias in findings, and to draw upon the most relevant (but also hard to find) information. Additionally, systematic reviews, such as Cochrane systematic reviews and meta-analyses, are increasingly the preferred method for conducting literature reviews in the fields of biomedical and social sciences, and are becoming more prominent in a world that increasingly privileges evidence in decision-making.

The three research questions that were developed focus on sexual health status, risk factors, and public health approaches to tackling the problem of STIs among YMSM. The questions were:

- 1) What can be said about sexual health status of YMSM in Canada with relation to STIs?
- 2) What are the risk factors associated with sexual health status of YMSM with relation to STIs?
- 3) What public health policies might address the sexual health needs with relation to STIs among YMSM in Canada?

All three of questions sought to address research gaps; while there are American literature reviews on YMSM and STIs, there is a paucity of literature that addresses these questions from a Canadian perspective.<sup>5</sup> Additionally, there is a multiplicity of Canadian studies, data, and information relating to the topic that have yet not been synthesized or compared.

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<sup>5</sup> BS Mustanski, et al., "HIV in Young Men Who Have Sex with Men: A Review of Epidemiology, Risk and Protective Factors, and Interventions", *J Sex Res*, March 2011; 48(2-3): 218-53.

Using a systematic approach, a literature review was conducted between August and December 2013 to collect a comprehensive account of the most up-to-date, relevant information that related to these research questions.

Based on review of multiple sources of data and information (including various cross-sectional and cohort studies, provincial, territorial and national epidemiological surveillance reports), findings reveal that variations in patterns of disease do indeed exist between younger and older MSM: many STIs, including cases of AIDS, HCV, LYG, and syphilis are less frequently reported among YMSM when compared to older MSM; however incidence rates of HIV infection have been steadily increasing among YMSM at the national level. Review of the literature also found that there are a broad set of recommendations for the prevention and control of STIs for YMSM in Canada, including primary and secondary prevention activities and strategies. These recommendations would impact all levels of government (national, provincial, and territorial, and municipal), as well as NGOs, but may be difficult to implement in the decentralized Canadian health system model.

## Part 2: Background

Over the past two decades, STIs among YMSM has emerged as a field of research for those with an interest in sexually transmitted infectious diseases. But who are YMSM? Additionally, what can be said about the epidemiology of STIs and the governance of sexual health in Canada? This section explores the YMSM construct, the background of STIs including HIV/AIDS in Canada, as well as the policy environment of sexual health in Canada; it sets up a context for understanding STIs among YMSM in Canada, as well as the public health policy implications and recommendations discussed in Part 4: Findings.

### 2.1 YMSM

“Young men who have sex with men” is a term used to define young men who engage in sexual relations with other men. It is an all-encompassing term; that is to say that it refers to young gay, bisexual, two-spirited, and other men who may engage in sexual relations with other men, in particular those who may not consider themselves as belonging to any of these groups. The YMSM term includes those who may not be “out” as well as those who do not self-report as gay or bisexual.

YMSM has its roots in “men who have sex with men”, which is commonplace in the field of epidemiology.<sup>6</sup> In a 2002 joint report by the Canadian AIDS Society and Health Canada, titled *A Guide to HIV/AIDS Epidemiological Surveillance Terms* MSM was defined as: “men who report having had sex with men; this includes men who report either homosexual or bisexual contact (in other words, some will also report having had sex with women as well); it is important to note

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<sup>6</sup> Epidemiology: “how often diseases occur in different groups of people and why”; “What is epidemiology?”, *BMJ Publishing Group Ltd*, 2014, accessed November 10, 2013 [online]: [www.bmj.com/about-bmj/resources-readers/publications/epidemiology-uninitiated/1-what-epidemiology](http://www.bmj.com/about-bmj/resources-readers/publications/epidemiology-uninitiated/1-what-epidemiology).

here that this exposure category refers to sexual behaviour and not a person's self-identified sexual identity".<sup>7</sup>

The term MSM is used by numerous authors cited in this paper, including Dumas, et al. (2011),<sup>8</sup> Gallant, et al. (2011),<sup>9</sup> George, et al. (2007),<sup>10</sup> Gilbert, et al. (2013),<sup>11</sup> Haig, et al. (2010),<sup>12</sup> Lambert, et al. (2011),<sup>13</sup> Machouf (2011),<sup>14</sup> Mustanski, et al. (2011),<sup>15</sup> Thomas, et al. (2011),<sup>16</sup> Veillette-Bourbeau, et al. (2011),<sup>17</sup> Weber, et al. (2001),<sup>18</sup> Winchester (2012),<sup>19</sup> Wong (2013),<sup>20</sup> as well as national and international organizations including PHAC, Health Canada, the Canadian AIDS Society, the United States Centres for Disease Control (CDC), and the World Health Organization (WHO).

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<sup>7</sup> "A Guide to HIV/AIDS Epidemiological Surveillance Terms", Canadian AIDS Society and Health Canada, 2004, accessed November 13, 2013 [online]: [www.cdnaids.ca/home.nsf/ad7c054e653c96438525721a0050fd60/c421c153b3f1b8a1052573250067881e/\\$FILE/HIV%20Glossary.pdf](http://www.cdnaids.ca/home.nsf/ad7c054e653c96438525721a0050fd60/c421c153b3f1b8a1052573250067881e/$FILE/HIV%20Glossary.pdf).

<sup>8</sup> J Dumas, et al., "Health-related use of the Internet by men who have sex with men (MSM) living with HIV (HIV+)", Canadian Journal of Infectious Diseases & Medical Microbiology, 2011; 22, (Suppl. B), 90B, P171.

<sup>9</sup> S Gallant, "Trends in factors associated with recent HIV testing among Montreal men who have sex with men (MSM): Results from the Argus 2005 and 2008 surveys", Department of Epidemiology, Biostatistics, and Occupational Health Faculty of Medicine McGill University, Montréal, Québec, August 2011, accessed November 10, 2013 [online]: [http://digitool.library.mcgill.ca/webclient/StreamGate?folder\\_id=0&dvs=1392653128528~583](http://digitool.library.mcgill.ca/webclient/StreamGate?folder_id=0&dvs=1392653128528~583).

<sup>10</sup> George, et al., "HIV and ethnicity in Canada: Is the HIV risk-taking behaviour of young foreign-born MSM similar to Canadian born MSM?", AIDS Care, January 2007; 19(1), 9-16.

<sup>11</sup> Gilbert, et al., "Targeting screening and social marketing to increase detection of acute HIV infection in MSM in Vancouver, British Columbia", AIDS, October 23, 2013; 27(16), 2649-54.

<sup>12</sup> Haig, et al., "Promoting new HIV testing options to MSM in montreal: Spot's communications campaign", 2010, accessed November 10, 2013 [online]: [www.spottestmontreal.com/Page/Document/PDF1.pdf](http://www.spottestmontreal.com/Page/Document/PDF1.pdf).

<sup>13</sup> G Lambert, "Correlates of Unprotected Anal Sex at Last Sexual Episode: Analysis from a Surveillance Study of Men who have Sex with Men in Montreal", AIDS Behav, April 2011; 15(3): 584-95.

<sup>14</sup> N Machouf, et al., "Risk factors for STIs among MSM attending a sexually transmitted disease clinic in Montreal, Canada", Sexually Transmitted Infections, 2011; Vol: 87(Suppl 1): A144-A144.

<sup>15</sup> BS Mustanski, et al., "HIV in Young Men Who Have Sex with Men: A Review of Epidemiology, Risk and Protective Factors, and Interventions", J Sex Res, March 2011; 48(2-3): 218-53.

<sup>16</sup> Thomas, et al., "Sexually transmitted HCV in MSM in Montreal", Sex Transm Infect, 2011; 87: A144.

<sup>17</sup> Veillette-Bourbeau, et al., "Opportunities and challenges in a new HIV prevention paradigm implementation: Project spot for rapid HIV testing among MSM in the montreal gay community", 2011, accessed November 10, 2013 [online]: [www.spottestmontreal.com/Page/Document/presse2.pdf](http://www.spottestmontreal.com/Page/Document/presse2.pdf).

<sup>18</sup> Weber, et al., "Risk factors associated with HIV infection among young gay and bisexual men in Canada", J Acquir Immune Defic Syndr, September 2001; 28(1): 81-8.

<sup>19</sup> WW Winchester, "The use of partner-seeking computer-mediated communication applications by young men that have sex with men (YMSM): uncovering human-computer interaction (HCI) design opportunities in HIV prevention", Health Systems, 2012 1, 26-35.

<sup>20</sup> CF Wong, "Changes in developmental contexts as predictors of transitions in HIV-risk behaviors among young men who have sex with men (YMSM)", Am J Community Psychol, June 2013; 51(3-4): 439-50.

The emergence of YMSM as a group refers to an age division between older and younger MSM. This stratification is used to study epidemiological and socio-behavioural differences between age groups. The floor age (lower limit) for YMSM is 18 years old in most Canadian and American studies; a review by Mustanski, et al. (2011) however found that the CDC used ages 13 to 24 to report on “youth” more generally, and that some studies of YMSM set the floor age at 15/16.<sup>21</sup> The ceiling age (upper limit) for YMSM is set at either 25 or 30 years old, however some studies included in this review use an age limit of 24.<sup>22</sup> These measurement differences are important to consider going forward.

## 2.2 Sexually Transmitted Infections

There are a number of bacteria, viruses, parasites, and other organisms known to cause sexually transmitted infections (STIs). An STI is defined as an infection that can be transmitted through sexual contact; however STIs can also be transmitted through skin to skin contact, blood and tissue transfer, bodily fluids, as well as mother to child contact. The WHO states that there are over 30 different infectious pathogens known to cause STIs in humans.<sup>23</sup>

According to the *Canadian Guidelines on Sexually Transmitted Infections*, national guidelines for the diagnosis, treatment and management of STIs, bacterial STIs found in Canada include chlamydia (*chlamydia trachomatis*), gonorrhea (*neisseria gonorrhoeae*), syphilis (*treponema pallidum* subsp. *pallidum*), chancroid (*haemophilus ducreyi*), lymphogranuloma venereum (LGV; *chlamydia trachomatis*, serovars L1, L2, L3), *granuloma inguinale*, as well as a variety of organisms that can cause bacterial vaginosis and trichomoniasis. Viral STIs found in Canada

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<sup>21</sup> BS Mustanski, et al., “HIV in Young Men Who Have Sex with Men: A Review of Epidemiology, Risk and Protective Factors, and Interventions”, *J Sex Res*, March 2011; 48(2-3), 218-53.

<sup>22</sup> Kubicek, “Use and Perceptions of the Internet for Sexual Information and Partners: A Study of Young Men who Have Sex with Men”, *Arch Sex Behav*, August 2011; 40(4): 803-16.

<sup>23</sup> “Sexually transmitted infections (STIs)”, *World Health Organization*, November 2013, accessed November 10, 2013 [online]: [www.who.int/mediacentre/factsheets/fs110/en/](http://www.who.int/mediacentre/factsheets/fs110/en/).

include HIV, hepatitis B (HBV) and hepatitis C (HCV), the human papillomavirus (HPV), and the genital herpes simplex virus (HSV). Parasitic STIs in Canada include ectoparasitic infections like public lice (*phthirus pubis*) and scabies (*sarcoptes scabiei*); candidiasis (*candida albicans*, *candida* spp. or *saccharomyces cerevisiae*), also found in Canada, is fungus that causes yeast infections.<sup>24</sup>

STIs can cause a variety of symptoms and syndromes, and can require complex clinical management. The seriousness and severity of STIs varies; many cause only minor discomfort, while others can result in more complicated health issues. These differences in severity are easily observable, for example, chlamydia is a relatively common STI but is curable with a course of antibiotics, while HSV has no known cure; syphilis has been linked to fetal death and gonorrhea is becoming more and more resistant to available antibiotics (limiting future options for treatment), while vulvovaginal candidiasis is treatable with over the counter antifungal creams. Some STIs, for example HIV, HBV, and HCV have been linked to life threatening conditions, including cancer and complications of the liver.<sup>25</sup>

According to the *Report on Sexually Transmitted Infections in Canada 2010*, the top three most reported bacterial STIs in Canada in 2010 were chlamydia, gonorrhea and syphilis.<sup>26</sup> The rates of all three of these STIs have dramatically increased since 2001. It is also noteworthy that reported cases of chlamydia and gonorrhea were by far more numerous than reported cases of syphilis (see Figure 1 below):

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<sup>24</sup> Clinical guidelines are resources used by healthcare professionals (physicians, nurses, etc) in their practice; there are a variety of clinical guidelines that exist in Canada, including national, and provincial and territorial guidelines. Adherence to guidelines is not mandatory.

<sup>25</sup> “Canadian Guidelines on Sexually Transmitted Infections”, [Public Health Agency of Canada](http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/index-eng.php), 2010, accessed November 15, 2013, [online]: <http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/index-eng.php>.

<sup>26</sup> “Report on Sexually Transmitted Infections in Canada”, [Public Health Agency of Canada](http://publications.gc.ca/collections/collection_2013/aspc-phac/HP37-10-2010-eng.pdf), 2012, accessed November 15, 2013 [online]: [http://publications.gc.ca/collections/collection\\_2013/aspc-phac/HP37-10-2010-eng.pdf](http://publications.gc.ca/collections/collection_2013/aspc-phac/HP37-10-2010-eng.pdf).

**Figure 1: Reported Cases and Rates (per 100,000 population) of chlamydia, gonorrhoea, and infectious syphilis, 2001, 2009 and 2010**

Year	Chlamydia		Gonorrhoea		Infectious syphilis	
	Cases	Rates	Cases	Rates	Cases	Rates
2001	50,077	161.4	6,756	21.8	287	0.9
2009	87,208	258.5	11,166	33.1	1,691	5.0
2010	94,690	277.6	11,397	33.4	1,757	5.2

(Source: PHAC, 2012)

### 2.3 HIV/AIDS

Among all other STIs, none may be more well-known than the Human Immunodeficiency Virus (HIV). HIV is a virus that attacks the human immune system, resulting in chronic illness and greater susceptibility to opportunistic infections.<sup>27-28</sup> Individuals infected with HIV can develop Acquired Immunodeficiency Syndrome (AIDS), a condition marked by “the development of certain cancers, infections [such as pneumonia], or other severe clinical manifestations”.<sup>29</sup>

HIV/AIDS is a communicable but preventable disease.<sup>30</sup> The virus is transmitted from an infected individual through certain bodily fluids, including blood, tissue, semen and pre-seminal fluid, rectal fluids, vaginal secretions, and breast milk,<sup>31-32</sup> similar to other STIs. Infections occur

<sup>27</sup> “What is HIV/AIDS?”, Public Health Agency of Canada, 2012, accessed October 10, 2013 [online]: [www.phac-aspc.gc.ca/aids-sida/info/](http://www.phac-aspc.gc.ca/aids-sida/info/).

<sup>28</sup> “Fact Sheet on HIV/AIDS”, World Health Organization, 2013, accessed October 10, 2013 [online]: [www.who.int/mediacentre/factsheets/fs360/en/index.html](http://www.who.int/mediacentre/factsheets/fs360/en/index.html).

<sup>29</sup> Ibid.

<sup>30</sup> “HIV”, United States Department of Health and Human Services, April 2013, accessed October 10, 2013 [online]: <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=22>.

<sup>31</sup> “How is HIV Transmitted?”, AIDS.org, 2013, accessed October 10, 2013 [online]: <http://www.aids.org/topics/aids-faqs/how-is-hiv-transmitted/>.

when these fluids come into contact with a mucous membrane or damaged tissue, or when they are injected directly into the bloodstream.<sup>33</sup> New HIV infections can be the result of unsafe sexual practices, needle sharing, and other mechanisms of transmission.

Worldwide, the WHO estimates that over 25 million people have died of HIV/AIDS in the last three decades.<sup>34</sup> HIV/AIDS continues to be a public health concern in Canada as well. There were an estimated 71,300 people living with HIV/AIDS in Canada in 2011 according to national epidemiologic modelling.<sup>35</sup> Of these, 33,330 (46.7%) were attributed to the MSM exposure category (see Figure 2 below):

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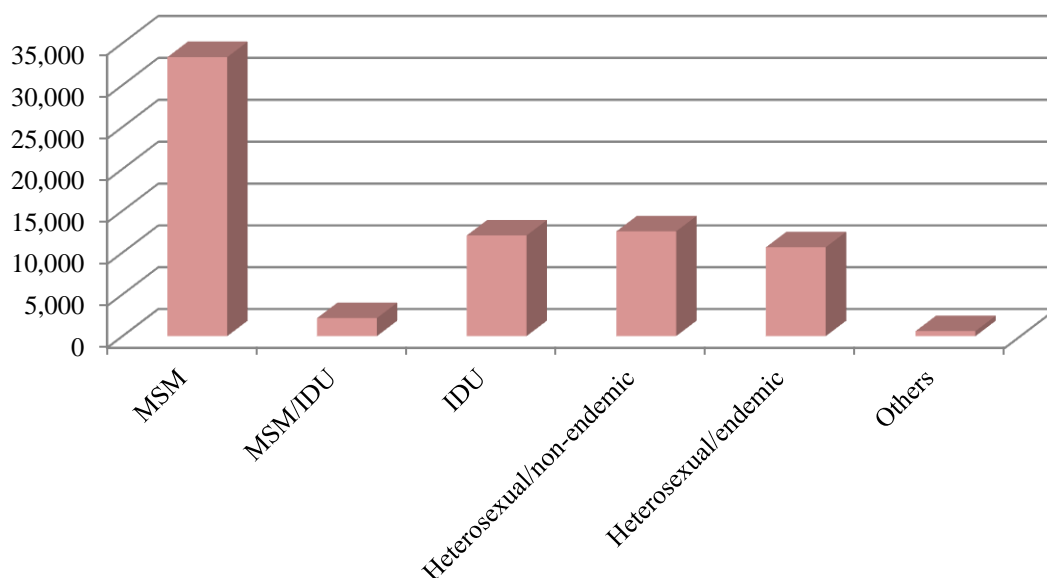
<sup>32</sup> “HIV Transmission”, United States Centers for Disease Control and Prevention, June 2013, accessed October 15, 2013 [online]: <http://www.cdc.gov/actagainstaids/basics/transmission.html>.

<sup>33</sup> Ibid.

<sup>34</sup> “Fact Sheet on HIV/AIDS”, World Health Organization, 2013, accessed October 10, 2013 [online]: [www.who.int/mediacentre/factsheets/fs360/en/index.html](http://www.who.int/mediacentre/factsheets/fs360/en/index.html).

<sup>35</sup> “Summary: Estimates of HIV Prevalence and Incidence in Canada, 2011”, Public Health Agency of Canada, 2011, accessed October 15, 2013 [online]: <http://www.phac-aspc.gc.ca/aids-sida/publication/survreport/assets/pdf/estimat2011-eng.pdf>.

**Figure 2: Estimated number of prevalent HIV infections in Canada at the end of 2011**



IDU: Injection drug user  
 Endemic refers to individuals living in Canada who originate from regions where HIV is endemic, e.g. certain African countries

(Source: PHAC, 2012)

The reporting of positive HIV diagnoses began in Canada in 1985 and in 1979 for confirmed cases of AIDS.<sup>36</sup> Since this time (and up till December, 2012), there have been over 76,275 reported positive HIV tests and 22,702 cases of AIDS reported at the national level.<sup>37</sup> After the advent of highly active antiretroviral therapy (a treatment regimen which slows the progression of HIV into AIDS, [HAART]) in the 1990s, there has been a significant decrease in the number of AIDS cases reported in Canada; in 2012, there were 172 cases of AIDS reported in Canada.<sup>38</sup>

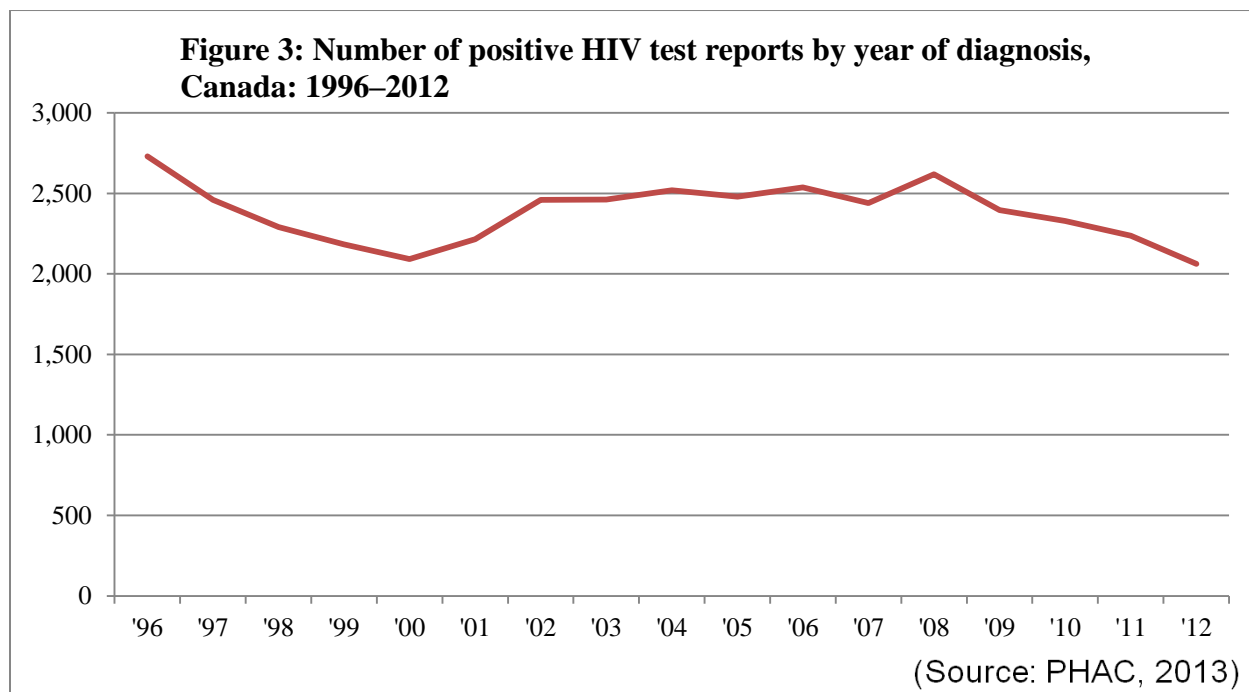
Despite the decrease in reported AIDS cases, new reported HIV infections in Canada continue to remain at a steady rate (slightly decreasing since 2008). In 2012, there were a total of 2,062 positive HIV test diagnoses reported at the national level; this number has not changed much

<sup>36</sup> "HIV and AIDS in Canada: Surveillance Report to December 31 2012", Public Health Agency of Canada, 2013.

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

since 1996, when there was a total of 2,729 positive HIV test diagnoses reported to PHAC (see Figure 3 below):<sup>39</sup>



#### 2.4 Governance of sexual health and other policies on HIV/AIDS and STIs

How do governments and other organizations in Canada manage, prevent, and control STIs? The governance of sexual health in Canada is based on a decentralized health system model; this model is discussed at length in Marchildon's *Health Systems in Transition*.<sup>40</sup> There are numerous actors involved in the management, prevention, and control of STIs, including federal departments of health (notably PHAC, Health Canada, the Canadian Institutes of Health Research [CIHR], and Correctional Service Canada [CSC]), provincial and territorial healthcare providers and public health departments, local public health units (e.g. Toronto Public Health, Ottawa Public Health), as well as non-governmental organizations and civil society (e.g. the

<sup>39</sup> Ibid.

<sup>40</sup> Marchildon, G, *Health Systems in Transition: Canada*, Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies, 2005, [online]: [www.euro.who.int/\\_data/assets/pdf\\_file/0011/181955/e96759.pdf](http://www.euro.who.int/_data/assets/pdf_file/0011/181955/e96759.pdf).

Canadian AIDS Society, the Canadian AIDS Treatment Information Exchange (CATIE), and LGBT and other organizations), and academia (academic researchers).

The various levels of government, non-governmental organizations, and other groups have different as well as shared responsibilities with respect to the governance of HIV/AIDS and STIs. Management and health care service delivery related to STIs (e.g. primary care) is coordinated by the provincial and territorial healthcare providers and public health departments and local public health units, with the exception of the federal government's roles in service delivery for aboriginal peoples and inmates; in this regard, treatment is for HIV/AIDS and STIs is conducted by frontline healthcare providers through these provincial and territorial health programs.

The governance of STI and HIV/AIDS prevention is much more dynamic. These activities are conducted by all groups in some capacity, whether it be through research, policy-making or through prevention program delivery (e.g. health promotion). Both large organizations (such as the PHAC), and small non-for-profits are involved in delivering prevention programs. National, provincial, and territorial governments play an important role in funding these activities. Research on STIs is conducted at the individual (academics), organizational (e.g. through non-governmental organizations), provincial and territorial, and national levels, through a variety of different actors (e.g. CIHR, PHAC, British Columbia Centre for Disease Control [BCCDC], Public Health Ontario [PHO]).

### 2.4.1 Federal Initiative to Address HIV/AIDS in Canada

The federal government plays an important steering role in the governance of HIV/AIDS.<sup>41</sup> National policy responses began in 1990 with the National AIDS Strategy (NAS, 1990-1998), described as a “formal and organized response” to the disease.<sup>42</sup> After several years of under the NAS, a new initiative was launched, known as the Canadian Strategy on HIV/AIDS (CSHA, 1998-2005).<sup>43,44</sup> Funding was increased from 37.3 million under the NAS to 42.2 million under the CSHA.<sup>45</sup> The move to the CSHA reflected a more collaborative approach to the disease, involving various levels of government as well as non-governmental actors: “it brought legal, ethical and human rights issues to the fore while continuing to support the work of local and national nongovernmental organizations, HIV/AIDS researchers and epidemiologists. Communities became more involved in the research process, and increased attention was given to the epidemic among prison inmates, members of Aboriginal communities and in developing countries”.<sup>46</sup>

In 2005, the federal government announced the Federal Initiative to Address HIV/AIDS in Canada (FIAHAC), led by PHAC (founded in the same year).<sup>47</sup> The new federal initiative increased funding for HIV/AIDS related activities to 84.4 million dollars annually by 2008-2009. The FIAHAC, which is the current national policy on HIV/AIDS, has four main goals which

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<sup>41</sup> “The Federal Initiative to Address HIV/AIDS in Canada Strengthening Federal Action in the Canadian Response to HIV/AIDS”, Government of Canada, 2005.

<sup>42</sup> Ibid.

<sup>43</sup> Ibid.

<sup>44</sup> “HIV/AIDS and HEPATITIS C A Scan of Policies, Programs, and Research in Atlantic Canada”, Atlantic Interdisciplinary Research Network for Social and Behavioural Issues in Hepatitis C and HIV/AIDS, September 2006.

<sup>45</sup> “The Federal Initiative to Address HIV/AIDS in Canada Strengthening Federal Action in the Canadian Response to HIV/AIDS”, Government of Canada, 2005.

<sup>46</sup> Ibid.

<sup>47</sup> “HIV/AIDS and HEPATITIS C A Scan of Policies, Programs, and Research in Atlantic Canada”, Atlantic Interdisciplinary Research Network for Social and Behavioural Issues in Hepatitis C and HIV/AIDS, September 2006.

include preventing the acquisition and transmission of new infections, slowing the progression of the disease and improve quality of life, reducing the social and economic impact of HIV/AIDS, and contributing to the global effort to reduce the spread of HIV and mitigate the impact of the disease.<sup>48</sup>

The FIAHAC added to the CSHA, most notably in the areas of communication and social marketing, improved responses to co-infections (for example, individuals infected with multiple STIs), greater collaboration (both at the national and international level), and greater targeted approaches and interventions for people living with HIV/AIDS, gay men, injection drug users, Aboriginal people, prison inmates, youth and women at risk for HIV infection, and people from countries where HIV is endemic.<sup>49</sup>

#### **2.4.2 Surveillance of STIs in Canada**

Modern STI surveillance activities in Canada date back to the creation of the Canadian Notifiable Disease Surveillance System (CNDSS) in 1924.<sup>50</sup> The surveillance of STIs at the national level is coordinated by the PHAC with the support of local, provincial and territorial public health departments, including laboratories, health care providers, and physicians, who act as frontline data collectors. Reported cases of STIs are collected and aggregated at the national level by PHAC to provide an overview of epidemiologic trends in Canada.

Not all STIs can be viewed from the national level, however; because the seriousness and severity of these diseases vary, some STIs are reportable to local, provincial and territorial, and national public health authorities, while others are non-reportable. Decisions regarding reportable

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<sup>48</sup> “The Federal Initiative to Address HIV/AIDS in Canada Strengthening Federal Action in the Canadian Response to HIV/AIDS”, Government of Canada, 2005.

<sup>49</sup> Ibid.

<sup>50</sup> “Canadian Notifiable Disease Surveillance System National Report: 2005-2008”, Public Health Agency of Canada, 2012, accessed November 20, 2013, [online]: [http://publications.gc.ca/collections/collection\\_2012/aspc-phac/HP40-75-2012-eng.pdf](http://publications.gc.ca/collections/collection_2012/aspc-phac/HP40-75-2012-eng.pdf).

status are made “with the objective of establishing the most efficient allocation of resources in the prevention and control of diseases that pose a threat to Canadians”.<sup>51</sup> Reportable STIs in Canada are chancroid, chlamydia, gonorrhoea, HIV, HBV, HCV, LYG, syphilis, trichomoniasis (in some jurisdictions), and HSV (in some jurisdictions). HPV, along with ectoparasitic infections (both public lice and scabies), bacterial vaginosis, and vulvovaginal candidiasis are not reportable.<sup>52</sup>

#### **2.4.3 Surveillance of HIV/AIDS in Canada**

Like the surveillance of STIs, routine and enhanced national surveillance of HIV/AIDS is coordinated by PHAC. Routine surveillance refers to the continual collection on the number of positive HIV diagnoses and AIDS cases in Canada, while enhanced surveillance refers to the collection of demographic and socio-behavioural information (e.g. sexual behaviours, socioeconomic status) on targeted groups of individuals, in addition to their HIV status.<sup>53</sup> Similarly to the surveillance of other STIs, these activities are supported by local, provincial and territorial public health departments, including laboratories, health care providers, and physicians, who act as frontline data collectors.<sup>54</sup>

In addition to routine national surveillance activities, PHAC also conducts enhanced surveillance of HIV/AIDS. Enhanced surveillance targets specific populations that have been linked to higher HIV prevalence or incidence, or have been identified as groups at risk of HIV infection, including aboriginal people (known as A-Track surveillance), people from regions where HIV is

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<sup>51</sup> “2004 Canadian Sexually Transmitted Infections Surveillance Report”, *CCDR*, 2007 Volume 33, accessed November 20, 2013 [online]: [www.phac-aspc.gc.ca/publicat/ccdr-rmtc/07vol33/33s1/](http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/07vol33/33s1/).

<sup>52</sup> “Canadian Guidelines on Sexually Transmitted Infections”, *Public Health Agency of Canada*, 2010.

<sup>53</sup> “HIV/AIDS Epi Updates - July 2010: Chapter 3: HIV Testing and Surveillance Systems in Canada”, *Public Health Agency of Canada*, 2010, accessed November 15, 2013 [online]: [www.phac-aspc.gc.ca/aids-sida/publication/epi/2010/3-eng.php](http://www.phac-aspc.gc.ca/aids-sida/publication/epi/2010/3-eng.php).

<sup>54</sup> *Ibid.*

endemic (known as E-Track surveillance), people who inject drugs (known as I-Track surveillance), street youth (known as E-SYS surveillance),<sup>55</sup> men who have sex with men (known as M-Track surveillance), and people living with HIV/AIDS (known as P-Track surveillance).

With respect to enhanced surveillance of HIV/AIDS among MSM, M-Track surveillance uses both structured interviews to collect demographic and socio-behavioural information, as well as HIV status through HIV testing. The six components of the M-Track interview are related to personal and social background, drug use and sex life, male sexual partners, casual and regular male sex partners, sex in exchange for goods and money, healthcare, HIV, hepatitis, and STIs, and opinions on HIV and knowledge of STIs.<sup>56</sup> These data are published in reports by PHAC on an annual or semi-annual basis.

While PHAC coordinates and reports on national trends, all provinces and territories also conduct surveillance of HIV/AIDS within their respective jurisdictions. The level of data that is collected and reported on within provinces and territories varies: many provinces and territories collect only total HIV positive diagnoses and total AIDS cases, while some provinces also collect and report on demographic and socio-behavioural data (e.g. age, risk factors, etc). With respect to MSM/YMSM and HIV/AIDS, differences in richness of data complicate comparisons between jurisdictions: for example, British Columbia and Quebec report on age and risk factor for HIV/AIDS, while Prince Edward Island and Nunavut report only on total HIV positive diagnoses.

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<sup>55</sup> “E-SYS Quick Facts”, Public Health Agency of Canada, March 13, 2008, accessed November 15 2013, [online]: <http://www.phac-aspc.gc.ca/sti-its-surv-epi/qf-fr/qa-qr-eng.php>.

<sup>56</sup> “M-Track: Enhanced Surveillance of HIV, Sexually Transmitted and Blood-borne Infections, and Associated Risk Behaviours among Men Who Have Sex with Men in Canada, Phase 1 Report”, Public Health Agency of Canada, 2011, accessed November 15, 2013 [online]: [http://orders.catie.ca/product\\_info.php?cPath=14\\_53&products\\_id=25916](http://orders.catie.ca/product_info.php?cPath=14_53&products_id=25916).

### Part 3: Methodology

The use of appropriate methodology was a very important component of this project. The paper applies a systematic review approach to the case study of YMSM and STIs in Canada in order to synthesize and analyze the most up-to-date, accurate evidence and information; this approach is similar to that used by some researchers in governments, NGOs, universities, and other institutions that are involved in policy- and decision-making.<sup>57</sup> The paper leverages the principle advantages of a structured and systematic design for literature reviews; these advantages include transparency on how conclusions were generated and reduced bias in findings by giving fair weight to the selection, evaluation, and analysis of studies. Furthermore, the systematic review draws upon the most relevant (but also hard to find) information and applies an increasingly popular methodology to a current knowledge gap (YMSM and STIs in Canada).

#### 3.1 Systematic reviews

Systematic reviews are crucial for providing answers to difficult research questions; this is true not only for academics, but for governments, NGOs, universities, and other institutions that are involved in policy- and decision-making. Systematic reviews seek to retrieve, appraise, and summarise information to answer clearly defined questions.<sup>58</sup> This approach is able to provide decision-makers with timely, unbiased information for making evidence-informed decisions, in a world that increasingly privileges evidence in decision-making.<sup>59,60,61</sup>

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<sup>57</sup> Donna Ciliska, “Introduction to Evidence-Informed Decision Making”, Canadian Institutes of Health Research, May 25, 2012 [online]: [www.cih-irsc.gc.ca/e/45245.html](http://www.cih-irsc.gc.ca/e/45245.html).

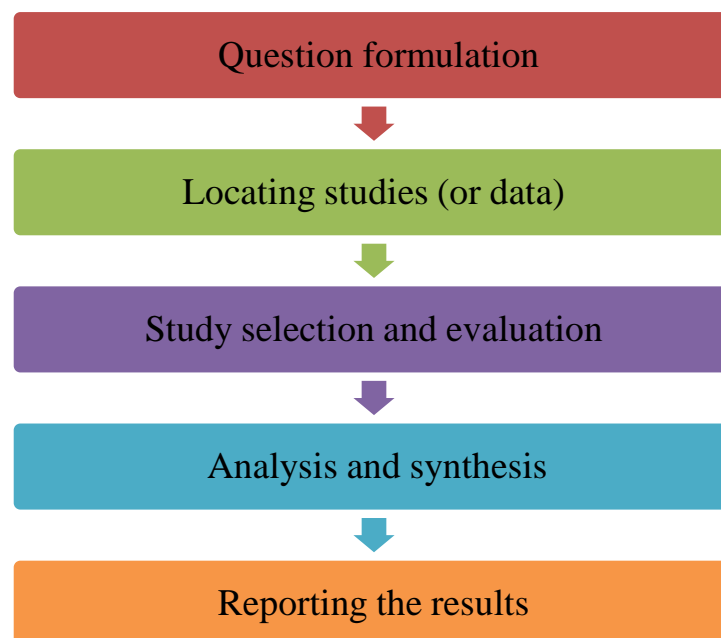
<sup>58</sup> A White and K Schmidt, “Systematic reviews”, Complement Ther Med, 2005 March; 13(1): 54-60.

<sup>59</sup> “Policy paper: Systematic reviews in international development”, Government of the United Kingdom, 1 May, 2013, accessed November 10, 2013 [online]: <https://www.gov.uk/government/publications/systematic-reviews-in-international-development/systematic-reviews-in-international-development>.

<sup>60</sup> “Systematic Reviews”, Department of Criminology, Law and Society, Center for Evidence-Based-Crime Policy, George Mason University, 2013, accessed November 10, 2013 [online]: [cebcp.org/systematic-reviews/](http://cebcp.org/systematic-reviews/).

The systematic review approach can be summarized in 5 key steps; these steps are question formulation; locating studies (or data); study selection and evaluation; analysis and synthesis; and reporting the results.<sup>62</sup> These steps are designed to provide a standard framework conducting literature reviews and assuring high quality findings that are free from bias, as well as to report transparently on how conclusions were generated and provide timely information to decision-makers:

**Figure 4: Key steps in a systematic review**



(Source: Denyer and Tranfield, 2009)

The first step in conducting a systematic review is to formulate key research questions. These questions should be the basis of any research project, and can either reflect gaps in the current

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<sup>61</sup> Donna Ciliska, “Introduction to Evidence-Informed Decision Making”, Canadian Institutes of Health Research, May 25, 2012.

<sup>62</sup> David Denyer and David Tranfield, “Producing a Systematic Review”, The Sage Handbook of Organization Research Methods, 2009, [online]: <http://www.cebma.org/wp-content/uploads/Denyer-Tranfield-Producing-a-Systematic-Review.pdf>.

literature and/or seek to synthesize a broad base of information or knowledge (i.e. many studies) and compare findings.

The best research questions are “relevant, manageable (not too broad or too narrow), substantial and (within reason) original, and clear and simple”,<sup>63</sup> and require reflection and possibly revision. Additionally, good research questions should be unbiased: for example, “does X increase Y” (biased) versus “what is the impact of X on Y” (unbiased). Research questions should also be formed prior to data collection (what is known as *a priori* design).<sup>64</sup>

After formulating a good research question(s), the next step in the systematic review is to search for and locate studies or data. Systematic searches are the foundation of a good systematic review.<sup>65</sup> Searching can be done through a variety of mechanisms such as searching through journal databases, Google Scholar, or other search portals (e.g. google.ca). The most popular approach to locating studies or data for systematic reviews is to select and search journal databases using key terms and/or Boolean logic. This means of data collection is the preferred method for high quality systematic reviews, such as those conducted by the Cochrane Collaboration.<sup>66</sup>

When conducting a systematic search, selection of databases should reflect the topic or issue: for example, medical reviews might use PubMed, a biomedical journal database, but not

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<sup>63</sup> “Formulating the Research Question”, Centre for Sociology, Anthropology and Politics, Centre for Social Work and Policy, Learning and Teaching Institute, Sheffield Hallam University, accessed November 15 [online]: [www.socscidiss.bham.ac.uk/research-question.html](http://www.socscidiss.bham.ac.uk/research-question.html).

<sup>64</sup> A summary of BJ Shea, JM Grimshaw, GA Wells, M Boers, N Andersson, C Hamel, and LM Bouter, “Development of AMSTAR: A measurement tool to assess the methodological quality of systematic reviews”, BMC Medical Research Methodology, 2007; 7(10).

<sup>65</sup> Jessie McGowan and Margaret Sampson, “Systematic reviews need systematic searchers”, J Med Libr Assoc, January 2005; 93(1).

<sup>66</sup> The Cochrane Collaboration, accessed November 10, 2013 [online]: [www.cochrane.org](http://www.cochrane.org).

Anthropology Plus.<sup>67</sup> Once appropriate databases have been selected, key terms relating to the research question can be searched using Boolean logic, a type of searching style that leverages mathematics to narrow or expand a search.<sup>68</sup> Terms can be combined using the basic commands “AND”, “OR”, and “NOT”, allowing the researcher to more precisely find articles relating to the initial research questions.<sup>69</sup> Whatever the combination of search terms, it is important that they are reported on transparently in order to provide readers with the exact methods used in formulating conclusions: knowing how a search was conducted shows not only the effort used to collect data, but the strategy.

While traditional journal databases and Boolean logic are routinely selected for conducting systematic reviews, Google Scholar is not frequently used for these types of projects. In comparison with traditional literature searching methods, Google Scholar may not be able to provide decision-makers with adequate scope of information, as many sources may not be available in Google Scholar. More importantly, Google Scholar privileges articles based on number of citations; this means that ‘popular’ articles may be more easily retrieved and other equally as important evidence may not be accessible, creating bias in findings. Boeker (2013) argues that “Google Scholar is not ready as a professional searching tool for tasks where structured retrieval methodology is necessary”, such as evidence-informed decision making.<sup>70</sup>

Once articles or data have been located using a systematic search, quality assessment or evaluation is conducted to assure that evidence is appropriate and related to the research

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<sup>67</sup> [Anthropology Plus](http://www.ebscohost.com/academic/anthropology-plus), accessed November 10, 2013, [online]: [www.ebscohost.com/academic/anthropology-plus](http://www.ebscohost.com/academic/anthropology-plus).

<sup>68</sup> “Introduction to Boolean Logic”, [United States National Library of Medicine](https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/020_350.html), 20 September, 2013, [online]: [https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/020\\_350.html](https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/020_350.html).

<sup>69</sup> “How To Use Boolean Logic Searching”, [Jack, Joseph, and Morton Mandel School of Applied Social Sciences, Case Western Reserve University](http://msass.case.edu/harrislibrary/libstudents/tutorials/tutboolean.html), 2014, accessed November 15, 2013 [online]: [msass.case.edu/harrislibrary/libstudents/tutorials/tutboolean.html](http://msass.case.edu/harrislibrary/libstudents/tutorials/tutboolean.html).

<sup>70</sup> Martin Boeker, Werner Vach and Edith Motschall, “Google Scholar as replacement for systematic literature searches: good relative recall and precision are not enough”, [BMC Medical Research Methodology](https://doi.org/10.1186/1745-6215-13-131), 2013; 13:131.

questions, and that selected articles are scientifically sound (of good methodological quality). Inclusion/exclusion criteria and screening protocol can be set up to screen articles by title and/or abstract to assure that they meet certain criteria. For example, many systematic reviews exclude studies published before a certain date, or those which do not have strong scientific methods. Additionally, if a researcher is seeking to review only studies which use a particular method (e.g. randomized control trials [RCT]), they may use this stage of the systematic review process to exclude articles which are not RCTs.

The study selection phase may lead to the exclusion of many articles, but this exclusion is done transparently. The total number of articles included and excluded from a search is usually reported. Moreover, an inclusion/exclusion criteria and screening protocol gives fair weight and likelihood for each article to be included into the research project, because each article is compared using the same standard for quality. This standard quality assessment and evaluation may reduce selection bias, since authors of non-systematic reviews may decide to include only articles that support their own opinions.

The final two stages of a systematic review are the analysis and synthesis of information and the reporting of results. These steps may seem to be the most important part of a literature review; however they depend entirely on how well the first three steps were conducted. If articles are selected in a biased way, the analysis and synthesis of information will be flawed, and the reporting and formulation of conclusions may not be accurate. Bias findings using non-systematic methods may lead decision-makers to overlook certain issues, draw uninformed conclusions, and consequently lead to negative policy outcomes.

One common approach to analyzing between studies used in the systematic review process is the meta-analysis. This method pools findings from a variety of studies to estimate the overall

impact or effect of some intervention. Meta-analyses are commonly used for drawing conclusions based on a large body of evidence. For example, if many studies have been conducted on a particular topic, a meta-analysis would provide the overall (and generalizable) conclusions of the intervention. Although meta-analyses are useful for decision-makers, they can be particularly difficult to conduct; meta-analyses require a large body of data, homogenous studies (i.e. studies using similar methodologies), and advanced skills in quantitative analysis on the part of the researcher.

Despite the difficulties in conducting a meta-analysis, the use of systematic review methods can assure that governments, NGOs, and other institutions are armed with more accurate evidence and information for decision-making.

### **3.2 YMSM and STIs in Canada: systematic review methodology**

This research project applies a systematic review approach to provide evidence on current epidemiologic trends relating to STIs among YMSM in Canada, as well as related policy implications. As previously discussed, the three research questions that were formulated for this project were:

- 1) What can be said about sexual health status of YMSM in Canada with relation to STIs?
- 2) What are the risk factors associated with sexual health status of YMSM with relation to STIs?
- 3) What public health policies might address the sexual health needs with relation to STIs among YMSM in Canada?

All three of questions sought to address research gaps; while there are American literature reviews on YMSM and STIs, there is a paucity of literature that addresses these questions from a

Canadian perspective.<sup>71</sup> Additionally, there is a multiplicity of Canadian studies, data, and information relating to the topic that have yet not been synthesized or compared.

The primary methods of data collection used in this project were two literature searches: one academic literature search using the PubMed,<sup>72</sup> Embase,<sup>73</sup> and Scopus<sup>74</sup> databases, and a concurrent grey literature search using Google and review of websites of national and provincial and territorial public health departments. PubMed, Embase, and Scopus were chosen for their broad coverage of the literature in the medical and social sciences. These databases are frequently used in high-quality systematic reviews, such as those conducted by the Cochrane Collaboration.

Both the academic and grey literature searches were conducted between in August and December of 2013.

The academic literature search used PubMed, Scopus, and Embase databases to search for articles relating to YMSM and STIs in Canada using Boolean logic. The keywords used in the literature search related directly to the research questions, and were YMSM (“YMSM”, “MSM”, “gay”, “bisexual”, “two-spirit”, “lgbt”, and “homosex\*/\$”), Canada (“Canad\*/\$”, “British Colum\*/\$”, “Vancouver”, “Albert\*/\$”, “Calgary”, “Edmonton”, “Saskatchewan”, “Regina”, “Manitoba”, “Winnipeg”, “Ontario\*/\$”, “Toronto”, “Ottawa”, “Quebec\*/\$”, “Montreal\*/\$”, “New Brunswick”, “Moncton”, “Fredricton”, “Nova Scotia”, “Halifax”, “P.E.I.”, “Prince Edward Island”, “Newfoundland”, “NFLD” “Nunvavut”, “N.W.T.”, and “Yukon”), HIV/AIDS and STIs (“sexually trans\*/\$”, “STI”, “HIV”, “human immuno\*/\$”, “AIDS”, “acquired

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<sup>71</sup> BS Mustanski, et al., “HIV in Young Men Who Have Sex with Men: A Review of Epidemiology, Risk and Protective Factors, and Interventions”, *J Sex Res*, March 2011 48(2-3): 218-53.

<sup>72</sup> PubMed, accessed September 2013 [online]: <http://www.ncbi.nlm.nih.gov/pubmed>.

<sup>73</sup> Embase, accessed September 2013 [online]: <https://www.embase.com/login>.

<sup>74</sup> Scopus, accessed September 2013 [online]: <http://www.elsevier.com/online-tools/scopus>.

immuno\*/\$, "gonorrh\*/\$", "syphilis", "chlamydia", "lymphogranuloma ven\*/\$", and "chancroid"), risk and sexual behaviour ("risk\*/\$", "risk factor\*/\$", "sexual\*/\$" and "behavio\*/\$"), and youth ("young", "youth\*/\$", "adolescent\*/\$", and "teen\*/\$"):

<b>Figure 5: Search strategy</b> (MSM + Canada + HIV/AIDS and STIs or Risk/Sexual Behaviours + Youth)				
MSM	Canada	HIV/AIDS and STIs	Risk/Sexual Behaviour	Youth
MSM	Canad*/\$	Sexually Trans*/\$	Risk*/\$	Young
Gay	British Colum*/\$	STI	Risk Factor*/\$	Youth*/\$
Bisexual	Vancouver	HIV	Sexual*/\$	Adolescent*/\$
Two-spirit	Albert*/\$	Human Immuno*/\$	Behavio*/\$	Teen*/\$
Lgbt	Calgary	AIDS		
YMSM	Edmonton	acquired immune*/\$		
Homosex*/\$	Saskatchewan	Gonorrh*/\$		
	Regina	Syphilis		
	Manitoba	Chlamydia		
	Winnipeg	Lymphogranuloma Ven*/\$		
	Ontario*/\$	Chancroid		
	Toronto			
	Ottawa			
	Quebec*/\$			
	Montreal*/\$			
	New Brunswick			
	Moncton			
	Fredricton			
	Nova Scotia			
	Halifax			
	P.E.I.			
	Prince Edward Island			
	Newfoundland			
	NFLD			
	Nunavut			
	N.W.T.			
	Yukon			

The grey literature search sought to identify reports, publications, and websites that were related to STIs among the MSM and YMSM populations in Canada, particularly epidemiologic data from national, provincial and territorial public health department websites. Google search was also used supporting documentation (e.g. information from the World Health Organization [WHO] and the United States Centre for Disease Control and Prevention [CDC]).

Initial academic literature search results were screened first by publication date; articles published before 2000 were excluded; this way done in order to provide only up-to-date, recent information. In addition, titles and abstracts were next screened for relevancy to YMSM in Canada and STIs; articles whose primary scope was outside of this were excluded:

<b>Figure 6: PubMed (MEDLINE)* results</b>		
Search		Results
1	gay [TI] OR MSM [TI] OR bisexual [TI] OR two-spirit OR lgbt [TI] OR YMSM [TI] OR homosex* [TI]	8139
2	Canad* [TI] OR "British Colum*" [TI] OR "B.C." [TI] OR Vancouver [TI] OR Albert* [TI] OR Calgary [TI] OR Edmonton [TI] OR Saskatchewan [TI] OR Regina [TI] OR Manitoba [TI] OR Winnipeg [TI] OR Ontario* [TI] OR Toronto [TI] OR Ottawa [TI] OR Quebec* [TI] OR Montreal* [TI] OR "New Brunswick" [TI] OR Moncton [TI] OR Fredericton [TI] OR "Nova Scotia" [TI] OR Halifax [TI] OR "P.E.I." [TI] OR "Prince Edward Island" [TI] OR Newfoundland [TI] OR Nfld OR Nunavut [TI] OR "N.W.T" [TI] OR Yukon [TI]	54311
3	"Sexually Trans*" [TI] OR STI [TI] OR HIV [TI] OR "Human Immuno*" [TI] OR AIDS [TI] OR Gonorrh* [TI] OR Syphilis [TI] OR Chlamydia [TI] OR "Lymphogranuloma Ven*" [TI] OR Chancroid [TI]	212253
4	Risk* [TI] OR "Risk Factor*" [TI] OR Sexual* [TI] OR Behavio* [TI]	517129
5	Young [TI] OR Youth* [TI] OR Adolescent* [TI] OR Teen* [TI]	197032
6	2 and 3 and 5	38
7	1 and 2 and 3	19
8	1 and 2 and 3 and 5	5
9	1 and 2 and 4 and 5	4
Total search results (excluding articles published before 2000)		42

\* Available at: <http://www.ncbi.nlm.nih.gov/pubmed>

<b>Figure 7: Scopus* results</b>		
Search		Results
1	TITLE("gay" OR "MSM" OR "bisexual" OR "two-spirit*" OR "lgbt" OR "YMSM" OR "homosex*")	13,828
2	TITLE(("Canad*" OR "British Colum*" OR "B.C." OR "Vancouver " OR "Albert*" OR "Calgary" OR "Edmonton" OR "Saskatchewan" OR "Regina " OR "Manitoba" OR "Winnipeg" OR "Ontario*" OR "Toronto" OR "Ottawa" OR "Quebec*" OR "Montreal*" OR "New Brunswick" OR "Moncton" OR "Fredericton" OR "Nova Scotia" OR "Halifax" OR "P.E.I." OR "Prince Edward Island" OR "Newfoundland" OR "Nfld" OR "Nunavut" OR "N.W.T" OR "Yukon")	148,939
3	TITLE("Sexually Trans*" OR "STI" OR "HIV" OR "Human Immuno*" OR "AIDS" OR "Gonorrh*" OR "Syphilis" OR "Chlamydia" OR "Lymphogranuloma Ven*" OR "Chancroid")	287,473
4	TITLE("Risk*" OR "Risk Factor*" OR "Sexual*" OR "Behavio*")	1,046,401
5	TITLE("Young" OR "Youth*" OR "Adolescent*" OR "Teen*")	285,296
6	2 and 3 and 5	58
7	1 and 2 and 3	21
8	1 and 2 and 3 and 5	5
9	1 and 2 and 4 and 5	4
Total search results (excluding articles published before 2000)		57

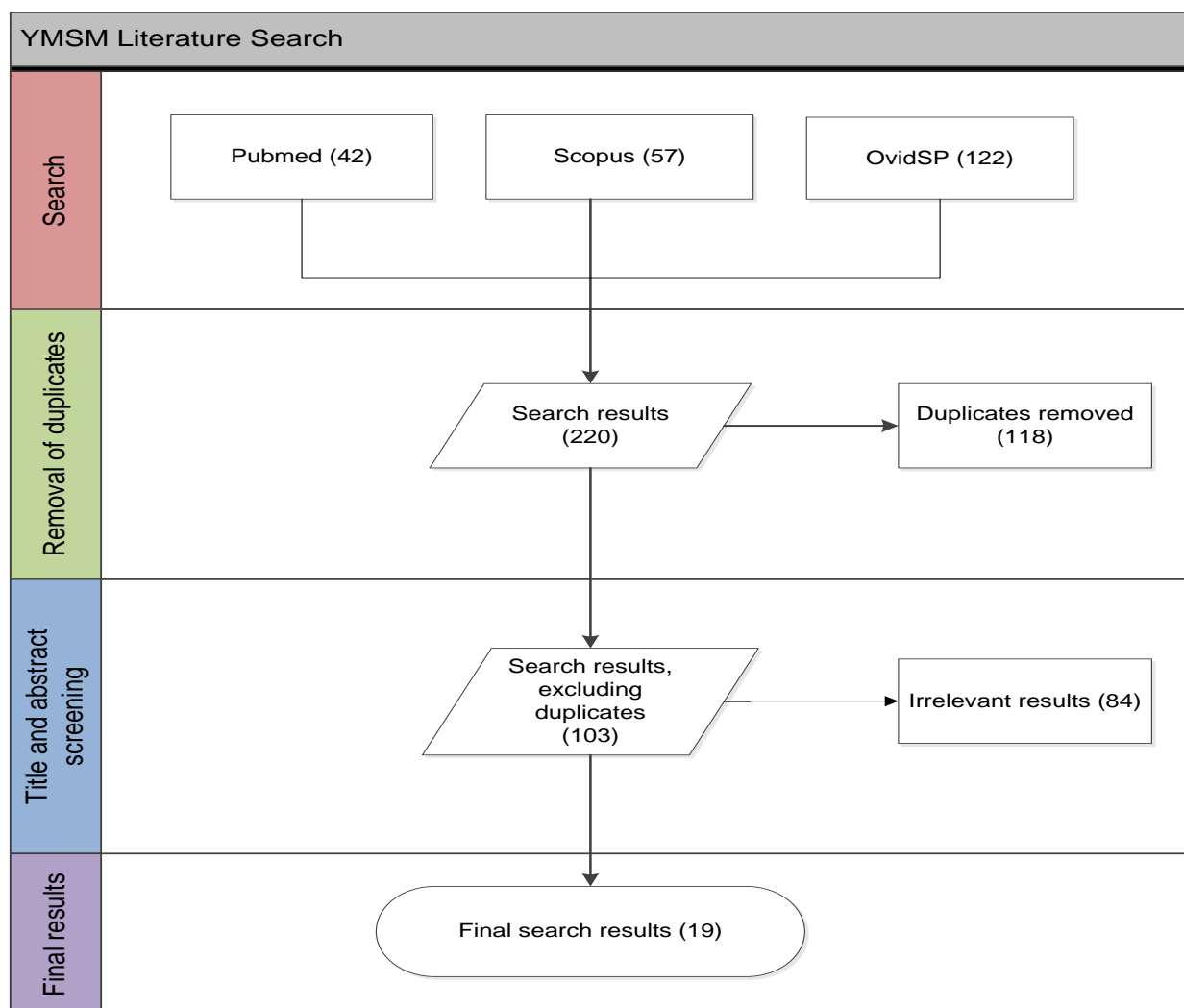
\* Available at: <http://www.scopus.com/home.url>

Figure 8: OvidSP* results		
Search		Results
1	gay (TI) OR MSM (TI) OR bisexual (TI) OR two-spirit OR lgbt (TI) OR YMSM (TI) OR homosex\$ (TI)	36782
2	Canad\$ (TI) OR "British Colum\$" (TI) OR "B.C." (TI) OR Vancouver (TI) OR Albert\$ (TI) OR Calgary (TI) OR Edmonton (TI) OR Saskatchewan (TI) OR Regina (TI) OR Manitoba (TI) OR Winnipeg (TI) OR Ontario\$ (TI) OR Toronto (TI) OR Ottawa (TI) OR Quebec\$ (TI) OR Montreal\$ (TI) OR "New Brunswick" (TI) OR Moncton (TI) OR Fredericton (TI) OR "Nova Scotia" (TI) OR Halifax (TI) OR "P.E.I." (TI) OR "Prince Edward Island" (TI) OR Newfoundland (TI) OR Nfld OR Nunavut (TI) OR "N.W.T" (TI) OR Yukon (TI)	263053
3	"Sexually Trans\$" (TI) OR STI (TI) OR HIV (TI) OR "Human Immuno\$" (TI) OR AIDS (TI) OR Gonorrh\$ (TI) OR Syphilis (TI) OR Chlamydia (TI) OR "Lymphogranuloma Ven\$" (TI) OR Chancroid (TI)	854845
4	Risk\$ (TI) OR "Risk Factor\$" (TI) OR Sexual\$ (TI) OR Behavio\$ (TI)	2121132
5	Young (TI) OR Youth\$ (TI) OR Adolescent\$ (TI) OR Teen\$ (TI)	2134292
6	2 and 3 and 5	173**
7	1 and 2 and 3	97**
8	1 and 2 and 3 and 5	25
9	1 and 2 and 4 and 5	19
Total search results (excluding articles published before 2000)		122

\* Available at: <http://ovidsp.tx.ovid.com/>.

\*\*results from these combinations contained many duplicates

The academic literature search returned 220 articles; PubMed (MEDLINE) returned 42 articles, Embase returned 57 articles, and OvidSP returned 122 articles. After screening for duplicates, 118 duplicate articles were removed, for a remaining total of 113 articles. After further review, another 84 were removed; final search results returned 19 relevant articles. Among the 84 removed during the last stage (“Irrelevant Results” in Figure 9), the most common reasons were articles relating to STIs among youth in general (with no information on YMSM/MSM), and articles relating STIs among female youth, injection drug users, and aboriginal youth; this was not surprising, given that one of the Boolean logic commands was “Canada” AND “HIV/AIDS and STIs” AND “Youth”.

**Figure 9: Systematic academic literature search: YMSM and STIs in Canada**

The grey literature that was found using Google and review national and provincial and territorial public health department websites (the grey literature search) that was opinion-based (e.g. news articles, editorials, blogs), as well as unofficial websites (e.g. personal websites), were excluded. This was done to reduce bias and provide accurate supporting information.

Grey literature results were mixed and highlighted the limited and heterogeneous nature of data on the topic. Results revealed that many provincial and territorial governments report only on incidence of positive HIV test diagnoses, AIDS cases, and/or total incidence of STIs within their

jurisdictions. Furthermore, data richness varies greatly between jurisdictions. As a result, some provinces produce large, comprehensive reports (e.g. British Columbia), while others do not publically report on HIV/AIDS and/or other STIs within their own jurisdictions.

## Part 4: Findings

What is the sexual health status of YMSM in Canada with relation to STIs? Based on systematic review of available data, the epidemiology of STIs among YMSM in Canada is complex. YMSM in Canada are disproportionately affected by some STIs, including an apparent increasing number of new HIV infections at the national level. Furthermore, the general MSM population, as well as youth, experience increased rates of both chlamydial and gonococcal infections in Canada. Despite these findings, many STIs appear to be less prevalent among YMSM when compared to older MSM: these include total number of prevalent HIV infections, as well as cases of AIDS, HCV, LVG and syphilis infections.

The most important epidemiological findings related to YMSM and STIs, based on review of both the academic and grey literature, is an increasing incidence of positive HIV diagnoses at the national level. Among YMSM in Canada, new HIV infections have been steadily increasing since 1999: from a low of 76 reported cases in 1999 to 176 reported cases in 2008 (see Figure 4).<sup>75</sup> In contrast, new HIV infections in youth that were associated with injection drug use and heterosexual contact have been decreasing and remaining constant (respectively) during this period. Still, the burden of HIV/AIDS continues to be concentrated among older MSM (>30 years).<sup>76</sup>

Besides HIV, there is limited epidemiological data available that routinely examines the STIs among YMSM in Canada. In general however, both youth and MSM appear to be disproportionately affected by chlamydial and gonococcal infections. Both groups have

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<sup>75</sup> "HIV/AIDS Epi Updates", Public Health Agency of Canada, July 2010.

<sup>76</sup> M-Track: Enhanced Surveillance of HIV, Sexually Transmitted and Blood-borne Infections, and Associated Risk Behaviours among Men Who Have Sex with Men in Canada, Phase 1 Report, Public Health Agency of Canada, 2011, accessed November 15, 2013 [online]: [http://orders.catie.ca/product\\_info.php?cPath=14\\_53&products\\_id=25916](http://orders.catie.ca/product_info.php?cPath=14_53&products_id=25916).

historically reported high incidence rates of these STIs and national clinical guidelines recommend routine screening for both gonorrhea and chlamydia for males under the age of 25 as well as for MSM.<sup>77-78</sup> Even so, there is some evidence from smaller cross-sectional and cohort studies to suggest that some STIs, including cases of AIDS, and HCV, LYG, and syphilis infections are concentrated among older MSM as opposed to YMSM.

#### **4.1 YMSM and HIV/AIDS in Canada**

It is important to note that very few Canadian jurisdictions examine incidence of HIV/AIDS among YMSM; those jurisdictions that do report on incidence of HIV infections among YMSM include BCCDC (British Columbia) and PHAC (the national level). Moreover, based on review of national, provincial and territorial HIV/AIDS reports, no jurisdictions have estimated prevalence of HIV/AIDS among YMSM.

The limited data from PHAC and BCCDC finds that incidence rates of new reported HIV infections have been steadily increasing among YMSM at the national level since 1999. At its lowest level, 76 cases were reported to PHAC in 1999. By 2008, this number more than doubled (to 176 cases).<sup>79</sup> This is noteworthy because among youth, the highest proportion of new HIV diagnoses in 2008 was attributed to the YMSM exposure category (53.9%; n = 172), with heterosexual contact at 22.9% (n = 73) and injection drug use (IDU) at 19.4% (n = 62).<sup>80</sup>

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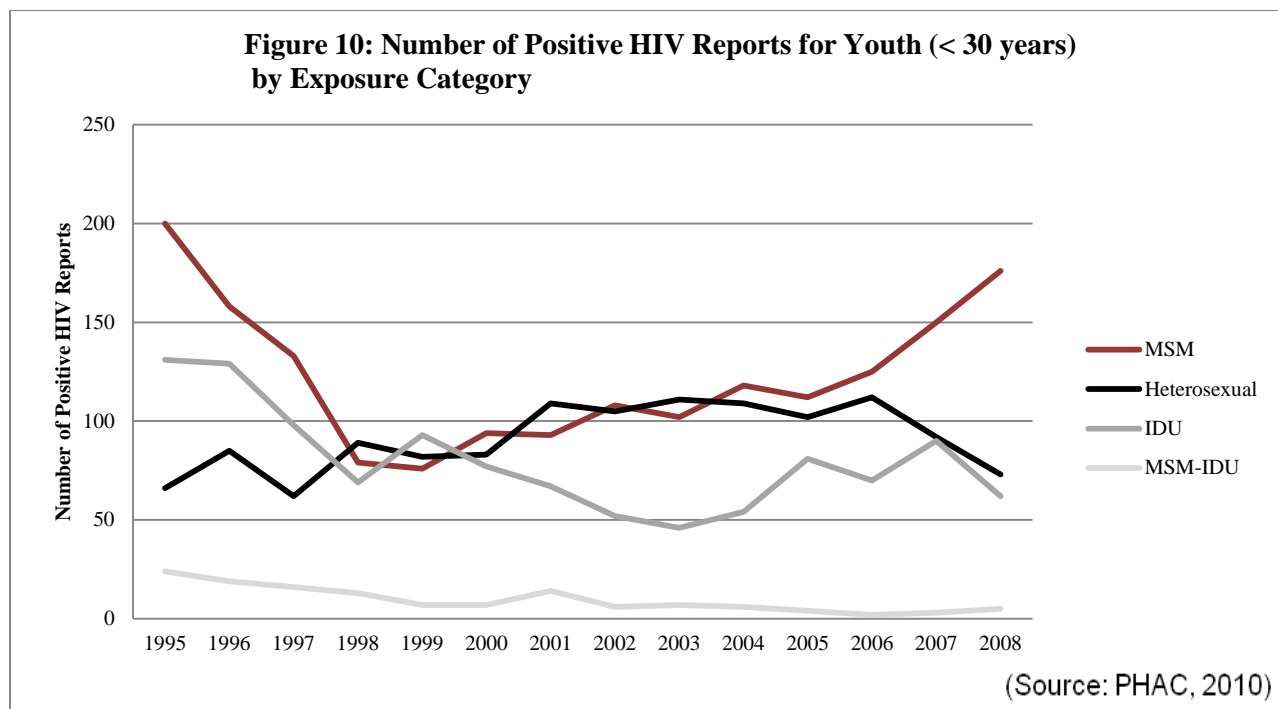
<sup>77</sup> "Gonococcal Infections Chapter Revised 2013: Canadian Guidelines on Sexually Transmitted Infections", Public Health Agency of Canada, July 2013.

<sup>78</sup> "Canadian Guidelines on Sexually Transmitted Infections", Public Health Agency of Canada, 2010, accessed November 15, 2013 [online]: <http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/index-eng.php>.

<sup>79</sup> "HIV/AIDS Epi Updates", Public Health Agency of Canada, July 2010.

<sup>80</sup> Ibid.

Additionally, BC CDC found that “of the 167 new HIV diagnoses among MSM in 2011 [in British Columbia], 22.2% (37 cases) were under the age of 30 years”.<sup>81</sup>



Despite increasing incidence of reported HIV infections, Canadian YMSM reported lower prevalence of HIV than the general MSM population in PHAC’s M-Track enhanced surveillance study. Among MSM that participated in this study (n = 4793), the prevalence of HIV was 15 %, while among YMSM it was only 4 %.<sup>82-83</sup>

Review of the available surveillance data also hints that the picture of HIV/AIDS among the heterosexuals, MSM, and YMSM is not clear cut across all regions. Historically, HIV/AIDS has been associated with only MSM, however in some jurisdictions, including Manitoba and

<sup>81</sup> “HIV Annual Report 2011”, British Columbia Centre for Disease Control, 2011, accessed November 10, 2013 [online]: [http://www.bccdc.ca/NR/rdonlyres/54BFF7F2-E283-4E72-BF2A-73EC2813F0D1/0/HIV\\_Annual\\_Report\\_2011\\_20111011.pdf](http://www.bccdc.ca/NR/rdonlyres/54BFF7F2-E283-4E72-BF2A-73EC2813F0D1/0/HIV_Annual_Report_2011_20111011.pdf).

<sup>82</sup> “HIV/AIDS Epi Updates”, Public Health Agency of Canada, July 2010.

<sup>83</sup> “M-Track: Enhanced Surveillance of HIV, Sexually Transmitted and Blood-borne Infections, and Associated Risk Behaviours among Men Who Have Sex with Men in Canada, Phase 1 Report”, Public Health Agency of Canada, 2011.

Saskatchewan, heterosexual contact and injection drug use have been identified as equal if not greater risk factors for new HIV infections than engaging in MSM-related sexual behaviours. For example, in 2010 MSM explained only 6 % of the total reported diagnoses of HIV infections in Saskatchewan.<sup>84</sup> Nevertheless, in the majority of jurisdictions in Canada, new HIV infections continue to be concentrated within the MSM community. Additionally, in the large provinces of Ontario and British Columbia, most cases of AIDS were concentrated within the MSM community.<sup>85-86</sup>

#### **4.2 YMSM and other STIs in Canada**

There is limited data that examines STIs among YMSM in Canada, and it is therefore difficult to draw sweeping conclusions on the epidemiology of other STIs among YMSM in Canada. Moreover, the evidence that does exist with regard to YMSM and other STIs (for the most part) does not sort MSM by age; although evidence exists for the increased prevalence of bacterial STIs (chlamydia, gonorrhea, and syphilis) among both MSM and youth,<sup>87</sup> the combination of these two groups (i.e. YMSM) is often unaccounted.

There is some evidence from smaller cross-sectional and cohort studies, as well as surveillance data to suggest that some STIs, including HCV, LYG, and syphilis infections are concentrated among older MSM as opposed to YMSM. For example, a longitudinal that reported on age-based trends for STIs in Canada from 1997-2007 found that syphilis was concentrated among older

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<sup>84</sup> “HIV and AIDS in Saskatchewan 2010”, Saskatchewan Ministry of Health, 2011

<sup>85</sup> Robert S Remis and Juan Liu, “HIV/AIDS IN ONTARIO: PRELIMINARY REPORT, 2011”, August 2013, accessed November 10 2013 [online]: [www.ohemu.utoronto.ca/doc/PHERO2011\\_report\\_preliminary.pdf](http://www.ohemu.utoronto.ca/doc/PHERO2011_report_preliminary.pdf).

<sup>86</sup> “HIV Annual Report 2011”, British Columbia Centre for Disease Control, 2011.

<sup>87</sup> “Canadian Guidelines on Sexually Transmitted Infections, Primary Care and Management of Sexually Transmitted Infections”, Public Health Agency of Canada, 2013.

MSM (aged  $\geq 30$ ) as opposed to YMSM.<sup>88</sup> Reported cases of LVG in Canada are also more concentrated among older MSM than YMSM (the youngest reported case of MSM-related LVG was 21 years of age);<sup>89,90,91</sup> Additionally, Thomas (2011) found that among attendees in a Montreal clinic, HCV was more reported among older MSM (aged  $\geq 30$ ).<sup>92</sup>

### 4.3 Risk factors for STIs among YMSM

What might explain increasing incidence of HIV infection among Canadian YMSM? In the field of epidemiology, risk factors are often used as variables that can predict or increase the likelihood of incidence of disease or illness. The WHO describes them as “any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury”.<sup>93</sup> The study of risk factors is used to inform public health policies with the goal of informing prevention activities; this is based on the assumption that activities can be tailored to meet implementation and other challenges of an intervention.

There are a variety of identified risk factors for STIs broadly speaking; according to PHAC, these include high risk and unsafe sexual practices (unprotected sex, multiple sexual partnering, and anonymous sexual partnering), sexual abuse and sexual assault, prostitution, illicit drug use including injection drugs, and homelessness and street involvement.<sup>94</sup> Most of these risk factors are linked to behavioural variables (i.e. an individual’s actions and behaviours); some however

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<sup>88</sup> Fang, et al., “Trends in age disparities between younger and middle-age adults among reported rates of chlamydia, gonorrhea, and infectious syphilis infections in Canada: Findings from 1997 to 2007”, *Sex Transm Dis.*, 2010 Jan; 37(1): 18-25.

<sup>89</sup> “Lymphogranuloma venereum - LGV, Prévention en pratique médicale”, March 2006, accessed November 15, 2013 [online]: [publications.santemontreal.qc.ca/uploads/tx\\_asssmpublications/1712-2945-MAR2006.pdf](http://publications.santemontreal.qc.ca/uploads/tx_asssmpublications/1712-2945-MAR2006.pdf).

<sup>90</sup> “Lymphogranuloma Venereum (LGV), Communicable Disease Management Protocol”, May 2007, accessed November 15, 2013 [online]: [www.gov.mb.ca/health/publichealth/cdc/protocol/lgv.pdf](http://www.gov.mb.ca/health/publichealth/cdc/protocol/lgv.pdf).

<sup>91</sup> Rhonda Kropp and Thomas Wong, “Emergence of lymphogranuloma venereum in Canada”, *CMAJ*, June 21, 2005; 172 (13); first published May 31, 2005.

<sup>92</sup> Thomas, et al., “Sexually transmitted HCV in MSM in Montreal”, 2011, *Sex Transm Infect*, 2011; 87:A144.

<sup>93</sup> “Risk factors”, *World Health Organization*, 2014, accessed November 10, 2013, [online]: [http://www.who.int/topics/risk\\_factors/en/](http://www.who.int/topics/risk_factors/en/).

<sup>94</sup> “Canadian Guidelines on Sexually Transmitted Infections, Primary Care and Management of Sexually Transmitted Infections”, *Public Health Agency of Canada*, 2013.

are related to broader social determinants of sexual health (e.g. homelessness and street involvement, socioeconomic conditions). Additionally, social and psychological factors (e.g. social support systems, psychological and mental health) may also increase risk for STIs.<sup>95</sup>

Review of the literature revealed that there are a number of both large and smaller studies that have been conducted with respect to understanding risk factors for STIs among YMSM in Canada. Major studies include the Vanguard and Omega Cohort projects, two cohort/longitudinal studies of YMSM (and older MSM in the Omega Cohort) living in Vancouver, British Columbia, and Montreal, Quebec. These studies used venue-based sampling methods and questionnaires matched with STI test results to examine correlations between risk factors and STIs among YMSM. The Vanguard project began (baseline) in 1995 and ended in 2000, and the Omega Cohort project began (baseline) in 1996 and ended in 2003.<sup>96-97</sup> The Vanguard project had over 1000 YMSM participants who completed a baseline questionnaire, and the Omega Cohort had 1583 YMSM/MSM participants. Smaller studies have also been conducted, in Canada, including Callander and Senn (2013),<sup>98</sup> Gallant, et al. (2011),<sup>99</sup> Lampinen,

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<sup>95</sup> William Boyce, "Canadian Youth, Sexual Health and HIV/AIDS Study", Council of Ministers of Education, Canada, 2003.

<sup>96</sup> Steve L. Martindale, "Evidence of Psychologic Distress in a Cohort of Young Gay/Bisexual Men", Oral presentation on May 23, 1997, in Ottawa, Ontario, at the Canadian Association for HIV/AIDS Research, [online]: [http://cfenet.ubc.ca/vanguard/papers\\_original/CAHR97Steve.html](http://cfenet.ubc.ca/vanguard/papers_original/CAHR97Steve.html).

<sup>97</sup> Lavoie, Elaine, 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", Sexually Transmitted Dis, January 2008; 35(1), 25-29.

<sup>98</sup> D Callander and Charlene Senn, "Examining the Role of Relationships, Body Image, Closeness to HIV/AIDS, and HIV Optimism in the Sexual Risks of Young Men Who Have Sex With Men", J of HIV/AIDS & Social Services, 2013; 12 (2).

<sup>99</sup> S Gallant, "Trends in factors associated with recent HIV testing among Montreal men who have sex with men (MSM): Results from the Argus 2005 and 2008 surveys", Department of Epidemiology, Biostatistics, and Occupational Health Faculty of Medicine McGill University, Montréal, Québec, August 2011.

et al. (2007),<sup>100</sup> Machouf (2011),<sup>101</sup> George, et al. (2007),<sup>102</sup> Saewyc, et al. (2006);<sup>103</sup> these studies use either a cohort or cross-sectional study design.

Findings from studies of risk factors for STIs among YMSM in Canada reveal that YMSM are particularly vulnerable to STIs (including HIV) when compared to heterosexual youth (these findings are also reflected in the literature on American YMSM).<sup>104-105</sup> However there is no one explanation as to why YMSM are at increased risk for STIs; rather, there are multiple explanations, which include participation in high risk and unsafe sexual practices, as well as social and psychological factors and socioeconomic conditions.

With respect to high risk sexual behaviour, including unsafe sexual practices, multiple sexual partnering, and anonymous sexual partnering, an analysis of 130 Vanguard study participants found that self-reported unprotected (unsafe) anal sex among YMSM ranged between 25 % and 44 % for casual sexual partners and between 54 % and 66 % for regular sexual partners over a five year period.<sup>106</sup> The same study (Vanguard) found that between 36.9 % and 41.5 % of participants self-reported having more than 20 sexual partners in the previous year over a five year period, while only between 30.7 % and 35.3 % of participants self-reported having either

<sup>100</sup> T Lampinen, et al., “Nitrite inhalant use among young gay and bisexual men in Vancouver during a period of increasing HIV incidence”, BMC Public Health, 2007; 7:35.

<sup>101</sup> N Machouf, et al., “Risk factors for STIs among MSM attending a sexually transmitted disease clinic in Montreal, Canada”, Sexually Transmitted Infections, 2011;87 (Suppl 1):A144-A144.

<sup>102</sup> C George, et al., “HIV and ethnicity in Canada: is the HIV risk-taking behaviour of young foreign-born MSM similar to Canadian born MSM?”, AIDS Care, January 2007; 19(1):9-16.

<sup>103</sup> EM Saewyc, et al., “Hazards of stigma: the sexual and physical abuse of gay, lesbian, and bisexual adolescents in the United States and Canada”, Child Welfare, 2006 Mar-Apr; 85(2): 195-213.

<sup>104</sup> Linton et al., “Street Youth in Toronto, Canada: An Investigation of Demographic Predictors of HIV Status Among Street Youth Who Access Preventive Health and Social Services”, J of HIV/AIDS & Social Services, 2009; 8(4).

<sup>105</sup> MD Kipke, et al., “The Health and Health Behaviors of Young Men Who Have Sex with Men”, J Adolesc. Health, April 2007.

<sup>106</sup> Piaseczna, et al., “Longitudinal patterns of sexual behavior and condom use in a cohort of HIV-negative gay and bisexual men in Vancouver, British Columbia, Canada, 1995-2000”, J Acquir Immune Defic Syndr, October 1, 2001; 28(2): 187-93.

none or only one sexual partner in the previous year over the same period.<sup>107</sup> The Omega Cohort found that 38.5 % of total study participants had engaged in unprotected anal sex.<sup>108</sup>

These findings may seem shocking, but unprotected sex is not uncommon among youth in general.<sup>109</sup> Wong et al (2013) found that among American YMSM, many transition between low-sexual risk periods and high-sexual risk periods as they age through adolescence and young adulthood. She writes that, “a good portion of YMSM transition greatly between different categories of higher risk-taking within a short period of time”, and that “a good proportion of these young men were experimenting in risky behaviors [i.e. unsafe sexual practices or multiple casual partners] during this volatile time”.<sup>110</sup>

Social and psychological factors have also been linked to increased risk for STIs including HIV. Boyce (2003) writes that high risk sexual behaviour is significantly correlated to antisocial behaviour and weak social support systems, and Mustanski (2011) calls the relationship between psychological and mental health and STIs a “strong interdependence”.<sup>111-112</sup> In a 2002 cross-sectional study of 345 young gay and bisexual men living in Vancouver, British Columbia, Botnick (2002) found that 43.5% (n = 150/345) of participants reported that they had ever considered committing suicide and 19.4% (n = 67/345) reported that they had attempted suicide

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<sup>107</sup> Ibid.

<sup>108</sup> Elaine Lavoie, 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”, Sexually Trans Dis, January 2008; 35(1), 25-29.

<sup>109</sup> “Sexual Risk Behaviours of Canadians - HIV/AIDS Epi Updates”, Public Health Agency of Canada, May 1999, accessed November 10, 2013 [online]: [www.phac-aspc.gc.ca/publicat/epiu-aepi/hiv-vih/epi0599/sexbe-eng.php](http://www.phac-aspc.gc.ca/publicat/epiu-aepi/hiv-vih/epi0599/sexbe-eng.php).

<sup>110</sup> CF Wong, et al., “Changes in developmental contexts as predictors of transitions in HIV-risk behaviors among young men who have sex with men (YMSM)”, Am J Community Psychol, June 2013; 51(3-4), 439-50.

<sup>111</sup> William Boyce, “Canadian Youth, Sexual Health and HIV/AIDS Study”, Council of Ministers of Education, Canada, 2003.

<sup>112</sup> BS Mustanski, et al., “HIV in Young Men Who Have Sex with Men: A Review of Epidemiology, Risk and Protective Factors, and Interventions”, J Sex Res., March 2011; 48(2-3): 218-53.

at least once. Moreover, stigma and discrimination may also negatively impact YMSM.<sup>113</sup> These issues demonstrate the possibility of weak social support system, as well as psychological and mental health issues among Canadian YMSM, explaining partly why YMSM may engage in high risk and unsafe sexual practices.

Other factors associated with risk for STIs relate to the broader social determinants of sexual health, in particular economic conditions that relate to housing and employment. Weber, et al. (2001) writes that a lower-education, unstable housing, and unemployment were all associated with higher HIV prevalence among YMSM. Unstable housing and employment relate to prostitution; the Vanguard project found that out of 720 study participants up to 1999, 188 (26%) had been paid for sex.<sup>114</sup> Those who had been paid for sex were more likely to report lower education and income and living in unstable housing.<sup>115</sup>

Mutanski et al.'s (2011) comprehensive review of risk factors for HIV among American YMSM expands on these variables (high risk and unsafe sexual practices, social and psychological factors, and economic conditions) and categorizes risk factors for STIs (he writes primarily about HIV) among YMSM into four groups: individual characteristics (mental health, internalized homophobia, personality, self-efficacy, alcohol/drug use, compulsive sexual behaviour), micro-system characteristics (partner characteristics, partner violence and sexual abuse, peer victimization, social support, connectedness to the gay community, and family support), meso-system characteristics (homophobia and discrimination, lack of sex education, gay community norms, peer norms, economic disparities and sex work, religious, race and ethnicity, lack of

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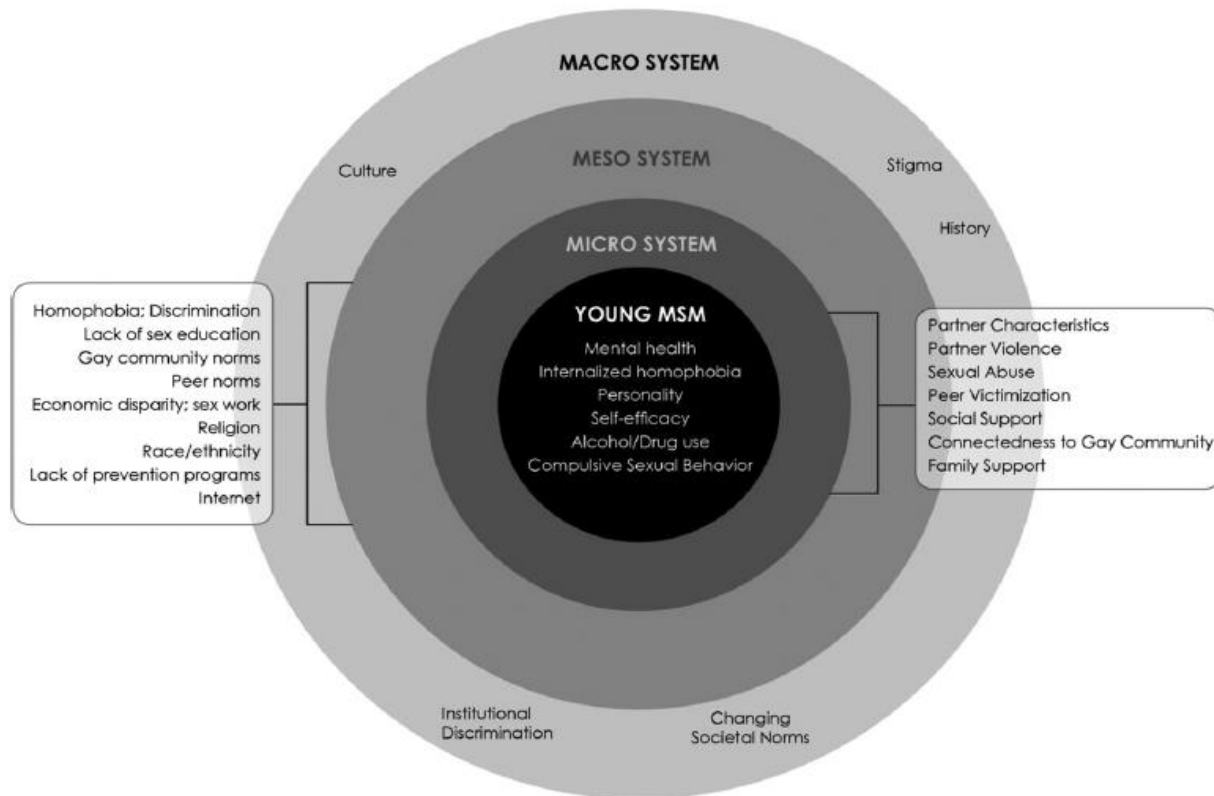
<sup>113</sup> “Social and Legal Issues”, Canadian AIDS Treatment Information Exchange (CATIE), accessed November 10, 2013 [online]: [www.catie.ca/en/prevention/social-and-legal-issues](http://www.catie.ca/en/prevention/social-and-legal-issues).

<sup>114</sup> Mary Lou Miller, “Comparison of HIV Incidence and Risk Behaviours between Male Sex Trade Workers and Other Young MSM in an Ongoing Prospective Study”, Oral presentation at the 8th annual Canadian Conference on HIV/AIDS Research on May 1999, in Victoria, BC.

<sup>115</sup> Ibid.

prevention programs, and the internet), and macro system characteristics (culture, stigma, history, societal norms, and institutional discrimination). These systems and risk factors are summarized in the Figure 11 below:

**Figure 11: Risk factors for HIV among American YMSM**



**(Source: Mutanski, et al. 2011)**

Indeed, there are many factors that may be associated with the increasing incidence of HIV infection in YMSM in Canada. Canadian studies have focused primarily on high risk and unsafe sexual practices, social and psychological variables, and socioeconomic conditions. Finally, it is important to note that high risk and unsafe sex (unprotected) is the necessary cause of transmission of the HIV virus, and that other variables (e.g. social support systems) simply influence the likelihood of this event.

#### 4.4 Policy implications

The increasing incidence rates of HIV infection among YMSM in Canada is troubling; moreover, studies which have examined the risk factors associated with STIs among Canadian YMSM reveal that this population is particularly vulnerable to infection. There is a need for an improved public health response to tackle these issues. Many articles applied in this literature review propose different solutions to reduce the burden of HIV infections and risk of STIs among Canadian YMSM; these include primordial and primary prevention activities such as a comprehensive approach to determinants of sexual health, and continued sexual health education targeting YMSM, as well as secondary prevention activities like new, novel approaches for reaching YMSM, better understanding and capacity to address young men's health needs, increased testing, in particular point of care and rapid testing for HIV, and a call for increased data collection on YMSM.

##### 4.4.1 Primary prevention activities

Where might public health professionals start when they plan interventions to reduce the spread of disease? Primary prevention refers to actions which reduce the likelihood of illness by reducing exposure to the disease-causing risk factors.<sup>116</sup> These actions can include changing environmental, behavioural, social, or other factors that increase the chance for an individual to become ill. Classic examples of primary prevention include the use of sunscreen to protect from sun exposure or vaccination against the flu.<sup>117-118</sup> Primary prevention is extremely important in the study of determinants of sexual health; there is a body of research that broadly examines

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<sup>116</sup> “Skin Cancer Module: Practice Exercises”, Centres for Diseases Control and Prevention, April 24, 2007, accessed November 15, 2013 [online]: [www.cdc.gov/excite/skincancer/mod13.htm](http://www.cdc.gov/excite/skincancer/mod13.htm).

<sup>117</sup> Ibid.

<sup>118</sup> “Chapter 4: Basic Concepts in Prevention, Surveillance, and Health Promotion: The stages of prevention”, The Association of Faculties of Medicine of Canada, accessed November 15, 2013 [online]: [phprimer.afmc.ca/Part1-TheoryThinkingAboutHealth/Chapter4BasicConceptsInPreventionSurveillanceAndHealthPromotion/Thestagesofprevention](http://phprimer.afmc.ca/Part1-TheoryThinkingAboutHealth/Chapter4BasicConceptsInPreventionSurveillanceAndHealthPromotion/Thestagesofprevention).

these issues, and addressing the determinants of health are becoming increasingly popular in public health programs and activities.<sup>119</sup> Primary prevention activities geared towards reducing the increasing incidence of HIV infections among YMSM in Canada include a comprehensive approach to the determinants of sexual health and continued sexual health education that targets YMSM.

#### **4.4.1.1 Comprehensive approach to determinants of sexual health**

One of the common approaches to primary prevention is to address the underlying determinants of health. As previously discussed, these include things like socioeconomic conditions (housing, employment, income), but also other factors. With respect to sexual health of YMSM, there is an exhaustive list of these determinants that have been documented; for example, CATIE writes that there are many determinants of sexual health, including income and social status, housing, employment and working conditions, social support networks and social exclusion, education and health literacy, social and physical environments, access to social and health services, gender, attitudes that affirm sexual orientation, culture, race and ethnicity, citizenship status, self-determination and colonialism, and HIV stigma and discrimination.<sup>120</sup>

Many national non-profit organizations in Canada, including the CATIE and the Canadian AIDS Society, advocate for reforms of all these different policy domains; they argue in favour of various policy reforms that would seek to reduce the burden of HIV/AIDS among MSM through a comprehensive approach to sexual health (e.g. improving employment and education outcomes for MSM).<sup>121</sup> However, tackling all of these issues would be very difficult for policy makers.

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<sup>119</sup> “Social Determinants of Health (2nd Edition)”, *World Health Organization*, 2003, accessed November 15, 2013 [online]: [www.euro.who.int/\\_data/assets/pdf\\_file/0005/98438/e81384.pdf](http://www.euro.who.int/_data/assets/pdf_file/0005/98438/e81384.pdf).

<sup>120</sup> “Social and Legal Issues”, *Canadian AIDS Treatment Information Exchange (CATIE)*, accessed November 10, 2013 [online]: [www.catie.ca/en/prevention/social-and-legal-issues](http://www.catie.ca/en/prevention/social-and-legal-issues).

<sup>121</sup> “Social Issues”, *Canadian AIDS Society*, accessed November 10, 2013 [online]: [www.cdnaids.ca/socialissues](http://www.cdnaids.ca/socialissues).

Rothstein (2002) writes that addressing “all societal factors that affect health may undermine efforts to deal with traditional public health issues”.<sup>122</sup> Additionally, since these issues involve not only health policy, but also housing, employment, other policy realms, it may be challenging to assure successful policy outcomes that meet the primary objective of reducing the burden of HIV infections among YMSM, since decisions would require expertise in a variety of domains and coordination between numerous policy actors.

#### **4.4.1.2 Continued sexual health education for YMSM and youth**

A more feasible approach to primary prevention may be continued targeted sexual health education for YMSM. This approach could include continued education and health promotion activities on the part of existing groups that already conduct similar activities geared towards the general MSM population. A new approach could be tailored to Canadian YMSM, similar to the *The Young Men Who Have Sex with Men (YMSM) Project: Reducing the Risk of HIV/STD Infection* campaign conducted by the CDC in the United States.<sup>123</sup> One pillar of the program is to “improve access for YMSM to age- and identity-appropriate HIV/STD prevention education and health and mental health care needs”.<sup>124</sup>

There may be a market for such a national sexual health education campaign geared towards YMSM in Canada. Poon, et al. (2001) writes that among Canadian Asian and south-east Asian YMSM (n = 90), more information about HIV/AIDS is needed: “77 % would like more

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<sup>122</sup> Mark A Rothstein, “Rethinking the Meaning of Public Health” J of Law, Medicine & Ethics, 2002; 30(2), 144–149.

<sup>123</sup> “The Young Men Who Have Sex with Men (YMSM) Project: Reducing the Risk of HIV/STD Infection”, United States Centres for Disease Control and Prevention, September 27, 2013, accessed November 10, 2013 [online]: <http://www.cdc.gov/healthyouth/disparities/ymsm/index.htm>.

<sup>124</sup> Ibid.

information on HIV; 49 % on hepatitis; 31-37 % on gonorrhea, genital warts, and syphilis”.<sup>125</sup> Moreover, in Canada, there are no national government-led programs or activities for sexual health education that targets YMSM as a group. A new approach could use financial and other resources from existing national, provincial, and territorial structures (e.g. PHAC, BCCDC), to target YMSM through NGOs and other organizations within civil society.

#### **4.4.2 Secondary prevention**

Addressing the determinants of health is a particularly daunting task and may require an organized and coordinated systems response from a variety of policy actors (different levels of governments, NGOs, and civil society); targeted sexual health education may be a more feasible approach. Additionally, there are also secondary prevention activities which are explored in the literature that may be useful for prevention and control of STIs among YMSM, particularly HIV.

Secondary prevention refers to the activities which “detect and treat pre-clinical pathological changes and thereby control disease progression”. The classic example in the case of STIs is improving the wellbeing and reducing viral load of someone infected with HIV using HAART in order to delay progression into AIDS.<sup>126</sup> Other measures include screening and testing asymptomatic individuals for STIs before they present with symptoms.

##### **4.4.2.1 Increase screening and testing, in particular rapid testing for HIV**

There is a need to increase screening for STIs among YMSM, in particular increase routine screening and testing for HIV. As part of secondary prevention activities, increased and routine screening and testing for HIV would reduce onwards transmission of HIV by making individuals

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<sup>125</sup> MKL Poon, et al., “Developing a Comprehensive Aids Prevention Outreach Program: A Needs Assessment Survey of MSM of East and Southeast Asian Descent Who Visit Bars And/or Bath Houses in Toronto”, The Canadian Journal of Human Sexuality, March 22, 2001.

<sup>126</sup> “Positive Prevention, International HIV/AIDS Alliance Draft Background Paper”, United States Centers for Disease Control and Prevention, July 2003, accessed November 15, 2013 [online]: [www.cdc.gov/hiv/topics/prev\\_prog/ahp/resources/other/pdf/Positive\\_Prevention\\_IHA\\_Marked.pdf](http://www.cdc.gov/hiv/topics/prev_prog/ahp/resources/other/pdf/Positive_Prevention_IHA_Marked.pdf).

more aware of their HIV status and reducing the number of infected unaware individuals within the population; there is evidence that those who are unaware of their HIV status are more likely to unknowingly transmit HIV to their partners,<sup>127</sup> and some argue that HIV-positive unaware individuals make up 25 % of total individuals living with HIV in Canada.<sup>128</sup>

One possible method to increase HIV screening and testing among YMSM is to increase the integration and utilization of point of care or rapid testing in both traditional (e.g. clinics and hospitals) and non-traditional settings. This method of testing offers many advantages, including high acceptability (particularly among MSM and youth),<sup>129,130,131</sup> and “real time” test results. Traditional testing for HIV using laboratory-based testing may take up to two weeks for individuals to receive their results, and many may not return to receive them.<sup>132</sup> Additionally, a study of point of care testing among MSM found that a majority of MSM stated that the availability of point of care or rapid HIV tests would increase their testing patterns.<sup>133</sup>

Currently point of care or rapid testing for HIV in Canada is offered in limited settings and availability varies between jurisdictions. The only rapid HIV test approved in Canada for use in clinical settings is the INSTI™ HIV-1/2 Antibody Test, which received Health Canada approval

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<sup>127</sup> G Marks, “Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA”, *AIDS*, June 26, 2006; 20(10), 1447-50.

<sup>128</sup> “HIV and AIDS in Canada: Surveillance Report to December 31 2012”, *Public Health Agency of Canada*, 2013.

<sup>129</sup> Sue Napierala Mavedzenge, “A Review of Self-Testing for HIV: Research and Policy Priorities in a New Era of HIV Prevention”, *Clin Infect Dis*, July 1, 2013; 57(1), 126–138.

<sup>130</sup> Turner SD, et al., “Rapid point-of-care HIV testing in youth: a systematic review”, *J of Adolescent Health*, 2013; 53(6): 683-691.

<sup>131</sup> Nitika Pant Pai, et al., “Supervised and Unsupervised Self-Testing for HIV in High- and Low-Risk Populations: A Systematic Review”, *PLOS Medicine*, April 2013; 10(4)

<sup>132</sup> “Fact Sheet 1 HIV/AIDS: the infection”, *World Health Organization*, accessed November 15, 2013 [online]: [www.who.int/hiv/about/hiv/en/fact\\_sheet\\_hiv.htm](http://www.who.int/hiv/about/hiv/en/fact_sheet_hiv.htm).

<sup>133</sup> Sue Napierala Mavedzenge, “A Review of Self-Testing for HIV: Research and Policy Priorities in a New Era of HIV Prevention”, *Clin Infect Dis*, July 1, 2013; 57(1), 126–138.

in 2005/2008, although there are many other rapid tests for HIV.<sup>134</sup> Unlike in the United States, in Canada there are no HIV testing kits that are available for retail purchase for use at home. Furthermore, rapid testing is only available in some clinics and other settings in Canada: while Ontario and British Columbia are increasing the availability of point of care testing for HIV (Ontario now has over 50 locations that offer point of care testing for HIV),<sup>135</sup> there are no sites that offer rapid testing services in Atlantic Canada (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador).<sup>136</sup>

Despite the advantages of rapid HIV tests, there are also many barriers to the implementation of rapid HIV testing programs. The barriers to the increased integration and utilization of rapid testing include the paucity of data on the cost and cost effectiveness of rapid testing schemes compared to traditional laboratory based testing, as well as on linkages to care and follow up of tests (i.e. do rapid tests increase integration of HIV positive individuals into the healthcare system?).<sup>137,138,139</sup> Another impediment to the use of point of care or rapid HIV tests is that there may be a lack of knowledge on the part of primary care providers on how to use these tests, as well as how to conduct pre-/post-test counselling for HIV.<sup>140</sup>

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<sup>134</sup> Ameeta E Singh, et al., “The INSTI HIV-1/HIV-2 antibody test: a review”, Expert Opinion: Diagnostic Evaluation, 2013, accessed November 10, 2013 [online]: [www.albertahealthservices.ca/LabServices/wf-lab-insti-hiv-review-expert-opinion.pdf](http://www.albertahealthservices.ca/LabServices/wf-lab-insti-hiv-review-expert-opinion.pdf).

<sup>135</sup> “HIV and AIDS: HIV testing”, Ontario Ministry of Health and Long-Term Care, September 12, 2013, accessed November 10, 2013 [online]: [www.health.gov.on.ca/en/public/programs/hivaids/hiv\\_testing.aspx](http://www.health.gov.on.ca/en/public/programs/hivaids/hiv_testing.aspx).

<sup>136</sup> “Rapid Point of Care HIV Testing”, Presentation Jane Greer, Hassle Free Clinic CATIE Satellite, CPHA Conference June, 2009, accessed November 10, 2013 [online]: [www.catie.ca/pdf/CPHA2009/rapid%20POC%20testing%20-%20EN.pdf](http://www.catie.ca/pdf/CPHA2009/rapid%20POC%20testing%20-%20EN.pdf).

<sup>137</sup> Kathleen Johnston Roberts, et al., “Outcomes of Blood and Oral Fluid Rapid HIV Testing: A Literature Review, 2000–2006”, AIDS Patient Care and STDs, 2007, Vol. 21 (9).

<sup>138</sup> Sue Napierala Mavedzenge, “A Review of Self-Testing for HIV: Research and Policy Priorities in a New Era of HIV Prevention”, Clin Infect Dis, July 1, 2013; 57(1), 126-138.

<sup>139</sup> Nitika Pant Pai, et al., “Supervised and Unsupervised Self-Testing for HIV in High- and Low-Risk Populations: A Systematic Review”, PLOS Medicine, April 2013; 10(4).

<sup>140</sup> FH Galvan, et al., “Rapid HIV testing: issues in implementation”, AIDS Patient Care STDs, January 2004;18(1),15-8.

In 2013, PHAC released national recommendations for increased routine screening and testing for HIV. The *HIV Screening and Testing Guide* sets general recommendations for public health practice for secondary prevention activities related to HIV/AIDS.<sup>141</sup> The guide recommends that individuals engaged in high risk practices (e.g. MSM) should be screened for HIV at least annually, in order to reduce the number of unaware high risk individuals. The guide further recommends that HIV screening and testing be integrated into routine medical care for all individuals who are sexually active, and provides recommendations for the use of rapid HIV tests.

Evidence on the uptake of these national recommendations is limited. A recent systematic review of testing in Canadian MSM populations found that 83 % of Canadian MSM self-reported ever having been tested for HIV, but data on routine or annual testing was not interpretable from results.<sup>142</sup>

#### **4.4.2.2 Address young men's health needs**

Another secondary prevention activity found in the literature is the need to address young men's health needs. Young men are infrequent users of health care services; a study of a youth clinic in British Columbia, the Evergreen Youth Clinic, found that less than 6 % of clinic users are male.<sup>143</sup>

Larkin (2006) et al.'s qualitative study (interviews) of Canadian youth found that norms around males and masculinity may be a barrier for increasing integration into existing health care

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<sup>141</sup> "Human immunodeficiency virus HIV Screening and Testing Guide", Public Health Agency of Canada, January 2013, accessed November 10, 2013, [online]: [www.phac-aspc.gc.ca/aids-sida/guide/hivstg-vihgdd-eng.php](http://www.phac-aspc.gc.ca/aids-sida/guide/hivstg-vihgdd-eng.php).

<sup>142</sup> Shalane Ha, et al., "HIV Testing in Canada", Public Health Agency of Canada, 2013.

<sup>143</sup> "Evergreen Guys Research Project - Men's Health Initiative", Vancouver Coastal Health, October, 2009, accessed November 10, 2013 [online]

[www.aboutmen.ca/application/www.aboutmen.ca/asset/upload/tiny\\_mce/page/link/SoN\\_FINAL\\_For-Web.pdf](http://www.aboutmen.ca/application/www.aboutmen.ca/asset/upload/tiny_mce/page/link/SoN_FINAL_For-Web.pdf).

systems.<sup>144</sup> Moreover, Courtenay (2000) writes that: “the social practices that undermine men’s health are often the instruments men use in the structuring and acquisition of power [...] health-related beliefs and behaviours that can be used in the demonstration of hegemonic masculinity include the denial of weakness or vulnerability, emotional and physical control, the appearance of being strong and robust, dismissal of any need for help, a ceaseless interest in sex, the display of aggressive behaviour and physical dominance”.<sup>145</sup>

Despite these findings, there is paucity in the literature on how to address these underlying causes that lead young men to disregard their health; more research is needed to clarify how public health policies should adapt to meet young men’s health needs. Research could be conducted by public health units or care providers (implementers).

#### **4.4.2.3 New, novel approaches for reaching YMSM**

Another recommendation found in the literature is new, novel approaches for reaching YMSM with public health interventions. Kubicek (2011),<sup>146</sup> Labacher (2013),<sup>147</sup> Mann (2011),<sup>148</sup> and Winchester (2012)<sup>149</sup> explore novel approaches for reaching youth and YMSM with STI-related public health activities, such as prevention and health promotion campaigns, as well as new STI screening and testing strategies.

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<sup>144</sup> June Larkin, et al., “Guy talk: contesting masculinities in HIV prevention education with Canadian youth”, Sex Education: Sexuality, Society and Learning, 2006; 6(3).

<sup>145</sup> WH Courtenay, “Constructions of masculinity and their Influence on men’s well-being: a theory of gender and health”, Social Science and Medicine, 2000; 50, 1385-1401.

<sup>146</sup> Kubicek, “Use and perceptions of the internet for sexual information and partners: a study of young men who have sex with men”, Arch Sex Behav, August 2011; 40(4), 803-16.

<sup>147</sup> Lukas Labacher and Claudia Mitchell, “Talk or Text to Tell? How Young Adults in Canada and South Africa Prefer to Receive STI Results, Counseling, and Treatment Updates in a Wireless World”, Journal of Health Communication: International Perspectives, 2013; 18(12).

<sup>148</sup> TA Mann, et al. “Get Tested Why Not? A novel approach to internet-based chlamydia and gonorrhea testing in Canada”, Can J Public Health, 7 March, 2013; 104(3), e205-9.

<sup>149</sup> Woodrow W Winchester III, et al., “The use of partner-seeking computer-mediated communication applications by young men that have sex with men (YMSM): uncovering human-computer interaction (HCI) design opportunities in HIV prevention”, Health Systems, 2012; 1, 26-35.

One innovative approach for reaching YMSM discussed by both Kubicek (2011) and Winchester (2012) is to leverage existing electronic mediums that are already popular among YMSM, including social networking websites, as well as MSM-targeted online and mobile chat applications (e.g. Grindr).<sup>150</sup> This new approach would make sense: the internet has become a popular means for YMSM to communicate with each other, seek sexual health information, and meet new partners. Kubicek (2011)'s study of YMSM (18 to 24 years old) living in Los Angeles (USA) found that the majority of study participants had met a previous sexual partner online, and that 40 % of participants had visited a gay chat room in the last three months; many YMSM stated that the internet was "certainly the most convenient" way to meet new partners.<sup>151</sup>

Although there is debate as to whether or not online partner seeking correlates with increased high risk sexual activity,<sup>152-153</sup> there is a great opportunity for public health policymakers to implement STI prevention and health promotion campaigns in collaboration online and mobile developers. For example, safer sex messaging could be included in all existing and new MSM-targeted social networking websites, as well as online and mobile chat applications. Currently there are no regulations to include this type of messaging; where safer sex messaging does exist, it varies between existing websites and mobile applications. These activities could be either through grass roots/collaboration or through regulatory action by governments. On this topic, Kubicek (2011) writes "the role of HIV prevention is not to interfere with where people meet,

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<sup>150</sup> Grindr, accessed November 10 2013 [online]: <http://grindr.com/>.

<sup>151</sup> Kubicek K, "Use and perceptions of the internet for sexual information and partners: a study of young men who have sex with men.", *Arch Sex Behav*. 2011 Aug;40(4):803-16.

<sup>152</sup> Woodrow W Winchester III, et al., "The use of partner-seeking computer-mediated communication applications by young men that have sex with men (YMSM): uncovering human-computer interaction (HCI) design opportunities in HIV prevention", *Health Systems*, 2012; 1, 26-35.

<sup>153</sup> Kubicek, "Use and perceptions of the internet for sexual information and partners: a study of young men who have sex with men", *Arch Sex Behav*, August 2011; 40(4), 803-16.

where they have sex, or how they have sex – with one expectation, and that is to advise people how (emphasis added) to have safer sex”.

Additionally electronic technology could be used to increase screening and testing for STIs among YMSM. Mann (2011) reviews an Ottawa-based campaign targeting youth called “Get tested, why not”, which used text messaging and online advertising to recruit and encourage youth to get screened and tested for STIs. This campaign found that the use of the internet helped them reach their target population, that the use of technology has expanded STI screening and testing options for youth in Ottawa.<sup>154</sup>

#### **4.4.3 Other policy implications: increase data collection for YMSM**

Among all policy actions, none may be more pertinent than the call for increased data collection on Canadian YMSM. There is a paucity of both up-to-date surveillance and socio-behavioural data on this population in Canada. This is especially true when one compares the availability of Canadian data to that of data on American YMSM.<sup>155,156</sup>

Up-to-date and publically available surveillance data of STIs among Canadian YMSM is needed, particularly for HIV, as existing data demonstrates an increasing incidence of HIV infection among YMSM. Increased enhanced surveillance data collection and dissemination activities should also focus on other STIs among YMSM, particularly those which most affect MSM, meaning gonorrhoea, chlamydia, syphilis, the human papillomavirus (HPV) (HPV is not even reported at the national level), as well as lymphogranuloma venereum (LGV). The public

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<sup>154</sup> TA Mann, et al. “Get Tested Why Not? A novel approach to internet-based chlamydia and gonorrhoea testing in Canada”, *Can J Public Health*, 7 March, 2013; 104(3), e205-9.

<sup>155</sup> “HIV Surveillance in Men Who Have Sex with Men (MSM)”, *United States Centres for Disease Control and Prevention*, accessed November 10, 2013, [online]: [www.cdc.gov/hiv/pdf/statistics\\_surveillance\\_MSM.pdf](http://www.cdc.gov/hiv/pdf/statistics_surveillance_MSM.pdf).

<sup>156</sup> “The Young Men Who Have Sex with Men (YMSM) Project: Reducing the Risk of HIV/STD Infection”, *United States Centres for Disease Control and Prevention*, September 27, 2013, accessed November 10, 2013 [online]: <http://www.cdc.gov/healthyouth/disparities/ymsm/index.htm>.

dissemination of up-to-date surveillance data is further needed because the governance of sexual health issues related to STIs, including prevention activities, operates in a highly decentralized health care model, with many localized NGOs and local public health units (e.g. Ottawa Public Health) conducting health promotion and STI prevention activities at the municipal and provincial levels. These groups require access to data for planning their activities and interventions.

Another important data collection activity would be to establish new cohort (longitudinal) studies similar to the previous Vanguard and Omega studies. These studies provided a wealth of information on socio-behavioural characteristics of Canadian YMSM, in particular sexual risk taking behaviours, but were discontinued in the early 2000s. Any new cohort studies should attempt to integrate rural YMSM as participants, as there is an extreme paucity of data on this population (most studies of MSM/YMSM focus on urban populations).

## **Part 5: Conclusions**

This review sought to identify and explain the burden of STIs among Canadian YMSM, identify policy implications and propose corrective actions, using a systematic approach. This approach was selected to report transparently on how the conclusions were generated, to reduce bias in findings, and to draw upon the most relevant (but also hard to find) information. The systematic approach was also chosen because it is similar to methods that used by some researchers in governments, NGOs, universities, and other institutions that are involved in policy- and decision-making.

The review finds that YMSM in Canada experience an increasingly disproportionate burden of HIV infections when compared to heterosexual youth, and that YMSM are particularly vulnerable to STIs (including HIV). There is limited data on the burden of other STIs (excluding HIV) among YMSM, but there is evidence that the burden of AIDS, HCV, LGV, and syphilis are concentrated among older MSM.

Finally, there are numerous policy recommendations related to YMSM and STBBIs found in the literature; these include primary and secondary prevention activities. A comprehensive approach to the determinants of YMSM sexual health, in addition to continued targeted safer sex education and health promotion activities may reduce the incidence of new HIV infections among YMSM. Additionally, primary care providers should take into account young men's health needs and continue to increase routine screening and testing for HIV, including increasing the integration and utilization of point of care or rapid testing in both traditional and non-traditional settings. Public health interventions should get creative with strategies that target YMSM; the internet and mobile applications may offer solutions in this regard. Finally, there is a need to increase data

collection on YMSM, in particular surveillance data of HIV/AIDS and other STIs, as well as new cohort studies of Canadian YMSM.

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