

# Men-centered Approaches for Primary and Secondary Prevention of HIV/AIDS: A Scoping Review of Effective Interventions

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## Abstract

Approximately 65,000 people live with HIV/AIDS (PLWHA) in Canada and around 82% of declared cases (52,932 cases) of HIV and AIDS are men. Without evidence-based specific interventions, HIV will continue to spread. This scoping review aims to identify evidence on best practice programs for sexual and reproductive health promotion (i.e. HIV/AIDS) targeting men, and to document the best channels for reaching men. English and French language literature indexed in relevant electronic databases was systematically searched. This was complemented by a manual search through five periodicals specializing in men's health. A total of 6608 articles were identified and 39 articles that met all inclusion and exclusion criteria were retained in the synthesis. Three reviewers independently extracted information on: health topic (i.e. HIV/AIDS), design of services (structure and resources), modes of delivery, content of intervention and main outcomes. The preventive practices with the strongest supportive evidence included, just in time information available through electronic channels (website or cell phone). Interventions designed for men only, showed significantly greater effectiveness compared to interventions targeting both men and women. We derived practical recommendations to design an integrated evidence-based preventive intervention targeting men.

**Keywords:** Men's health; HIV/AIDS prevention; Best practices; Prevention interventions; Scoping review

## Introduction

High rates of *Human Immunodeficiency Virus* (HIV) infection and *Acquired Immune Deficiency Syndrome* (AIDS) have become a significant issue of global concern, particularly the rates of such infection amongst men [1]. In Canada, the rate of positive HIV test reports is 7.6 per 100,000. At the national level, the trend in annual HIV case reports since 1996 showed a steady decrease in the number of reported cases to the year 2000. This was followed by an overall increase through to 2008, at which time the number of positive HIV test reports reached a high of 2,619. In 2011, 2,221 new adult cases ( $\geq 15$  years) were reported showing a slight decrease. In terms of sex and age distribution, among these 2,221, 76.7% were men with a higher proportion of case reports among the 40-49 year olds (27.1% of male cases vs. 21.6% of female cases), followed by those over the age of 50 (M: 20.9% vs. F: 14.0%) [2]. Overall, when looking at the different risk exposure categories for HIV, men who have sex with men (MSM) is still the leading reported exposure category in Canada; this is followed by heterosexual contact and injection drug use. There emergence of the HIV epidemic among MSM is likely due in part to a shift in perception, from viewing HIV as a terminal illness to viewing HIV as a chronic, manageable condition and a resulting sense of complacency related to HIV prevention behaviors [3]. However, the pattern of risk exposure differs by province/territory as well as by other health determinants (i.e. behavioral, social and biological factors). In fact, there are important differences between men and women in the physical mechanisms, as well as in socio-economic factors and consequences associated with HIV/AIDS infection. These stem from biology, risky behaviors and socially constructed gender differences between men and women, as well as utilization and access to timely and accurate healthcare and social resources. For example, distinct differences are observed between men and women in terms of age at diagnosis of HIV and AIDS. MSM received public health nursing care less frequently than youth and women who have sex with men [4]. Men tend to be diagnosed at an older age (compared to women) with MSM being the leading reported risk factor followed by heterosexual contact and injection drug use.

These specifically gendered epidemiological patterns of infection challenge both public health strategies and primary care services in how they can most effectively target the prevention of HIV/AIDS, especially when we know that: (1) the PHAC estimates that 25% of the 71,300 (58,600 to 84,000) people living with HIV/AIDS in Canada were unaware of their infection (due to a lack of testing and/or diagnosis) and (2) the percentage distribution of positive HIV test reports among adult men ( $\geq 15$  years) by heterosexual contact exposure and year of test increased from 16.3% in 2004 to 20.4% in 2011 [2]. These two major statistics can be partly explained by the failure of standard population-based preventive interventions to raise HIV awareness among the male population. MSM account for 23% of HIV/AIDS risk factors (i.e. risky sexual behaviors) for Canadians aged 15 and older [5]. Although MSM have high HIV/AIDS incidence and prevalence rates [6], this trend is changing and there is limited evidence on how best to face the challenge and be proactive in reducing infection amongst not only this group but also amongst other groups of men [7]. There is currently a focus in the literature on specific populations such as MSM, gay men and HIV positive men yet few prevention options that focus on other men. Given all that, some men may respond better to personal follow-up, while others may be more sensitive to group, computer-based or community based interventions [8-10], thus there is an urgent need for evidence-based multifaceted preventive strategies. In short, there is limited evidence that the HIV epidemic will be adequately addressed

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in Canada or the United States in the near future because both countries have concentrated epidemics, and many prevention intervention strategies are not tailored to the needs of what should be the priority populations within the two countries [4].

In New-Brunswick, a small rural Canadian province of 750,000 habitants and one of the Atlantic provinces, between 1985-2006, the percentage of all declared cases of HIV infection and AIDS among people age 15 and older was 88% (HIV) and 91% (AIDS) in men compared with 12% (HIV) and 9% (AIDS) in women [11]. Despite the fact that in New Brunswick, the rate of positive HIV test new reports per 100,000 population is one of the lowest ones in Canada, there has been a significant increase from 0.6 in 2009 to 1.4 in 2011 [2]. To better understand the New Brunswick (NB) local context, one has to know that some social issues, such as illiteracy (more than 66% have not reached Level 3 literacy, the minimum level required to function in Canadian society) and disadvantaged economic status (an unemployment rate around 11%), are prevalent in the region. NB is an official bilingual province, where French communities are considered as linguistic minorities. Men in NB have the lowest life expectancy in Canada (77.5 years) and only 53.5% of men aged more than 18 in NB see their health as very good or excellent. They are under users of health services, only 72.9% of men visited their family doctor in the last year. Moreover, public health in NB is an emerging sector with a major focus on non-communicable diseases and children and youth health. Although HIV/AIDS prevention is an issue for NB public health, development of a well-structured and integrated program for HIV/AIDS prevention is in its infancy.

Knowing all that, there is currently no consensus on how to build an evidence-based comprehensive and integrated approach to prevent HIV/AIDS infection in men, and especially for those living in rural and remote areas. This scoping review aims to set the stage for the proposition of an evidence-based preventive intervention for men through the identification of best practice programs for sexual health promotion and of effective channels for reaching such men.

## Method

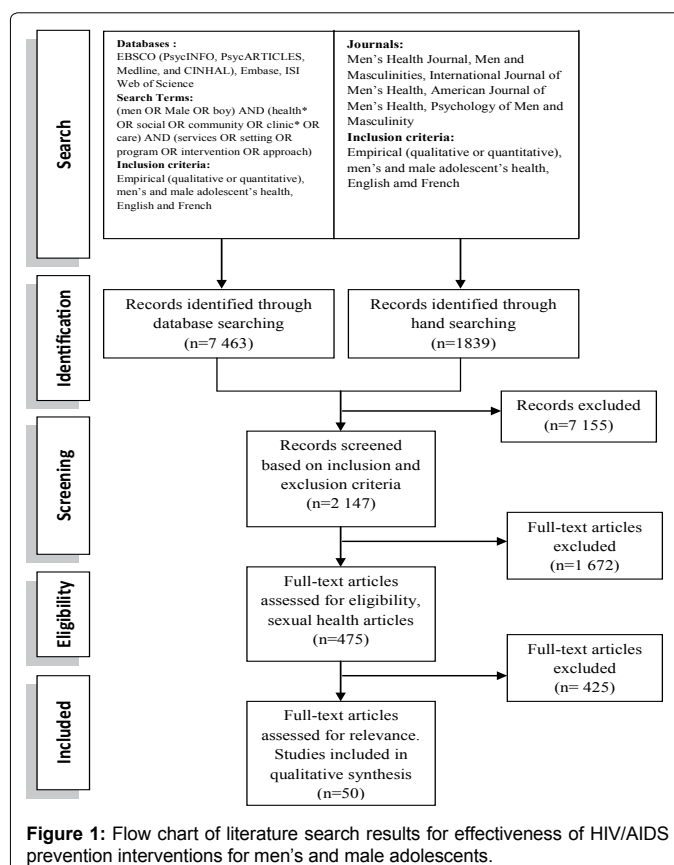
We conducted a scoping review that adheres to the guidelines in the *Preferred Reporting Items for Systematic Reviews and Meta-Analysis* (PRISMA) statements [12]. The English and French language literature indexed in EBSCO (Medline, CINHAL, PsycINFO, and PsycARTICLES), Embase and ISI Web of Science from January 01, 2000 to December 31, 2012 was systematically searched in March 2013 using the following key words: (men OR Teenager OR adolescent OR boy) and (health\* OR social OR community OR clinic\* OR care) and (services OR setting OR program OR intervention OR approach) (see Figure 1). In addition, a manual search was conducted in five periodicals specialized in men's health (Men's Health Journal, Men and Masculinities, International Journal of Men's Health, American Journal of Men's Health and Psychology of Men and Masculinity) using the same time frame as the computerized database search (see Figure 1). Inclusion criteria for this selection of articles comprised empirical articles using either a qualitative or quantitative approach, publication domain in men's or male adolescent (15 or older) health and English or French language literature. Exclusion criteria included essays, book reviews, theses, editorials, project reports and grey literature. References were managed using Ref Works 2.0. A further, complementary review was made on computer-based and telephone-based interventions to derive practical recommendations (see Figure 1). The references of the selected studies were systematically checked to

identify relevant articles that were not identified through the electronic and hand search strategies. From this pool of articles, three reviewers independently extracted information on: health topic (i.e. HIV/AIDS), design of services (structure and resources), modes of delivery, content of intervention and main outcomes for men.

## Findings

### Descriptive statistics

Studies that met inclusion and exclusion criteria and were evaluating the efficacy of an HIV/AIDS prevention intervention for men or male adolescents were selected. A total of 50 articles were included from an initial total of 301 articles on sexual health (see Figure 1). An overview of these articles and descriptive data of the selected studies are presented in Table 1. Among the 50 articles, 36 studies were based on quantitative design and 10 on mixed method (qualitative and quantitative design). Among the 50 selected articles, 12 studies were based on a Randomized Clinical Trial (RCTs). The overall quality score of the 12 RCTs study design was assessed based on CONSORT Checklist criteria [13]. The quality score of the RCTs study design varied from good to somewhat good. All the studies had relevant theoretical foundation and used one of the following behavioral theories: the Behavioral Skills Acquisition Model, The Transtheoretical Model of Behaviour Change, The Decisional Balance Model, the Social Cognitive Theory and the Social Action Model. Only one study, led in South Africa, was based on the Social Constructionist Theory of Gender. From the 50 selected articles, 44 were exclusively targeting HIV/AIDS and 6 targeted HIV/AIDS and other health topics (hepatitis, Sexually Transmitted Diseases (STD), violence, drug use, alcohol, sexual behavior, sexuality, and mental health). In terms of geographic localization, based on country of intervention delivery and not on 1<sup>st</sup> author affiliation, the distribution



Reference	Geographic localization	Population	Program description	Design	Follow-up observation
Aggarwal and Duggal [31]	Rural area of Lalpur, Ferozepur, Andheri; Haryana state; North India	403 males and 329 females	<b>Type and model:</b> Community-based, educational and advice (group and individual) <b>Content:</b> - Health education activities consisting of 6 RTI/STD camps (2 in each village) including vaginal examination and free medication, and one-on-one counseling and 20 interactive health education sessions (talks) (2 year duration). - Use of health pamphlets (RTI and HIV/AIDS) in simple vernacular language.	QT	1 month and 2 years
Barss et al. [44]	Al Ain and Abu Dhabi in Abu Dhabi Emirate, United Arab Emirates	1398 females and 505 males (grade 12 high school students)	<b>Type and model:</b> School-based, educational (group) <b>Content:</b> - Peer-led school presentations about HIV/AIDS (30-35 minutes, brief history of AIDS, prevalence, description of the disease, modes of transmission, treatment and prevention) and 3 short workshops on attitude and stigma (10 minutes).	QT	Post-intervention
Bing et al. [50]	Angola	568 Male soldiers	<b>Type and model:</b> Work-based, educational (group) <b>Content:</b> - 5 day military focused interactive HIV prevention interventions including monthly booster sessions available after each intervention. - Based on Fisher and Fisher's Information, Motivation and Behavioral Skills (IMB) model of behavior change.	QT	3 and 6 months
Blas et al. [54]	Lima, Peru	808 gay and 588 non-gay MSM	<b>Type and model:</b> Electronic-based, educational (individual) <b>Content:</b> - 5 minutes HIV-testing motivational videos framed within the Health Belief Model and customized for three audiences (s1-non gay, s-2 gay, s-3 trans) - Offered through 7 gay websites which included a link to online survey, information about risk and benefits of participation, privacy policy information, frequently asked questions and a phone number for more information.	QT - RCT	mean of 125.5 days
Bogart et al. [64]	Los Angeles County, California,	121 HIV-positive clients, 87% male	<b>Type and model:</b> non-randomized evaluation, in multivariate models <b>Content:</b> -a non-randomized evaluation examining relationships of TA (treatment advocacy) participation to adherence, care engagement, social services utilization, unmet needs, patient self-advocacy, and adherence self-efficacy among 121 HIV-positive clients (36 in TA, 85 not in TA; 87% male) -Participants completed 1-hour interviews at baseline, and at 3- and 6-month follow-up. -TA participants (vs. non-TA participants) showed higher electronically monitored and self-reported adherence	QL, QT	3- and 6-month follow-up
Bowen et al. [55]	Wyoming and Texas, USA	90 MSM	<b>Type and Model:</b> Electronic-Based, educational and advice (individual) <b>Content:</b> - Internet-delivered HIV risk-reduction intervention modules (conversation with HIV + and – men, interactive graphics and activities) - 2 modules of 20 minutes (HIV testing, living with HIV, treatment issues and routes of infection, safer sex options, condom types and correct condom application)	QT - RCT	1 week
Boyer et al. [49]	Western pacific aboard ships	584 young US marine males	<b>Type and model:</b> Work-based, educational (group) <b>Content:</b> - Four 2-hours multicomponent interactive sessions facilitated by trained navy corpsmen and a 2-hour booster session. (information, motivation and behavioral skills models)	QT	6 months
Butler et al. [26]	22 USA states	167 HIV+ ado and youth males with haemo-philia	<b>Type and model:</b> Community-based, educational and advice (individual and group) <b>Content:</b> - Based on the Transtheoretical Model of Behavior Change and the Theory of Reasoned Action. Intervention 1 (establish initial rapport and elicit input for future programming –individual), intervention 2 (social activity with a group session to develop a supportive peer group), intervention 3 (intensive weekend retreat and recreational activities with group sessions) and intervention 4 (facilitate continuing progress and relapse prevention- individual).	QT/QL	Post-intervention and 6 months
Caron et al. [45]	Quebec, Canada	698 junior and 306 senior high school students	<b>Type and model:</b> School-based, educational (group) <b>Content:</b> - Protection Express Program (Peer-led) based on the Theories of Planned Behavior and Interpersonal Behavior and a teaching model based on Social Cognitive Theory. Content developed to affect attitude, perceived social norm, perceived behavioral control, personal normative belief, role belief and the belief underlying these main construct.	QT	2 weeks (T1), and 9 Months (T2)

Chernoff and Davison [43]	California, USA	155 college students	<b>Type and model:</b> College-based, educational and advice (group) <b>Content:</b> - 20 minutes self administered intervention using normative feedback about the prevalence of sexual risk behaviors among college students. Selection of specific risk reduction goals by students to be implemented over a 30 day follow up period.	QT	30 days
Chesney et al. [42]	San Francisco Bay Area, USA	149 gay men or bisexual males (MSM)	<b>Type and model:</b> Clinical-based, educational and advice (group) <b>Content:</b> - 10 weekly training sessions in appraisal of stressful situations, problem focused and emotional focused coping, fit between stressful situations and coping strategies, and the use of social support; skill-building group activities (relaxation guidance, day-long retreat, take home exercises) and 6 maintenance sessions.	QT - RCT	3, 6, and 12 months
Coleman et al. [14]	Philadelphia, USA	60 older HIV+ African American males	<b>Type and model:</b> Community-based, educational (group and individual) <b>Content:</b> - 4 week (2 h/w) intervention to increase condom use (condom use activities; information on stigma, marginalization, side effect of drug therapy and comorbidities; the checking video; SWAT negotiation; take home assignment with DVD).	QT	Post-intervention and 3 months
Dilley et al. [38]	San Francisco, USA	248 gay males (MSM)	<b>Type and model:</b> Clinical-based; advice (individual) <b>Content:</b> - One face to face counseling session focusing on self-justification (1 hour) – introduction, recent history, critical examination and closure.	QT -RCT	6 and 12 months
Exner et al. [39]	Ibadan, Nigeria	281 males	<b>Type and model:</b> Clinical-based, educational and advice (group) <b>Content:</b> - Two 5 hour workshops, with a monthly 2 hour check-in session (didactic and interactive teaching, small group discussion, etc.). Modules: HIV stigma, knowledge, prevention, risk reduction strategies, sexual negotiation and gender based violence. Sessions: emphasis on communication, assertiveness and negotiation skills.	QT	3 months
Harding et al. [9]	London, UK	50 gay males	<b>Type and model:</b> Community based, educational (group) <b>Content:</b> - «SMsex: an introduction to the sm scene»: 25 group members meet for four sessions of 7 hours (assumption and knowledge, practical tools, risk taking, fantasy, limits and boundaries).	QT - RCT	8 and 20 weeks
Hoff et al. [24]	New-York City and San Francisco, USA	811 HIV+ gay and bisexual males	<b>Type and model:</b> Community-based, educational and advice (group) <b>Content:</b> - The Seropositive Urban Men's Intervention Trial (SUMIT): behavioral intervention including six peer led sessions (3 h). (sexual and romantic relationships, HIV and STD transmission, drug and alcohol use, assumptions about HIV status of partners, HIV transmission responsibility and disclosure of HIV status)	QT - RCT	3 and 6 months
Jones et al. [15]	Raleigh, Greensboro and Charlotte, North Carolina; USA	1190 black MSM	<b>Type and model:</b> Community-based, educational (group) <b>Content:</b> - HIV behavioral intervention of 4 two hour sessions on topics like: local and state epidemiology of HIV/AIDS and STDs, facts and myths about HIV/AIDS and characteristic of an effective risk reduction conversation.	QT	4, 8 and 12 months
Kalichman et al. [28]	Eastern and western cape region of South Africa	99 Males	<b>Type and model:</b> Community-based, educational and advice (group) <b>Content:</b> - Based on the Social Cognitive Theory and the Social Constructionist Theory of Gender (five 3 h group sessions with 8-12 men). Includes elements of education, motivational enhancement to reduce HIV risk and sexual violence, HIV/AIDS destigmatization, and learning skills for avoiding violence and reducing sexual risks.	QT	After 5th session
Kegeles et al. [32]	All regions of the US; 31 states, plus the District of Columbia and Puerto Rico	49 community-based organizations; population size: 30,000-11,000,000	<b>Type and model:</b> Community-based, Translating Research into Practice (TRIP) Study (a longitudinal project) <b>Content:</b> -Development of an intervention to help CBOs (community-based organizations) implement the MP (Mpowerment Project: a community-level, evidence-based HIV prevention intervention for young gay/bisexual men that is a combination HIV prevention approach) called the Mpowerment Project Technology Exchange System (MP TES). -The MP TES consists of seven components (program manual, overview video, M-group Facilitator Guide, M-group training video, Training program, Technical assistance (TA) program, Web-based resources)	QL	Up to 2 years

Koblin et al. [8]	Boston, Chicago, Denver, New York, San Francisco, and Seattle; USA	4295 MSM	<b>Type and model:</b> Community-based, educational and advice (individual) <b>Content:</b> -Intervention designed to address individual, interpersonal and situational related factors associated with risk taking among MSM. Ten core modules delivered at one-on-one counseling sessions (one module per session) within 4-6 months randomization. Maintenance sessions every 3 months until the end of the study.	QT - RCT	Every 6 months (4 years)
Kubicek et al. [34]	Los Angeles, CA, USA	526 YMSM (young MSM; ages 18-24)	<b>Type and model:</b> Community-based, longitudinal study of an ethnically diverse cohort <b>Content:</b> -Study about how YMSM use the Internet to find information related to sex, sexuality, and sexual partners. HYM (Healthy Young Men) participants completed an extensive 60 to 90 min survey every 6 months over the course of 2 years. -Findings show how YMSM researchers and interventionists can most effectively reach YMSM through online methods.	QT and QL	Every six months over the course of two years
Landolt et al. [65]	Thailand	100 HIV-positive women and 100 HIV-positive men	<b>Type and model:</b> Cross-sectional study; participants completed a questionnaire <b>Content:</b> -Study about the sexual life of HIV-positive heterosexual men and women in a stable relationship and on successful antiretroviral therapy (ART) in Thailand. -Sexual practices and options for contraception, as well as intention for conception and factors influencing it were studied.	QT	N/A (None)
Lapinski et al. [21]	Michigan, USA	72 HIV+ MSM	<b>Type and model:</b> Community-based, educational and advice (group and individual) <b>Content:</b> -Individual level counseling condition (ILC): based on the Stage of Change Model and the AIDS Risk Reduction Model, counselors assessed HIV risk and developed risk reduction plans; Group level sessions condition (GLS): 6 peer facilitated group level sessions based on the Theory of Reasoned Action and the Social Cognitive Theory and GLS and ILC arm condition: added appropriate medical and psychosocial referrals.	QT	Post-intervention and 6 weeks
Leonard et al. [51]	Kaolack, Senegal	260 males	<b>Type and model:</b> Work-based; educational and advice (group) <b>Content:</b> - Peer education program (information on HIV and STD, condom distribution, referrals, etc).	QT	3 months
Mansergh et al. [22]	Chicago, Los Angeles, New York, San Francisco; USA	1686 substance using MSM	<b>Type and model:</b> Community-based, educational and advice (group) <b>Content:</b> - 6 weekly 2 hour group sessions consisting of an intervention (cognitive behavioral techniques and skill building techniques including modeling and behavioral rehearsal) and twelve 45-55 min modules of the attention-control (20-30 min video and group discussion on MSM related issues such as relationships, spirituality and racism).	QT - RCT	3, 6 and 12 months
Morin et al. [23]	USA	616 MSM HIV+	<b>Type and model:</b> Community-based, educational and advice (individual) <b>Content:</b> - Cognitive behavioral intervention, individually tailored sessions, 90 minutes individual counseling sessions grouped into 3 modules (stress coping and adjustment/safer behavior/healthy behavior) each consisting of 5 sessions.	QT	5, 10, 15, 20 and 25 months
Mustanski et al. [35]	USA (Midwest states)	329 MSM (18- to 24-year-old)	<b>Type and model:</b> Community-based mixed-methods; interviews, quantitative and qualitative analysis <b>Content:</b> -Describing Internet-related behaviors among young MSM that positively and negatively impact their sexual health. Three areas of sexual health were explored: HIV/STI knowledge, sexual self-acceptance, and sexual risk behaviors. -Use of the Internet to find HIV/AIDS information was very common. -The findings present an optimistic picture about the role of the Internet in the development of sexual health among young MSM.	QT, QL	N/A
Ngongo et al. [66]	Eastern and Southern Africa (Kenya, Rwanda, Uganda, Zambia, and South Africa)	16 key staff members from the 10 RCs (Research Centers)	<b>Type and model:</b> data collection by a designed survey tool <b>Content:</b> -To inform a standard approach to care and prevention services in its sponsored research, the International AIDS Vaccine Initiative (IAVI) conducted a survey to systematically assess and document current practices at 10 HIV prevention research centers (RCs) in Eastern and Southern Africa. -A collaborative process between IAVI and the RCs was undertaken to reach consensus on expected standards of care. A set of required and recommended services to be provided on-site or by referral was developed.	QT, QL	N/A

Njau et al. [36]	Northern Tanzania (in rural settings)	91 participants (male and female)	<b>Type and model:</b> Community-based, formative qualitative study, Purposive sampling, interviews and Focus group discussions (FGDs) <b>Content:</b> -The Government of Tanzania has recognized a door-to-door recruitment approach as a key strategy for universal HIV testing. Findings in this study indicate that such an intervention is likely to be acceptable among couples and service providers, although concerns remain that might limit uptake.	QL	N/A
Operario et al. [16]	Oakland, CA, USA	36 African American MSMW	<b>Type and model:</b> Community-based, educational and advice (group) <b>Content:</b> - 4 weekly 1 h counseling sessions (HIV prevention, interpersonal dynamics with male and female partners and motivations of sexual episodes) - Based on Information-Motivation-Behavioral Skills Model of HIV Behavior Change and The AIDS Reduction model.	QT	3 months
Parsons et al. [30]	Oklahoma, USA	255 HIV+ males with haemophilia and 158 females	<b>Type and model:</b> Community-based, educational and advice (Individual and group) <b>Content:</b> - 3 general communication skills modules, at least one stage based activity for safer sex behaviors and at least one stage-based activity for communication about safer sex behaviors.	QT	15 months
Peacock et al. [27]	Johannesburg, South Africa	139 Males	<b>Type and model:</b> Community-based, educational (group) <b>Content:</b> - Men as partner workshops intervention: educational workshops; 4 to 5 days (35 hours of activities) on topics like gender and sexuality, violence, HIV prevention, etc.	QT/QL	3 to 4 months
Philips et al. [4]	British Columbia, Canada	N/A (Commentary)	<b>Type and model:</b> A commentary article that introduces a community-oriented public health HIV prevention plan <b>Content:</b> -A group of experts criticize the current population-based public health approaches for HIV prevention in North America. They propose a community-oriented public health approach for HIV prevention with a substantial attention to sexual minorities (including MSM) as the at risk population.	QL	N/A
Picciano [57]	Seattle, USA	89 MSM	<b>Type and model:</b> Electronic-based, educational and advice (individual) <b>Content:</b> - 90-120 min counseling session using a motivational interviewing style.	QT - RCT	6 and 7 weeks
Puccio et al. [58]	Los Angeles, USA	8 HIV+ Young males	<b>Type and model:</b> Electronic-based, cell phone reminders (individual) <b>Content:</b> - Cell phone reminders to improve HAART (highly active antiretroviral therapy) adherence via a free cell phone. - Participants received phone calls from an adolescent medicine research team for 12 weeks (first 4 weeks calls occurred on a daily basis, weeks 5 through 8 calls were only made Monday through Friday, weeks 9 through 12 calls occurred on Sunday, Tuesday, and Thursday).	QT/QL	4 weeks intervals and post-intervention (24 weeks)
Read et al. [56]	Los Angeles, USA	110 MSM	<b>Type and model:</b> Electronic based, educational and advice (individual) <b>Content:</b> - Counseling session: one-on-one AIDS counseling administered by a trained, professional HIV counselor after a negative AIDS test. (review of safer sex behavior, teaching behavioral and problem-solving skills for managing cognitions and behavior when dealing with risky situations) - Video: interactive virtual environment designed to simulate the emotional, interpersonal, and contextual narrative of an actual sexual encounter while challenging and changing MSM's more automatic patterns of risky responses (peer-coach).	QT	Post-intervention
Rotheram-Borus et al. [41]	Los Angeles, New York, San Francisco, and Miami, USA	310 HIV+ youths	<b>Type and model:</b> Clinical-based, educational and advice (group) <b>Content:</b> Twenty three 2 h sessions based on The Social Action Model - Stay Healthy intervention; a 12 session module that focuses on coping, implementation of daily healthy routines, issues of disclosure and participating in health care decisions. - Act safe (11 sessions); enhance altruistic motivation to reduce transmission acts.	QT	9 and 15 months

Saberi et al. [37]	California (San Francisco Bay Area), USA	328 men (MSM) (164 couples)	<b>Type and model:</b> a mixed-methods study, including qualitative sub-study interviews <b>Content:</b> -They found that among 328 men,62% had heard about PrEP (Pre-Exposure Prophylaxis), but those at greatest risk may not be receptive of PrEP. Those who engage in moderate risk express more interest in PrEP -Results indicate a need for further education of MSM communities and the need to determine appropriate populations in which PrEP can have the highest impact.	QT, QL	
Siegel et al. [46]	Rochester, NY; USA	4001 middle and high school students	<b>Type and model:</b> School-based, educational (group) <b>Content:</b> - RAPP intervention is a 10 or 12 consecutive health class sessions (2 or 3 sessions per week) delivered for 2 to 7 weeks; based on the Theory of Reasoned Action (in depth discussion and skills based activities).	QT	+41.2 weeks
Sikkema et al. [36]	New York City, USA	65 men (newly HIV-diagnosed MSM)	<b>Type and model:</b> a collaborative, community-based approach; intervention development and feasibility study (pilot intervention trial) <b>Content:</b> -The primary objective of this study was, in partnership with a large nonprofit community health center, to develop, pilot test, and assess the potential effectiveness of a theoretically based brief risk reduction intervention to reduce HIV transmission risk among newly diagnosed MSM. -The intervention comprised three 60-minute individual sessions. -Many individuals in the study reduced risk behavior immediately postdiagnosis.	QL	3-month, and 6-month follow-up
Somerville et al. [18]	California, USA	766 young Latino migrants (MSM)	<b>Type and model:</b> Community-based, educational (group) <b>Content:</b> - Modules on basic HIV information, communication, learning when to provide information and when to provide referrals for professional assistance and STI.	QT	Post-intervention
Toro-Alfonso et al. [19]	Puerto Rico	587 Latino gay MSM	<b>Type and model:</b> Community-based, educational (group) <b>Content:</b> - 15 hours (3 hours small group discussion and four sessions workshops), peer-led issues of intimacy, relationships, drug abuse, sexual behavior, HIV and other STDs, and health perceptions.	QT	Post-intervention
Ugarte Guevara et al. [33]	León, Nicaragua	119 males (MSM)	<b>Type and model:</b> mixed methods investigation, using a sequential triangulation design in which qualitative in-depth interviews were followed by a quantitative survey. <b>Content:</b> Fifteen participants (MSM) recruited by purposive sampling completed an in-depth interview that was then thematically analyzed. An additional 104 participants (MSM) were surveyed by means of an interviewer-administered questionnaire. The study was conducted from September 2008 to May2009. -Findings demonstrate a satisfactory understanding of HIV transmission among MSM population.	Mixed (Interviews and Questionnaires)	N/A
Van der Borgh et al. [52]	Congo, Rwanda, Brundi and Nigeria	females and males	<b>Type and model:</b> Work-based, educational and testing (individual and couple) <b>Content:</b> Comprehensive HIV workplace program (i.e. antiretroviral treatment, peer-groups, special events, etc.)	QT	Post-intervention
Walker et al. [47]	Morelos, Mexico	10954 1st year high school students	<b>Type and model:</b> School-based, educational (group) <b>Content:</b> - HIV education course with condom promotion condition (15 w/30 h) and the same course plus emergency contraceptive and access condition (16 w/32 h) (life skills teaching and UN program on HIV and AIDS).	QT -RCT	Post-intervention and one year
Wiktor et al. [40]	Abidjan, Côte d'Ivoire	559 males and females	<b>Type and model:</b> Clinical-based; educational, advice and testing (individual and group) <b>Content:</b> - HIV counseling sessions (10-15 minutes) – HIV transmission, knowledge and prevention; misconceptions and reinforce correct responses.	QT	Post-intervention and 4 months
Wilton et al. [17]	New-York, USA	338 black MSM	<b>Type and model:</b> Community based, educational and advice (group) <b>Content:</b> - 3 MV: 5 sessions intervention (behavioral and social determinants of HIV/STD risks) based on the Social Cognitive Theory, The Behavioral Skills Acquisition Model, The Transtheoretical Model of Behavior Change and The Decisional Balance Model.	QT - RCT	3 and 6 months

Wolitski et al. [25]	California, Mississippi, Rhode Island, and Wisconsin; USA	522 young incarcerated males	<b>Type and model:</b> Community-based (prison), educational and advice (individual) <b>Content:</b> included prevention case management and motivational interviewing and harm reduction - Single session intervention: 60-90 minutes individual session based on a brief HIV assessment and risk reduction planning intervention. - Enhanced intervention: 2 schedule individual sessions before (60-90 minutes) release and 4 after release (30-60 minutes).	QT	1, 12 and 24 weeks
Wolitski et al. [25]	New-York City and San Francisco; USA	811 gay and bisexual HIV+ males	<b>Type and model:</b> Community-based, educational and advice (group) <b>Content:</b> - Six peer-led sessions (3 h) that addresses sexual and romantic relationships, HIV transmission, drug and alcohol use, assumptions about HIV status of sex partners, disclosure of HIV status and mental health.	QT - RCT	3 and 6 months
Zhang et al. [20]	Anhui, China	218 MSM	<b>Type and model:</b> Community-based, educational and advice (group) <b>Content:</b> - Based on AIDS Risk Reduction Model (4/1.5 h sessions with activities), sessions included: behavioral labeling and evaluating individual high risk behaviors, developing individualized plans to make commitment to change high risk behaviors, emphasized taking actions to change high risk behaviors.	QT	3 months

QT: Studies using a quantitative design; QL: Studies using a qualitative design; RCT: Randomized controlled trials; MSM: Men who have sex with men

**Table 1:** Preventive interventions overview and descriptive findings.

of articles was as follows: USA (30), South Africa (2), India (1), United Arab Emirates (1), Angola (1), Peru (1), Canada (2), UK (1), Nigeria (1), Tanzania (1), Senegal (1), Puerto Rico (1), Mexico (1), Côte d'Ivoire (1), China (1), Nicaragua (1), Thailand (1), and multi-African countries (Congo, Rwanda, Burundi, Zambia, Uganda, Kenya, South Africa, and Nigeria) (2). The studied interventions were targeting specific groups such as MSM, gay men, bisexual males and males living with HIV/AIDS. Among the selected articles, 41 were targeting only males and 9 had a female group for comparison. The interventions were of two categories: (1) general educational approaches providing information on HIV/AIDS, sexual health counselling, motivational interviews and behavioral skills development tools; and (2) Clinical preventive approaches combining health education and clinical examination or testing.

These interventions were delivered in different types of settings, 31 articles explored community-based interventions while 5 articles explored clinical-based, 5 explored school-based, 4 were work-based and 5 were provided through electronic channels (website or cell-phone).

### Analytical synthesis of evidence

Based on information extracted from the 50 selected articles, we identified some general trends that have implications for future research and practice. First, we identified a trend of evidence on the duration of effective interventions. HIV/AIDS face-to-face education sessions are more effective if their duration is less than 1 hour per session. Second, both individual and group based educational, counseling and psychosocial support strategies showed a positive impact on sexual risk behavior change strategies among men. Third, strategies targeting raising awareness and adopting screening behaviours (HIV testing among MSM) are shown to be effective. In the following, we will present the evidence synthesis in respect to intervention delivery setting: community-based, clinics-based, school-based, work-based and electronic-based interventions.

**Community-based interventions:** Among the 50 selected articles, 30 were exploring community-based interventions. These interventions were very heterogeneous in terms of type of prevention activities, targeted group and model of delivery. Indeed, 6 articles were conducted

for specific MSM from ethnic and/or racial minority populations in the United States of America (USA). Four HIV prevention interventions for black and African American men led in USA were selected [14-17]. Taken together, these interventions, which consisted of either counseling sessions and/or group educational sessions, were found effective in increasing condom use and decreasing risky sexual behaviors. Furthermore, two studies targeting Latino men [18,19] were found effective in decreasing risky sexual behaviours through their educational interventions as was a peer-led educational and HIV testing study conducted in a Chinese setting [20]. In addition, four more prevention interventions studies were found effective in decreasing risky sexual behaviours through behavioural, cognitive, individual and/or group counseling sessions [8,21-23]. Community-based interventions targeting gay men and bisexual men showed that peer-led behavioral educational interventions [24,25] are not particularly effective in decreasing unprotected sex among HIV positive gay and bisexual men. An RCT compared short (8 weeks) and mid-term (20 weeks) effectiveness of a multi-session group work for HIV prevention (4 group sessions, of 7 hours each), on safe sex in a context of sadomasochistic (SM) sex intercourse. This intervention is provided in a volunteer-led organization and aims to promote gay men's health through actions designed to meet the objectives of "Making It Count", a governmental program. This intervention was found effective in increasing knowledge, skills and attitudes [9]. However, this RCT has several limitations: the sample was exclusively white gay men, well-educated, it mixed men with different HIV status (HIV positive, HIV negative and HIV non-tested), and the age ranged from 24 to 70 years. A theory-based intervention, using the "Transtheoretical Model of Behavior Change" and the "Theory of Reasoned Action", for HIV positive young men and adolescents with haemophilia was found effective in increasing safer sex behaviors [26]. Two studies conducted in South Africa, which aimed to decrease domestic violence and HIV risk reduction through educational workshops [27] and a theory-based intervention [28], were found effective in increasing knowledge, attitudinal change, perception of stigma and/or risk reduction self-efficacy. One study explored an enhanced multisession intervention providing individual educational and advice sessions (including prevention case management and motivational interviewing and harm reduction) to MSM (18 to before and after prison release [29]. HIV

prevention information was integrated with more general information on competing issues affecting MSM's ability to successfully re-enter the community after prison release. This large study revealed lower reported rates of unprotected sexual intercourse with main partners in the enhanced intervention group. Two studies explored the effectiveness of interventions for HIV positive men with hemophilia and their female partners [30,31]. Parson et al. [30] found significant differences with regards to safer sex behaviors, communication and condom self-efficacy after a mixed intervention (individual sessions and group sessions). Aggarwal and Duggal [31] tested a complex health-education intervention in a rural community. The intervention was based on health education activities consisting of 6 reproductive tract infections (RTI) or STD camps (2 in each village) including vaginal examination and free medication, one-on-one counseling, 20 interactive health education sessions (talks) and distribution of health pamphlets (RTI and HIV/AIDS) in simple vernacular language. The follow-up at 1 and 24 months after intervention showed no effective impact on increasing the average total knowledge score in men.

In a large study in the USA [32], the development of an intervention discussed; an intervention to help CBOs (community-based organizations) implement the MP (Mpowerment Project, a community-level, evidence-based HIV prevention intervention for young gay/bisexual men that is a combination HIV prevention approach: small groups, community outreach, publicity, a drop-in center, and community mobilization). Mathematical modeling has demonstrated that MP is one of the intervention strategies with the potential to prevent the greatest number of new HIV infections in the US in a cost effective manner. The program has been implemented in over 150 US CBOs. They called this intervention Mpowerment Project Technology Exchange System (MP TES). The seven-component MP TES was provided to 49 CBOs implementing the MP that were followed longitudinally for up to two years. They found that except for the widely used program manual, other program materials were used early in implementing the MP and then their use declined. In contrast, once technical assistance was proactively provided, its usage remained constant overtime, as did requests for technical assistance.

In a study in Nicaragua Ugarte Guevara et al. [33], findings demonstrate a satisfactory understanding of HIV transmission among MSM population, 75% of whom reported concerns of becoming infected with HIV in the future. Approximately one-half claimed that they always used condoms when having sex with men, but only one-third of the time with women, indicating inconsistent condom use.

Having an understanding of the risks associated with searching for partners online, and how and why YMSM use the Internet for a variety of purposes, can inform the development of more effective Internet-based risk reduction programs. Kubicek et al. [34] in their study, showed that YMSM (young MSM) used the Internet to find information related to sex and sexuality; and how YMSM researchers and interventionists can identify how to most effectively reach YMSM through online methods.

Participants in a large study in the USA [35] reported that the Internet filled an important and unmet need for sexual health education. There was no evidence of increased risk behaviours with partners met online, but at the same time the potential for the use of the Internet to facilitate safer sex communication was largely untapped. Their findings generally present an optimistic picture about the role of the Internet in the development of sexual health among young MSM.

The results of these two studies regarding the Internet use by MSM

and especially Young MSM can be used effectively in developing the prevention intervention for HIV/AIDS and promotion of sexual health plans in rural areas. In these areas, where people live in small communities that some times are far from major health promotion facilities, the on-line intervention and educational methods can reach lots of people particularly the young men. Both of these studies found that young MSM made extensive use of the Internet to find sexual health information.

In Tanzania approximately 6% of the adult population are infected with HIV, but fewer than 30% of adults reporting ever receiving an HIV test. In a formative study, Njau et al. [36] assessed the acceptability of a home-based couples counselling and testing (HBCCT) approach in rural settings in Northern Tanzania. HIV testing is considered as gateway to HIV prevention. An HBCCT intervention appears to be broadly acceptable among participants. Their findings are promising for interventionists in rural areas, although cultural differences should be considered in individual communities or countries.

In a study regarding PrEP (Pre-Exposure Prophylaxis) for HIV in MSM couples [37], Findings suggest that those at greatest risk may not be receptive of PrEP. Those who engage in moderate risk express more interest in PrEP; however, many voice concerns of increased risk behavior in tandem with PrEP use. Results indicate a need for further education of MSM communities and the need to determine appropriate populations in which PrEP can have the highest impact.

Philips et al. [4] in their commentary article, proposed development of a comprehensive HIV prevention program based on COPH (Community-Oriented Public Health). COPH is the discipline that applies population health principles in the context of the community's health. It deals with the identification and analysis of the health status and its determinants in a particular community, group of communities, or geographic region. It is followed by interventions addressing the community's health needs and their determinants through promotion, and prevention actions through multidisciplinary and intersectoral Cooperation.

**Clinical-based prevention interventions:** Clinical-based interventions are mainly provided in primary care clinical settings or public health clinics providing prevention services. Six clinical-based prevention interventions were included in this scoping review. Interventions consisting of HIV counseling/testing and group educational sessions were found effective in decreasing risky sexual behaviors, decreasing stigmatized beliefs, increasing HIV testing and/or increasing reported condom use in gay men, bisexual men and heterosexual men [38-40]. These studies were conducted in different countries involving a wide range of strategies. We also identified a complex prevention intervention for youth living with AIDS that was clinic-based and included numerous educational sessions targeting health in general and social responsibility [41]. This intervention was found ineffective in improving positive lifestyle changes and active coping styles in men. Finally, a coping effectiveness training intervention was found effective in decreasing perceived stress/burnout and increasing coping self-efficacy in HIV positive MSM [42].

In their article, Sikkema et al. [3] introduce a plan for secondary prevention of HIV infection in newly diagnosed MSM. From a behavioural perspective, the first year after receiving a diagnosis appears to be a critical period for risk reduction, particularly for men. Failure to take advantage of this "teachable moment" may be a missed opportunity to reduce HIV transmission risk at a critical

period. Given the disproportionate burden of HIV among MSM, the benefits of early intervention for positive prevention, and the paucity of research in this area, there is an urgent need for the development and evaluation of HIV positive prevention interventions that can be delivered to newly diagnosed MSM in the HIV primary care setting. The primary objective of their study was, in partnership with a large non-profit community health center, to develop, pilot test, and assess the potential effectiveness of a theoretically-based brief risk reduction intervention to reduce HIV transmission risk among newly diagnosed MSM. They explored whether the intervention reduced sexual risk behaviour, substance use, traumatic stress related to being diagnosed with HIV, and increased uptake of services offered at the community health center. Consistent with the literature, many individuals in their study reduced risk behaviour immediately post diagnosis. However, continued transmission risk behaviour was evident among a subset of this high-risk sample. This is of particular public health significance as a large proportion of the sample was likely recently infected with HIV and a significant portion had a high viral load. Participants in the intervention condition, compared to the control condition group, reduced their number of sexual partners and use of alcohol [3]. Secondary prevention can be considered as an important part of the prevention intervention plans in rural areas.

**School-based prevention interventions:** School-based prevention interventions have the potential to reach large numbers of young boys before or during their first sexual experiences. Through educational-based programs, the target population could acquire skills and tools for HIV/AIDS infection risk reduction and prevention. Frequently, school-based interventions aim at reinforcing empowerment and decision-control. In this scoping review, we identified 5 school-based prevention interventions delivered in heterogeneous populations. A risk behavior prevention intervention for college students using normative feedback and goal setting was effective in increasing reported condom use in men [43]. The other studies retrieved showed mixed results. For instance, a peer-led workshop on HIV/AIDS knowledge and attitudes was found less effective in men than in women [44]. Educational sessions were found effective in increasing knowledge, self-efficacy, behavior intention and/or self-reported behaviors in young boys who were involved in less risk (e.g. not yet sexually active) at study enrollment [45,46]. However, these interventions showed less effectiveness on intention to practice safe-sex behaviors among young boys reporting previous sexual experience. Finally, a life skills teaching intervention, based on a combination of a local educational program and a UN program on HIV and AIDS, showed that young boys (in high school) reported using a condom with a sex worker or a casual partner more often than those in the control group although efficacy results were limited [47].

**Work-based prevention interventions:** Work-based prevention interventions have been shown to be an effective way to engage men in health promotion in the context of the working day, having the advantage of reaching people in their work environment without having to attend meetings or sessions after work hours [48].

Four work-based prevention interventions were selected in this review. Two military-setting interventions, involving men, found divergent results. A cognitive-behavioral skill-building interactive group session was found ineffective in influencing motivation or behavioral skills factors [49] while a 5 day military focused HIV prevention intervention was effective in reducing reported risky sexual behaviors and increasing HIV/AIDS knowledge [50]. Furthermore, a peer-mediated education and condom distribution program in male transport workers has been shown effective in altering AIDS related

knowledge, attitude and behavior [51]. Finally, long-term, voluntary, individual or couple counseling and HIV testing was found to be less successful in reaching male employees than female employees [52].

**Electronic-based prevention interventions:** Electronic based prevention interventions can facilitate reach to large populations through the web or through other sources such as phones and mobile devices. These types of outreach media have the advantage of offering interventions in an anonymous way; important considering the high stigmatization around HIV/AIDS and the merits attached to privacy and confidentiality in health services for men [53]. Five electronic-based prevention interventions for MSM were selected in this review search. Computer-based individual online educational videos, interactive virtual environments and internet modules are effective in increasing HIV testing, knowledge and/or reported safer sex practices in men [54-56]. Furthermore, individual cell phone reminders and telephone based brief counseling interventions using a motivation interviewing style are effective in improving knowledge, antiretroviral therapy adherence and/or reported safer sex practices in men [57,58].

In two community-based studies that were mentioned earlier in this review [34,35], though they didn't propose any prevention intervention plan for HIV/AIDS, their findings are promising about using electronic-based technologies to develop new intervention plans. They found that among MSM and especially young MSM Internet has an important role in finding sexual health information. They explored the role of the Internet in the sexual health of ethnically diverse young MSM. Quantitative results from a large survey of young MSM that tested HIV negative in a community clinic demonstrated high level of Internet use. The vast majority of the participants used the Internet a minimum of several times each week. Similarly, use of the Internet to find HIV/AIDS information was very common. A unique finding in their study was the sexual orientation differences in frequency of Internet use, with MSM using the Internet significantly more frequently (daily use MSM=77%, non-MSM=60%) [35]. Additionally, their data provide an opportunity to see how young MSM use a variety of different media within the Internet. Understanding what is attractive to young men (e.g., photos, insightful profiles) can be useful when considering web-based interventions [34].

## Discussion

Unfortunately, both Canada and the United States have concentrated epidemics of HIV/AIDS. The sexual minorities (including MSM) continue to carry the largest burden of HIV in both Canada and the United States [4]. According to the United Nations General Assembly, the political declaration on HIV/AIDS calls for each country to "define the specific populations that are key to its epidemic and response, based on the epidemiological and national context". Recognizing health care in equities and disparities among sexual minorities offers a glimmer of hope that the health needs of these communities will be addressed. The men and especially MSM is a distinct population group with its own specific health needs. Furthermore, the experiences of individuals are not uniform and are shaped by factors of race, ethnicity, socioeconomic status, geographical location, and age, any of which can have an effect on health-related concerns. Additionally, the identification of a need to improve medical and health sciences education related to community and sexual minority health across North America is promising for the development of HIV prevention interventions tailored to the needs of communities. Researchers still have a great deal to learn and face a number of challenges in understanding the health

needs of sexual minority populations [4]. The practical application of COPH (Community-Oriented Public Health) in the development of a comprehensive approach to HIV prevention among sexual minority communities starts with strategic planning. Strategic planning entails the development of plans that include analysis of intervention alternatives and available resources to best address priority health issues in the community. The COPH function of adapting policies to the local level entails adapting national policies to the specific community's needs and the local scene and culture (i.e., context). These functions provide the basis for conducting a community health assessment. The community health assessment process begins with the identification of existing data sources and the initiation of studies to gather new information about the community's health status and its determinants, needs, and assets. This process includes the performance of health surveillance and an analysis of equitable service provision, gaps in services provided, and health inequalities. For instance, based on the available health surveillance data for British Columbia, the provincial response to HIV prevention should be tailored to the community needs of the priority populations of sexual minorities, injecting drug users (IDU), and Aboriginal people. In New Brunswick, we need up-to-date health surveillance data for making a strategic plan.

Each of the community health assessment findings must be addressed in the development, implementation, and evaluation of comprehensive COPH (Community-Oriented Public Health) HIV prevention interventions. In the development, implementation, and evaluation of a comprehensive COPH HIV prevention intervention, the governments should be encouraged to explore the use of a participatory contextual analysis. A participatory approach to the development of a comprehensive COPH HIV intervention engages communities in the process of problem solving, builds on local knowledge, and generates an indigenous response that is sustainable [4].

This scoping review aimed to identify effective HIV/AIDS prevention interventions targeting the male population. The extracted information has demonstrated mixed results. However, and importantly, the majority of interventions have been shown to be effective in improving knowledge, attitudes and behaviours.

For clinic based interventions, our scoping review showed that there is a paucity of knowledge on when, what and how HIV related information and counselling should be provided to target populations. Moreover, there is lack of evidence on who should provide this information, nurses or general practitioners.

Prevention with persons living with HIV/AIDS (PLWHA), commonly referred to as secondary or positive prevention, has become a central component of a multipronged approach to fighting the HIV epidemic. With regard to MSM, studies indicate that over 50% of recently diagnosed MSM report sexual risk behavior within 3-12 months of diagnosis and while the majority respond to their HIV diagnosis by adopting lower risk sexual behaviors, a substantial proportion continue to engage in high risk sexual behaviors. Evidence suggests that positive prevention efforts should target people soon after HIV diagnosis. The newly diagnosed may include those with recent infection, and has been linked to nearly 50% of primary infections in some predominantly MSM populations [3].

To improve school-based interventions, they have to be implemented earlier in adolescence, before the onset of risky behaviors. However, young people are reluctant to use sexual health services and may need to be reassured about privacy and confidentiality to have positive impact

on safe sex-behavior [59]. Electronic or computer-based interventions offer an interesting avenue and “*may serve as a complementary part of an overall behavioral and biomedical strategy for reducing sexual risk by addressing the specific needs and circumstances of the target population, and by changing individual knowledge, motivations, and community norms*” [60].

Understanding what is attractive to MSM can certainly inform the development of new and innovative web-based interventions, which are becoming increasingly important given their potential to reach a larger audience and have greater impact. More interactive web-based spaces should also be considered, such as chat rooms and virtual environments where MSM can learn from their own and others' ideas [34]. Individual online educational videos, interactive virtual environments and internet modules were effective in increasing HIV testing, knowledge and/or reported safer sex practices among MSM. Individual cell-phone reminder and telephone-based brief counseling interventions using a motivation interviewing style are also effective in improving knowledge, antiretroviral therapy adherence and/or reported safer sex practices in MSM. Work-based interventions are an adequate strategy to reach men. Evidence on effectiveness of strategies among military men is controversial. Moreover, some peer-led behavioural interventions showed low effectiveness among gay men. Finally, it is to be noted that interventions designed for men only, showed clear effectiveness compared to interventions targeting both men and women. Not surprisingly, this demonstrates that health interventions need to be gender-sensitive to men's needs as well as women's needs when developing and implementing health promotion options.

In summary, most interventions identified in this review have shown to be effective in improving knowledge, attitudes and sexual behaviors in men. None of the studies explored predictors of non-compliance to safe sex and HIV testing behavior among men in general. But, some of them have highlighted barriers and facilitators for achieving the goal of an HIV-free generation among sexual minority communities including MSM. They have been critical of the approach taken by the governments to respond to their concentrated HIV epidemics using a population-based public health approach that is targeted to the general population rather than specific communities that are most affected by HIV [4]. E-Health prevention interventions seem particularly effective among men. HIV studies follow a trend in terms of the elements that make for effective interventions: (1) target secondary prevention and (2) target specific populations such as MSM, gay males and HIV positive men. There is a clear need for evidence on effective strategies to improve HIV testing and to support safer sex among men of all sexual orientations. We need to rethink public health strategies and primary care, using a gender main stream analysis integrating context (rural/urban), cultural and social context (hegemonic masculinity) and sexual orientation (gay/non gay), to help improve men's health and reduce gender inequities. Moreover, sexual behavior and help seeking (i.e. utilization of healthcare services and social support) are negatively impacted by dominant heteronormative cultural ideals [61].

Lessons to be learnt, by New Brunswick, from international experiences for HIV prevention among men are in relation to: (1) Developing more men sensitive HIV prevention interventions; (2) Designing multi-faceted HIV prevention approaches targeting men; and (3) Integrating technology in public health interventions targeting men. However, before designing “one size fits all” interventions more research is needed to explore the social context of NB men to better understand the existing association between culture, beliefs, values,

language, etc. and health care use behaviour in NB men. Moreover, there is a clear need for a better understanding for specific factors such as organizational factors (i.e. access to healthcare services, men-sensitive public health programs, men-targeting health promotion and education intervention) and professional factors (i.e. men's health awareness, men-sensitive health communication skills).

This study aims to identify major trends in men-oriented HIV prevention interventions to help develop a structural basis for a comprehensive program for a rural Canadian context. However, this scoping review has some limitations. The first limitation relates to the diversity of included interventions. We have decided to include a wide range of interventions instead of focusing on only one type to explore all facets that might need to be included in a comprehensive strategy for HIV prevention among men. The last limitation is the heterogeneity of studies in terms of geographic location. Organizational, clinical and socioeconomic and cultural factors have a major impact on how to design, deliver and assess effectiveness of an intervention. However, reviewing studies from different countries can be considered as one of the strengths of this scoping review. It provides comprehensive information and a wide range of potential interventions that can be rethought and adjusted to particular contexts, such as rural and remote areas in Canada. Moreover, it adds to our knowledge about the major components of comprehensive and integrated plans to consider for NB. But, at the same time, differences in terms of organizational structure, economic condition, and cultural and social determinants have to be considered when it is time to develop and design an intervention model for New Brunswick. We call here for local NB studies to explore adequacy, appropriateness and relevance of the strategies identified in this study. More research will be needed to assess their feasibility, acceptance and effectiveness among NB men.

## Conclusion

Canada has concentrated epidemics of HIV/AIDS. A concentrated epidemic is one in which the prevalence of HIV is firmly established in one or more subpopulations but not the entire population. Operationally, in a concentrated epidemic, HIV prevalence among specific subpopulations consistently exceeds 5% of that subpopulation but is below 1% among pregnant women in urban areas. The distinction between different kinds of HIV epidemics provide health officials and public-policy makers with data about the magnitude of the problem that HIV represents in their jurisdictions. This information can help health officials and public-policy makers to devise strategies for prevention of new HIV infections and can guide resource allocation to individuals and groups most in need. When epidemiologic evidence is available and used appropriately, the result is evidence-based health care. By design, population based public health interventions may not use community-based needs assessments and are based on aggregate data. Given these limitations, population-based public health reduces the likelihood of gaining sufficient information to target populations that are most at risk, are not sustainable public health approaches, and may not be the best or most efficient use of public health resources. This creates unique challenges for populations at risk for HIV, because public health resources are mobilized inequitably and target the entire population rather than individuals and groups most at risk for acquiring the disease. Sexual minorities, including MSM, continue to carry the largest burden of HIV in Canada. Using available epidemiological data and understanding the national and regional contexts in which the populations at risk live, HIV prevention interventions can be tailored to the needs of priority populations. This strategy will provide

health care systems with the most efficient community-oriented HIV prevention interventions. Men, and especially MSM, are a distinct population group with their own specific health needs. For New Brunswick we propose the development of a comprehensive HIV prevention program based on community-oriented public health (COPH). COPH is the discipline that applies population health principles in the context of the community's health. It deals with the identification and analysis of the health status and its determinants in a particular community, group of communities, or geographic region. It is followed by interventions addressing the community's health needs and their determinants through promotion, and prevention actions through multidisciplinary and intersectoral cooperation. It is described by definition, as community-based and acting through different environmental "settings where people live, study, work, receive care, or spend their leisure time"; in short, the environmental context. COPH requires the application of specific functions to guide comprehensive HIV prevention program design, implementation, and evaluation. These functions include strategic planning; adapting policies to the local level; community health assessment; development, implementation, and evaluation of interventions; service-oriented research; capacity building; and coalition building. The practical application of COPH in the development of a comprehensive approach to HIV prevention among communities starts with strategic planning. Strategic planning entails the development of plans that include analysis of intervention alternatives and available resources to best address priority health issues in the community. These functions provide the basis for conducting a community health assessment. The community health assessment process begins with the identification of existing data sources and the initiation of studies to gather new information about the community's health status and its determinants, needs, and assets. This process includes the performance of health surveillance and an analysis of equitable service provision, gaps in services provided, and health inequalities. A participatory approach to the development of a comprehensive COPH HIV intervention engages communities in the process of problem solving, builds on local knowledge, and generates an indigenous response that is sustainable. The next function of COPH, service-oriented research, provides the basis for health assessments, intervention program development, program evaluation, and continued HIV disease surveillance. Capacity and coalition building are the final functions of COPH. Effective capacity building not only includes work force preparation in the methods needed but also considers the indigenous knowledge and understandings of the health problem inherent in the affected community. Coalition building in the form of establishing partnerships among all community stakeholders (e.g., members of the affected community, health services, other social services) facilitates the pooling of human and economic resources that contribute to the sustainability of COPH programs [4]. Health-care workers in the primary care clinics should have a good knowledge of HIV/AIDS and especially the most recent epidemiologic data in their communities. They should know about the high-risk population and their health needs. There is a good opportunity to discuss about sexual health including HIV/AIDS when people come for HIV testing. These clinics are an essential part in implementation of prevention interventions and particularly in the secondary prevention. They are also good places for researchers to collect epidemiologic data and study the different intervention plans. In New Brunswick, these clinics are not usually crowded and time for sexual health education could be scheduled.

There is a need to design RCTs protocols that explore men's

responsiveness and compliance to HIV/AIDS prevention strategies and to launch a multidisciplinary Research Program to address demographic, geographic (rural versus urban), social, psychological, organizational and policy issues of men's sexual health services in New Brunswick. More research is needed to identify relevant and optimal effective strategies to be used by health professionals to raise HIV awareness. Such strategies have to be not only sexual orientation sensitive, but also culture, literacy and economic situation sensitive to adapt the message in terms of format, content and delivery mode.

There is also a need to develop research agendas to better clarify why and how men acquire, synthesize and embed sexual health information and transform it into healthy behaviors and to consider what determinants may influence (positively or negatively) this process. Furthermore, there is a need for more evidence on the efficacy of e-health or the so called mobile-Health (or m-Health) prevention interventions. Considering the expansion of the technologies and electronics resources available (i.e. smartphones, electronic tablets, etc.) and their popularity, such media could be used to increase effectiveness within prevention programmes which aim to reach men and particularly male adolescents.

Rethinking public health strategies and primary care, using gender based analysis which integrates context (rural/urban), sexual orientation (gay/non gay) and culture, may help improve men's health and reduce gender inequities [62,63]. The design and development of gender sensitive public health programs as well as the implementation of equitable and ethically sound policies to improve men's sexual health are essential. In addition, fostering a better understanding of the political implications of men's sexual health in Canada and in New-Brunswick may help public health authorities to develop more effective male-friendly services and programs. There is an urgent need for accurate evidence to develop evidence-based criteria and guidelines for clinical practices integrating male perspectives. These clinical strategies and tools have to target not only HIV but also other health issues. Building effective personalized preventive medicine practices for men will call for a better understanding of how men process health information and what factors may impact the shift from knowledge and attitude to behavior and lifestyle change and safe sex behavior maintenance.

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