

# Testing interventions for HIV and sexually transmitted infections (STIs) among young men who have sex with men

## Question

What are effective interventions to increase uptake of HIV and sexually transmitted infections (STIs) testing among young men who have sex with men?

## Key Take-Home Messages

- In Canada in 2018, 63% of all HIV diagnoses among youth were attributed to gay, bisexual, and other men who have sex with men (1); similarly, in the U.S. in 2018, 92% of HIV diagnoses among youth were attributed to male-to-male contact (2).
- In general, testing uptake for HIV (3, 4) and STIs (5, 6) is low among young men who have sex with men.
- Several studies found that healthcare providers may play an important role in HIV test uptake among young men who have sex with men (7–10).
- *Mpowerment* (11) and *Keep It Up! 2.0* (12), two interventions identified in the Centers for Disease Control and Prevention’s (CDC) Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention, are intended to increase testing among young men who have sex with men.
- Some interventions, such as *All About Me* (13) and *Get Connected!* (14), tailor HIV testing options from baseline data by using a computer algorithm that takes into consideration individual characteristics relevant to participants’ behaviours through an assessment and deploys these algorithms to generate intervention messages relevant to the specific needs of each user (14).

## Rapid Response: Evidence into Action

The OHTN Rapid Response Service offers quick access to research evidence to help inform decision making, service delivery, and advocacy. In response to a question, the Rapid Response Team reviews the scientific and grey literature, consults with experts if required, and prepares a review summarizing the current evidence and its implications for policy and practice.

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- Other interventions described in the literature include a peer-based component to increase HIV testing among young men who have sex with men (11, 15–18).

## The Issue and Why it's Important

In Canada in 2018, youth aged 15–29 accounted for 24% of all new HIV diagnoses; among youth who identified a risk factor, 63% of infections were attributed to young gay or bisexual men who have sex with men (1). Similarly, in the U.S. in 2018, 21% of new diagnoses of HIV were among youth aged 13–24; of these, 92% were attributed to young men who have sex with men (2). Furthermore, using data from 2010 to 2015, the CDC estimated that 51.4% of individuals living with undiagnosed HIV are among youth aged 13–24 (19). HIV testing is important, as identifying the virus encourages linkage to care for antiretroviral therapy, in addition to preventing secondary transmission (4, 20).

Trends in the uptake of HIV and STI testing among young men who have sex with men is well-established in the literature:

- A systematic review among studies (n=32; 2005–2014) reporting HIV testing behaviours among Internet-using men who have sex with men in the U.S. (n=83,186) found that younger men (aged <30) were less likely to have tested for HIV (4).
- 2010 data from a Dutch STI surveillance database found that in STI clinics, never being tested for HIV was associated with being younger (n=3,800; aged 16–76) (21).
- A study conducted in 2012 in the U.S. among men who have sex with men (n=1,170; aged ≥18) found that younger age was significantly associated with never having tested for HIV (22).
- Data from the 2014 American Men’s Internet Survey found that young age was significantly associated with unknown HIV status (n=9,170; aged ≥15) (23).
- A study analyzed testing characteristics of adolescent men who have sex with men in the U.S. who were given CDC-funded HIV tests in non-healthcare facilities in 2015; of the 703,890 tests that were delivered, 6,848 (0.9%) were among those aged 13–19 (24).
- In terms of bacterial STIs (chlamydia, syphilis, and gonorrhoea), data from a 2015 U.S. survey found that among adolescent men who have sex with men (n=428; aged 13–18), “...STI screening was suboptimal and STI burden was significant” (5).

## References

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- Another U.S. study, conducted in 2017–2018, found that bacterial STI screening rates among men who have sex with men were lower among adolescent and young adult participants (n=2,572; aged 15–65) (6).
- A meta-analysis (n=67; 1996–2018) examining various testing patterns among U.S. Black men who have sex with men (n=42,074) found that younger age “...was correlated with lower lifetime/recent HIV testing prevalence” (3).
- A retrospective chart review in a sample of adolescents living with HIV (n=301; aged 14–26) – where 81% (n=248) identified as men who have sex with men – found a high rate of missed opportunities for HIV testing in the year prior to diagnosis (25).
- The *MSM Testing Initiative* (2012–2015), a project funded by the CDC, found that 66.5% of first-time testers were among men who have sex with men younger than 30 years (26).
- Research done in British Columbia using surveillance and laboratory data examined HIV case counts and testing characteristics among gay, bisexual, and other men who have sex with men, comparing data between those under the age of 30, and those aged 30 and older (27). Unlike most of the body of the evidence, the results suggested that gay, bisexual, and other men who have sex with men diagnosed with HIV under the age of 30 have better testing practices compared to those who are diagnosed at older ages (27).

Generally, it appears that the uptake of HIV and STI testing is low among young men who have sex with men. Despite these findings, the CDC has no guidelines that recommend an HIV testing interval specifically for *young* men who have sex with men (28–30). The latest recommendation for HIV testing frequency among men who have sex with men (aged 13–64), was established in 2006 (28), and suggests that screening occur once per year (28, 31). An article published in *Morbidity and Mortality Weekly Report* in 2017 details the decision not to change these guidelines, stating that there is insufficient evidence to recommend screening more frequently than once per year for this particular population (28). At the same time, the CDC states that sexually active gay and bisexual men may benefit from more frequent testing, for example, every 3 to 6 months (32), and each clinician can consider the benefits of offering more frequent screening to individual at increased risk for acquiring HIV infection, weighing their risk factors, local HIV epidemiology, and local testing policies (28).

According to one study, testing every three months for high-risk young men who have sex with men may be ideal: Neilan *et al.* (2020) found that HIV screening every three months was cost effective when compared to the status quo, and could result in a 40% reduction in primary transmission among men who have sex with men up to 30

6. Jenness SM, Weiss KM, Prasad P, Zlotorzynska M, Sanchez T. Bacterial sexually transmitted infection screening rates by symptomatic status among men who have sex with men in the United States: A hierarchical Bayesian analysis. *Sexually Transmitted Diseases*. 2019;46(1):25–30.
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11. Centers for Disease Control and Prevention. Mpowerment. 2020. Available from: <https://www.cdc.gov/hiv/effective-interventions/prevent/mpowerment/index.html> Accessed September 21, 2020.

years of age (29).

This review explores factors associated with HIV and STI testing among young men who have sex with men, their testing preferences, and presents several interventions that may increase uptake of HIV and STI testing in this population.

## What We Found

In the literature, “young” typically encompasses men in their mid-teens to mid-twenties, though some publications include men up to the age of 30, as in the case of the Neilan *et al.* study (29); another study among “young” men includes participants up to age 34 (16). Nonetheless, there is a plethora of academic literature describing HIV testing behaviours among young men who have sex with men.

### Factors associated with testing

A large number of studies examined factors associated with testing behaviours among young men who have sex with men. Some of these studies reported similar results, while others had more unique findings:

- Data collected in 2018–2019 among young men who have sex with men in the U.S. (n=699; aged 13–18) found that HIV testing increased with age, and that sexual experience was a strong predictor of testing; furthermore, 75.4% of participants who had HIV testing conversations with a doctor had received tests (8).
- In a U.S. study completed in 2012–2017 on a sample of young men who have sex with men in relationships (n=430; aged 18–29), authors found that rural participants were less likely to have been tested for HIV/STIs compared to urban participants (33).
- A survey from 2011–2013 among young Black men who have sex with men in Texas (n=1,565; aged 18–29) found that binge drinking was independently associated with lower odds of recent testing for HIV, but that engagement in spiritual and religious activities was associated with greater odds of HIV testing (34).
- A qualitative study conducted in Scotland in 2012–2013 among young men who have sex with men (n=30; aged 18–29) found that social support plays an important role in encouraging and facilitating HIV testing, while social norms of non-testing can act as a barrier (35).
- A U.S. study conducted in 2017 on a sample of young men who have sex with men (n=198; aged 14–17) found that participants with physicians who initiated discussion about their sexual orientation were more likely to have received testing for HIV and STIs and other preventative services (7).

12. Centers for Disease Control and Prevention. Keep It Up! 2.0. 2018. Available from: <https://www.cdc.gov/hiv/pdf/research/interventionresearch/compendium/rr/cdc-hiv-keep-it-up-best-rr.pdf> Accessed September 22, 2020.
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- One study found that the likelihood of testing for HIV may be increased if young men who have sex with men received sex education from parents and health care providers on specific topics such as condom use (n=323; aged 15–24) (10).
  - A survey among young men who have sex with men and transgender women (n=752; aged 15–24) found that reporting a non-gay identity and anticipating HIV stigma were associated with delaying HIV testing, especially among Black and Hispanic participants (36).
  - A focus group discussion conducted with young men who have sex with men in Nevada (n=11; aged 18–24) found that the primary barrier to HIV testing was lack of awareness or knowledge about testing for HIV; other barriers included access issues, stigma, and testing environments that are unfriendly for young people (37).
  - An Internet-recruited sample of young men who have sex with men in the U.S. (n=302; aged 14–18) found that fear and a lack of knowledge about the closest testing site were barriers to HIV testing (38).
  - A qualitative study exploring barriers and facilitators to HIV testing among young Black men who have sex with men (n=36; aged 18–30) found that including information on self-risk and pre-exposure prophylaxis (PrEP) alongside HIV testing campaigns may be useful, as this may help young men to better understand their need for testing (39).
  - A sample of men who have sex with men testing for HIV for the first time (n=914; aged 18–85) in Los Angeles determined the average age for first HIV test to be 25.8 years; for White individuals it was 28.0 years, for Black/African American individuals 25.5 years, and for Hispanic individuals 24.7 years (40). Authors concluded HIV testing is occurring too late among young men who have sex with men.
  - A qualitative study among men who have sex with men in the UK (n=61; aged ≥20) noted that young men seeking STI testing were especially sensitive to feeling awkward and self-conscious (41).
  - A study among young Black sexual minority men (n=273; aged 18–30) in the U.S. who use dating apps to find a sexual partner found that testing rates were high, and that compared to non-users, app users were over two times more likely to test for HIV every 12 months (42).
  - A sample of cisgender males (n=207; aged 14–17) in the U.S found that adolescents who disclosed their male-male attraction to their healthcare provider were five times more likely to test for
17. Strömdahl S, Hoijer J, Eriksen J. Uptake of peer-led venue-based HIV testing sites in Sweden aimed at men who have sex with men (MSM) and trans persons: A cross-sectional survey. *Sexually Transmitted Infections*. 2019;95(8):575–9.
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HIV (9).

## Testing preferences

A few studies examined testing preferences among young men who have sex with men:

- A 2017 study evaluated a multisite HIV testing program, *Connect to Testing and Prevention Services*, designed to promote uptake of HIV testing and prevention among young, at-risk sexual minority males of colour (aged 13–24) (43). Adolescent primary care programs implemented HIV testing strategies that followed one of three testing approaches: universal screening in community-based and clinical settings (e.g. school-based health centres), targeted testing at community-based events (e.g., youth-focused parties), and a combination of both approaches (43). A total of 3,301 tests were completed: 15% (n=505) through the targeted testing strategy, 29% (n=962) through universal testing, and 56% (n=1,834) through the combination of thereof (43). While fewer participants were tested through the targeted testing strategy, this strategy actually reached more sexual minority males of colour compared to the other two strategies. Compared with universal screening, targeted and combination testing each identified a greater proportion of HIV infections that were previously unidentified (43).
- A study among young Black, Hispanic, and White men who have sex with men (n=425; aged 18–24), recruited from the internet (2015–2016), sought to determine if participants were more likely to complete a home-based oral fluid HIV self-test when compared to other testing methods (44). Participants were randomly assigned to three different groups: free oral rapid HIV self-test (n=142), free mail-in blood sample collection HIV test (n=142), or testing at a medical facility/community organization (n=141) (44). Results demonstrated that completion of the assigned test, willingness to refer others to one's assigned type of test, and legitimate number of referrals were greater among those in the self-test arm compared to the mail-in blood sample arm, but not in the medical facility/community organization arm. Furthermore, there were no differences in completing assigned tests across ethnicities. Authors noted their surprise that the HIV self-test “was not embraced more strongly” compared to the community organization/medical facility testing (44). Authors also noted that the mail-in blood sample collection test was not a favoured methodology in this sample (44).
- A study among young men who have sex with men in the U.S. (n=1,975; aged 18–24) found that while participants viewed oral fluid rapid HIV self-tests as favourable, past use and future intentions to use it were low, when compared with other testing options (45).

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- In a small qualitative study of young Black men who have sex with men in New York City (n=30; aged 16–29), authors explored perceptions of various HIV testing methods (46). Results showed that perceived accuracy of the testing methods, venue characteristics, and lack of experience or knowledge with newer testing options (such as self-testing) were identified as key themes relevant to testing preferences (46).
- Another small qualitative study among young Black men who have sex with men in Alabama (n=36; aged 16–35) sought to identify HIV testing preferences (47). Focus groups were conducted between 2017 and 2018. Authors found that participants preferred to be tested by a physician at a doctor’s office, but also preferred having other testing options related to location, frequency, and timing. However, testing by staff members other than physicians and self-testing at home were not favourable (47).
- A qualitative study among young Black men who have sex with men and transgender women in New York City (n=30; aged 16–29) investigated uptake and access of the HIV self-test (48). Focus groups revealed that participants found self-testing to be convenient and private when compared to venue-based testing; barriers to testing included cost of the test, correct test operation, and lack of social support in the case of a reactive test (48).
- A study in Australia examining HIV testing behaviours of gay and bisexual men (n=5,988; aged ≥16) compared characteristics of men whose last HIV test was conducted at a community-based service to men who last tested for HIV at a traditional setting (49). Authors found that younger (<30) age was independently associated with testing in a community-based setting (49).
- A study among Black and Hispanic males (n=415; aged 13–19) in three U.S. cities who reported sexual attraction to other males and/or identified as gay or bisexual found that 64.4% of participants stated that they would test for HIV if it were offered in schools (50).

## Interventions, strategies, and models

While there was an overwhelming number of approaches to increase HIV testing among young men who have sex with men, few discussed STI testing. For the purposes of this Rapid Response, studies were classified as either “general” or “population-specific”. For example, the intervention *Stick To It* (51) is for all young men who have sex with men, aged 18–26, and is described beneath the **General population** heading. *Tu Amigo Pepe* (52) specifically targets young Latino men who have sex with men, and is thus classified as **Population-specific**. The majority of studies that fell under **Population-specific** focused on young Latino men who have sex

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with men and young Black men who have sex with men.

### **General population of young men who have sex with men**

*Stick To It* is an HIV prevention intervention focused on the routinization of HIV screening, targeting young men who have sex with men (aged 18–26) (51). This mobile health intervention utilized ‘gamification’, a method that employed theory and tools from behavioural science to motivate behaviour change in a fun way. The study had two objectives: to determine acceptability of the intervention among participants, and to ascertain if an increase in repeat HIV testing was observed (51). The pilot study occurred between 2016–2017 at two sexual health clinics in California, and included four components: recruitment, online enrollment, online activities (e.g. quizzes), and in-person clinic activities. Participants earned points through online activities, and points were redeemed in-person during HIV/STI screening visits for a chance to win prizes. Authors note that engagement in the intervention was limited: while 313 men were eligible, 166 (53%) registered; of the 166, 93 (56%) completed enrollment; of the 93, 31 (19%) completed  $\geq 1$  online activity in the subsequent six months. Of the 166 participants that registered, only 19 (11%) visited the clinic during the study period (51). The evaluation data consisted of participant surveys, medical record reviews, intervention engagement data, and in-depth interviews. Despite the low level of engagement in the intervention, qualitative interviews revealed that participants were motivated by the use of games in the HIV/STI testing experience, something usually considered stressful (51). Conversely, others noted that while they saw value in the program, it was not necessarily motivating for each participant. During the follow-up period, 15 (48%) of individuals received  $\geq 2$  HIV tests, compared to 157 (30%) of a historical comparison group, which consisted of similar young men who have sex with men living in the same zip codes who received care at the same clinics before the intervention (51).

*Get Connected!* is an eHealth intervention aimed at encouraging HIV and STI testing among young men who have sex with men (14, 53, 54). Developed for men who have sex with men, aged 15–24, in Southeast Michigan, *Get Connected!* is an online HIV and STI test site locator that considers the cultural sensitivities and unique structural needs (e.g. transportation, provision of identification) of participants (14). Participants in the pilot trial were randomized to the tailored condition (n=86) or the non-tailored control (n=44) (14). The tailored condition was developed by gathering psychosocial data (e.g. age, race/ethnicity, sexual identity, relationship status, testing history and motivations, recent sexual behaviour, sources of support, and structural barriers) from the baseline assessment (14); then, a computer algorithm personalized intervention content (i.e. images and text) on the website. For example, a Black participant saw images of other Black men; a participant who had previously tested for HIV received content that reinforced the importance of repeat testing (14). Participants in the non-tailored condition did

33. Sarno EL, Bettin E, Jozsa K, Newcomb ME. Sexual health of rural and urban young male couples in the United States: Differences in HIV testing, pre-exposure prophylaxis use, and condom use. *AIDS & Behavior*. 2020 [Epub ahead of print].
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not receive any personalized, tailored content; they only received access to an online provider directory. Of the participants that completed the intervention (n=130), 80% (n=104) were retained for 30-day follow-up (13). High acceptability among participants in both conditions was observed; furthermore, 30 reported having tested for HIV/STIs at the follow-up assessment, with the majority being from the tailored condition (n=22) (53). Further analysis of this same data set found that engagement in the intervention was associated with being older, higher educational attainment, and more methods of connecting to the internet (53). Of note, a protocol outlining plans for a larger efficacy trial of *Get Connected!* was published in 2018 (55).

PRONTO! is a peer-delivered, rapid-point-of-care HIV testing centre located in Melbourne, Australia, that opened in 2013; it is in close proximity to several gay social and sex-on-premises venues (15). The primary aim of PRONTO! is to increase of the frequency of HIV testing among gay, bisexual, and other men who have sex with men. Operating on Saturdays and weekday evenings, PRONTO! is advertised as being run by gay men, for gay men. A mixed methods study was published to describe the acceptability of the peer model, and its contribution to HIV prevention, during the first 14 months of operation (15). Peer leaders facilitated the rapid-point-of-care test and discussed HIV risk reduction during the ten-minute incubation period of the HIV test; the facilitator would engage the client in discussions about recent HIV and STI exposures and HIV risk reduction strategies. Testing events were accompanied by brief behavioural surveys. Analysis of data was restricted to individuals aged  $\geq 18$ , and examined two benefits of the peer-led model: preference to test with peers (opposed to sexual health care providers) and improved HIV risk-reduction knowledge. Follow-up surveys were completed by PRONTO! clients three and six months after the service was established. Qualitative data was collected in focus groups among a sample of participants who completed the evaluation surveys. In general, authors found that a peer-delivered, rapid-point-of-care testing model was highly acceptable to gay, bisexual, and other men who have sex with men in Melbourne, and can overcome barriers to frequent testing. Additionally, authors reported that younger participants (aged 18–29) improved their HIV risk reduction knowledge, an opportunity afforded during the test incubation period (15).

*Partner Services SMS Reminder* is an intervention designed for men who have sex with men – with no focus on a particular age group – that aims to reach those with syphilis, gonorrhoea, and chlamydia via short message service (SMS) by sending quarterly testing reminders (56). In King County, Washington (2013–2018), 8,236 men who have sex with men with one or more STIs were reported by medical providers and laboratories; 64% (n=5,237) of individuals were interviewed by public health staff for the intervention, and of these, 78% (n=4,087) were offered SMS testing reminders (56). Thirteen percent (n=545) accepted the reminders, 7% (n=265) were

38. Phillips G, 2nd, Ybarra ML, Prescott TL, Parsons JT, Mustanski B. Low rates of human immunodeficiency virus testing among adolescent gay, bisexual, and queer men. *Journal of Adolescent Health*. 2015;57(4):407–12.
39. Washington TA, D'Anna L, Meyer-Adams N, Malotte CK. From their voices: Barriers to HIV testing among Black men who have sex with men remain. *Healthcare*. 2015;3(4):933–47.
40. Maitino EM, Shafir SC, Beymer MR, Shover CL, Cunningham NJ, Flynn RP, et al. Age at first HIV test for MSM at a community health clinic in Los Angeles. *AIDS Care*. 2020;32(2):186–92.
41. Datta J, Reid D, Hughes G, Mercer CH, Wayal S, Weatherburn P. Places and people: The perceptions of men who have sex with men concerning STI testing: A qualitative study. *Sexually Transmitted Infections*. 2018;94(1):46–50.
42. Rosengren AL, Davy-Mendez T, Hightow-Weidman LB. Online sex partner seeking and HIV testing frequency among young Black sexual minority men. *Journal of HIV/AIDS & Social Services*. 2020;19(1):42–54.
43. Miller RL, Boyer CB, Chiamonte D, Lindeman P, Chutuape K, Cooper-Walker B, et al. Evaluating testing strategies for identifying youth with HIV infections and linking youths to biomedical and other prevention services. *JAMA Pediatrics*. 2017;171(6):532–7.

already receiving SMS reminders from other organizations, and 80% (n=3,277) refused (56). In their analysis, authors found that uptake of SMS reminders was higher among younger men who have sex with men and was significantly higher among men not on PrEP (56).

A study among youth (n=235; aged 12–24) with high-risk sexual behaviours were recruited from homeless shelters, organizations that support sexual minorities, and community health centres in Los Angeles and New Orleans in order to test the feasibility and effectiveness of same-day testing and treatment for chlamydia and gonorrhoea (57). Participants initially received point-of-care testing and were then referred to another clinic for treatment; later in the study, participants were provided same-day treatment along with partner treatment packs. After observing a significant uptake in same-day treatment when it was provided, authors concluded that providing same-day testing and treatment for chlamydia and gonorrhoea is feasible and safe (57). However, a Letter to the Editor was published in response to this article, noting the omission of several key elements in the publication, such as cost and funding sources; additionally, the original article failed to describe patient retention, adherence, and symptomology at appointments (58).

*We Prevent* is a proposed relationship-skills focused HIV intervention for young men who have sex with men and their partners (aged 15–19) designed to increase HIV and STI testing (59). The intention to perform a randomized controlled trial in the U.S. and a description of the intervention is presented in a protocol from 2019. The intervention will be attended by both partners and will be comprised of two telehealth-delivered sessions that focus on relationship skills, couples HIV testing and counselling, and prevention planning (59).

LYNX is a mobile app intended to increase HIV and STI testing and PrEP service uptake among young men who have sex with men (aged 15–24) (60). A research protocol, published in 2019, discusses three phases to develop and refine the app: the use of focus groups to develop and optimize LYNX, an open pilot trial to optimize usability, and a six-month pilot randomized controlled trial among 60 young men who have sex with men in the U.S. who are at risk for HIV (60). The LYNX app includes an electronic diary to track sexual behaviours, a personalized risk score to promote accurate risk perception, testing reminders, access to home-based testing options and for HIV and STIs, and geospatial HIV and STI testing care sites (60).

*Project Swerve* is a motivational interviewing-based substance use brief intervention aimed to address substance use and increase HIV testing among young men who have sex with men and transgender persons (aged 15–29) in the Detroit Metro area (61). Published in 2018, the research protocol outlined the design of the four-arm factorial randomized controlled trial to examine efficacy of *Project Swerve*. There are two components to the intervention: Component

44. Merchant RC, Clark MA, Liu T, Romanoff J, Rosenberger JG, Bauermeister J, et al. Comparison of home-based oral fluid rapid HIV self-testing versus mail-in blood sample collection or medical/community HIV testing by young adult Black, Hispanic, and White MSM: Results from a randomized trial. *AIDS & Behavior*. 2018;22(1):337–46.
45. Merchant RC, Clark MA, Liu T, Rosenberger JG, Romanoff J, Bauermeister J, et al. Preferences for oral fluid rapid HIV self-testing among social media-using young black, Hispanic, and white men-who-have-sex-with-men (YMSM): Implications for future interventions. *Public Health*. 2017;145:7–19.
46. Frye V, Wilton L, Hirshfield S, Chiasson MA, Lucy D, Usher D, et al. Preferences for HIV test characteristics among young, Black men who have sex with men (MSM) and transgender women: Implications for consistent HIV testing. *PLoS ONE*. 2018;13(2):e0192936.
47. Eaton EF, Austin EL, Dodson CK, Heudebert JP, Jackson D, Muzny CA. Do young black men who have sex with men in the deep south prefer traditional over alternative STI testing? *PLoS ONE*. 2018;13(12):e0209666.
48. Frye V, Wilton L, Hirshfield S, Chiasson MA, Usher D, Lucy D, et al. “Just because it’s out there, people aren’t going to use it.” HIV self-testing among young, Black MSM, and transgender women. *AIDS Patient Care & STDs*. 2015;29(11):617–24.

1 employs motivational interviewing to explore substance use and co-occurring sexual risk taking and includes seven steps that participants have to transition through (62). Component 2 varies based on the results of an HIV test; the focus will include either risk-reduction counselling or linkage and retention to care. The three outcomes of the study are engagement in HIV prevention and care services, substance use, and sexual risk. *Project Swerve* was launched in 2017 in Michigan, and enrollment is ongoing (61).

### **Population-specific**

*Tu Amigo Pepe* is a HIV testing pilot campaign targeting immigrant Latino men who have sex with men, aged 18–30, in Seattle (52). Launched in January 2014, the multimedia campaign ran for 16 weeks. It included Spanish-language public service announcements via radio, social media outreach, a mobile phone reminder system, print materials, and a hotline. Additionally, a website featured local options for HIV testing. Development of the campaign was guided by the Integrated Behavioural Model, which focuses on the determinants of intention to perform a behaviour (63). Thus, campaign messages addressed beliefs that would influence intention to test for HIV by influencing attitudes, norms, and self-efficacy. Fifty male Latino participants that met inclusion criteria were recruited. Interviews with participants occurred three months before the campaign (n=50), three months into the campaign (n=44), and two months post-campaign (n=41) (52). Of note, the interviewer made participants aware of the different ways to test for HIV: at a medical office, at a testing centre, at a community-based organization, and at home by using an HIV self-test (52). The primary outcome was HIV testing rates; authors noted that the campaign had a “... significant and immediate impact on attitudes, beliefs, norms, and self-efficacy towards HIV testing” (52). Additionally, an increase in HIV testing rates was observed over time.

*All About Me* is an intervention intended to increase HIV testing among young Black men and transwomen who have sex with men or transwomen by matching individuals to ideal HIV testing approaches (13). Participants were 16–29 years old, Black, identified as male at birth, resided in New York City, and were not currently taking PrEP. All participants completed a computerized baseline assessment, and were randomized (unblinded) to receive a personalized recommendation of an HIV testing approach (intervention group; n=118) or receive standard HIV testing information (control group; n=118) (13). Participants in the intervention arm answered questions on education level, health insurance, incarceration history, primary partner, stigma and/or fear as a reason to avoid testing, HIV testing self-efficacy, comfort of testing at home, and social support. Responses to these questions provided data for a computer algorithm that would match participants to three types of HIV testing: clinic-based, self-test, or couples HIV counselling and testing (13). Participants received information on HIV testing access based on their match; in the case of self-testing, a free HIV

49. Lee E, Mao L, Bavinton B, Prestage G, Holt M. Which gay and bisexual men attend community-based HIV testing services in Australia? An analysis of cross-sectional national behavioural surveillance data. *AIDS & Behavior*. 2020;24(2):387–94.
50. Morris E, Topete P, Rasberry CN, Lesesne CA, Kroupa E, Carver L. School-based HIV/STD testing behaviors and motivations among Black and Hispanic teen MSM: Results from a formative evaluation. *Journal of School Health*. 2016;86(12):888–97.
51. McCoy SI, Buzdugan R, Grimball R, Natoli L, Mejia CM, Klausner JD, et al. Stick To It: Pilot study results of an intervention using gamification to increase HIV screening among young men who have sex with men in California. *mHealth*. 2018;4(40).
52. Solorio R, Norton-Shelpuk P, Forehand M, Montano D, Stern J, Aguirre J, et al. *Tu Amigo Pepe*: Evaluation of a multi-media marketing campaign that targets young Latino immigrant MSM with HIV testing messages. *AIDS & Behavior*. 2016;20(9):1973–88.
53. Bonett S, Connochie D, Golinkoff JM, Horvath KJ, Bauermeister JA. Paradata analysis of an eHealth HIV testing intervention for young men who have sex with men. *AIDS Education & Prevention*. 2018;30(5):434–47.

self-testing kit was provided. Most participants were recommended to either clinic-based testing or self-testing methods. At six-month follow-up, self-reported HIV testing increased in both arms, with no major differences between each arm. Authors concluded that providing information on HIV testing options was sufficient to increase uptake of HIV testing (13).

*Mpowerment* is an HIV prevention intervention designed for young men who have sex with men (aged 18–29) from diverse backgrounds (11). Included in the CDC’s Compendium of Evidence-Based Interventions and Best Practices for HIV Preventions, *Mpowerment* focuses on increasing HIV testing and decreasing sexual risk behaviours among younger HIV-positive and status unknown men who have sex with men (11). Run by a core team of peers (consisting of community members and paid staff), HIV testing and safe sex practices are promoted formally (e.g. at locations frequented by other young men) and informally (e.g. with friends in social networks). Additionally, peer-led “M-groups” allow for discussion of issues related to HIV testing and sexual risk behaviours (11). From 2009–2012, three community-based organizations utilizing *Mpowerment* were evaluated (64). In this sample (n=298), most participants were 18–24 years old (80.3%), and either Hispanic (41.9%) or non-Hispanic Black/African American (39.6%) (64). Baseline measures were compared to data at 3- and 6-months follow-up; results demonstrated that HIV testing and self-efficacy for safer sex increased at both time points (64).

*Panther Mpower* is an adaptation of the *Mpowerment* model for use on campus at Florida International University (FIU) (62). The FIU Nursing school collaborated with a local community-based organization, *Latinos Salud*, to adapt the intervention for campus use. Used as a tool to recruit Latino and other men who have sex with men for HIV testing, *Panther Mpower* hosted M-groups and outreach events where safer-sex packets were distributed, risk-reduction strategies were discussed, and rapid HIV tests were conducted (62). *Panther Mpower* is the first targeted HIV/STI testing initiative for men who have sex with men at FIU or in southwest Miami (62).

*Keep It Up 2.0* is another intervention featured in the Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention (12). *Keep It Up! 2.0* was tested in a double-blinded randomized controlled trial of an online HIV and STI prevention intervention tailored to ethnically diverse young men who have sex with men (aged 18–29) that occurred between 2013 and 2017 (65). Participants (n=901; 63% from a racial/ethnic minority) were recruited from Atlanta, Chicago, and New York; only participants that received an HIV-negative test during screening were enrolled in the intervention. The intervention condition (n=445) included content tailored to young men who have sex with men in the form of interactive exercises: games, animations, and other videos addressed HIV knowledge, motivation for safer behaviours, self-efficacy, and

54. Horvath KJ, Bauermeister JA. eHealth literacy and intervention tailoring impacts the acceptability of a HIV/STI testing intervention and sexual decision making among young gay and bisexual men. *AIDS Education & Prevention*. 2017;29(1):14–23.
55. Bauermeister JA, Golinkoff JM, Horvath KJ, Hightow-Weidman LB, Sullivan PS, Stephenson R. A multilevel tailored web app-based intervention for linking young men who have sex with men to quality care (Get Connected): Protocol for a randomized controlled trial. *JMIR Research Protocols*. 2018;7(8):e10444.
56. Ronen K, Golden MR, Dombrowski JC, Kerani RP, Bell TR, Katz DA. Uptake and impact of short message service reminders via STI partner services on HIV/STI testing frequency among men who have sex with men. *Sexually Transmitted Diseases*. 2019;46(10):641–47.
57. Keizur EM, Goldbeck C, Vavala G, Romero-Espinoza A, Ocasio M, Fournier J, et al. Safety and effectiveness of same-day Chlamydia trachomatis and Neisseria gonorrhoea screening and treatment among gay, bisexual, transgender, and homeless youth in Los Angeles, California, and New Orleans, Louisiana. *Sexually Transmitted Diseases*. 2020;47(1):19–23.
58. Rock A. Additional considerations for the implementation of same-day screening and treatment of sexually transmitted infections. *Sexually Transmitted Diseases*. 2020;47(6):e14.

behavioural skills. This was all completed on an e-learning platform accessed via computers and tablets. The control condition (n=456) included HIV information readily available on other websites (65). Booster sessions were included at three and six months to reinforce intervention content. Authors concluded that testing for sexually transmitted infections at-home was both acceptable and feasible to participants; additionally, incidence of STIs decreased (65).

*Get Yourself Tested* was a 2009 nationwide campaign in the U.S. that sought to reduce stigma and promote HIV and STI testing among American youth (66). In a study that assessed the campaign's engagement, authors noted that testing for STIs increased by 71% from 2008 to 2010 at reporting Planned Parenthood affiliates (66). One study published in 2016 sought to adapt *Get Yourself Tested* for Black and Latino sexual minority youth (67). Existing campaign materials for the intervention were adapted to be more inclusive of Black and Latino sexual minority youth ( $\leq 24$  years), and were used in a three-month campaign in four venues and through mobile testing sites (i.e. vans) in New York City (67). During the campaign period, the number of STI tests at select campaign venues increased when compared to baseline data from a comparable period (67). While uptake of tests in mobile vans remained low, the sample was high-prevalence: a positivity rate of 26.9% for chlamydia and 11.5% for gonorrhea was observed (67).

*Peer Mentors* is a U.S. intervention that trains young Black men who have sex with men (aged 18–30) to become mentors by using and promoting the use of HIV self-testing and STI home-based specimen collection (for gonorrhea, chlamydia, syphilis, and herpes) to members of their social network (18). One study describes the feasibility and acceptability of *Peer Mentors* among participants that were recruited through venue-based outreach (e.g. bars, clubs, community-based organizations) and through word-of-mouth referral (18). The first in-depth interview described the *Peer Mentors* training intervention as follows: “You would learn communication skills and be asked to talk with your friends and family about home-based testing and reducing risky behavior” (18). The kits used for testing and specimen collection were presented, and a discussion followed where the participant was asked several questions, including: “How willing would you be to talk about home HIV/STI testing with your friends and family?”, and “Who would you be the most likely to talk to about home testing?” (18). At the conclusion of the interview, the participant was given a booklet with images of the testing kits, and asked to talk with one or two members within their social network about home-based testing. In the second in-depth interview, which occurred one week later, participants were asked to provide details about the conversations they had with members of their social network. Fifteen participants completed the first round of interviews, and ten completed round two. Qualitative analysis for the study was based on data from the second round of interviews. Individuals in the social network that participants had conversations with were males and females,

59. Gamarel KE, Darbes LA, Hightow-Weidman L, Sullivan P, Stephenson R. The development and testing of a relationship skills intervention to improve HIV prevention uptake among young gay, bisexual, and other men who have sex with men and their primary partners (We Prevent): Protocol for a randomized controlled trial. *JMIR Research Protocols*. 2019;8(1):e10370.
60. Liu A, Coleman K, Bojan K, Serrano PA, Oyedele T, Garcia A, et al. Developing a mobile app (LYNX) to support a linkage to HIV/sexually transmitted infection testing and pre-exposure prophylaxis for young men who have sex with men: Protocol for a randomized controlled trial. *JMIR Research Protocols*. 2019;8(1):e10659.
61. Stephenson R, Bonar EE, Carrico A, Hunter A, Connochie D, Himmelstein R, et al. Intervention to increase HIV testing among substance-using young men who have sex with men: Protocol for a randomized controlled trial. *JMIR Research Protocols*. 2018;7(4):e114.
62. Fenkl EA, Jones SG, Oves JC. Panther Mpower: A campus-based HIV intervention for young minority men who have sex with men. *Journal of Health Care for the Poor & Underserved*. 2017;28(2S):9–15.

ranging from age 17 to 37, and included sex partners, friends, and family members (18). Generally, the role of the *Peer Mentor* was regarded as acceptable, as it was viewed as having a positive impact on the community and would help address barriers to testing (18). Of note, the novelty and accuracy of the tests, and having access to resources to link to care, emerged as factors that would facilitate peer outreach in promoting home-based testing (18). Barriers to conducting peer outreach included fear of peer reactions and concerns about disclosure of sexual behaviour. Authors concluded that the intervention was acceptable to participants and perceived as valuable in educating others about home-based testing (18).

*TIM Project* is a video-based intervention delivered via Facebook to motivate HIV testing among young Black men who have sex with men (68). Authors discuss the use of social media technology as a vehicle to drive health-related research, noting the popularity of Facebook, but also the lack of studies that aim to deliver a video-based intervention to increase HIV testing. Thus, authors addressed this gap by determining the feasibility of a video-based intervention among young Black men who have sex with men on Facebook (68). Content for the intervention was informed by a previous study among young Black men who have sex with men, and features of the social networking platform were used to direct participants to the intervention. Participants for the randomized control pilot study were recruited at community-based organizations through social media, and were included if they were Black/African American male, aged 18–30, HIV status unknown, had not tested for HIV in the past six months, had sex with a man in the past three months, and a resident of Los Angeles County (68). Recruitment, delivery, and follow-up occurred in 2014; 56 individuals enrolled, with 28 randomized to the *TIM Project* group (video intervention), 26 to the Health Information group (control). Participants receiving the video intervention were asked to view five one-minute videos on a weekly basis. Content in the videos included HIV prevention knowledge, risk behaviours and practices, benefits of HIV testing and early detection, treatment for HIV, influence of peer support for testing uptake, coping with HIV disclosure to friends and family, and the importance of social support for HIV prevention, treatment, and management (68). Control group participants reviewed standard HIV text information about HIV test information, prevention knowledge, STIs, stigma, and social support. Six weeks after initial enrollment, participants received a reminder message to complete an assessment survey, which included questions regarding HIV testing uptake and behaviour (68). Authors found that those who received the video intervention were seven times more likely to have tested for HIV compared to those in the control group at six-week follow-up and concluded that the intervention was indeed feasible for motivating HIV testing (68).

*Testpoint* is a large-scale HIV testing program in Sweden targeting young, foreign-born men who have sex with men who would not normally test for HIV in a healthcare facility (17). Anonymous HIV

63. Montañó D, Kasprzyk D. Theory of Reasoned Action, Theory of Planned Behavior, and the Integrated Behavioral Model. In: Glanz K, Rimer BK, Viswanath K. Health behaviour and health education: Theory, research, and practice. San Francisco, California: Jossey-Bass. 2008.
64. Shelley G, Williams W, Uhl G, Hoyte T, Eke A, Wright C, et al. An evaluation of Mpowerment on individual-level HIV risk behavior, testing, and psychosocial factors among young MSM of color: The monitoring and evaluation of MP (MEM) Project. *AIDS Education & Prevention*. 2017;29(1):24–37.
65. Mustanski B, Parsons JT, Sullivan PS, Madkins K, Rosenberg E, Swann G. Biomedical and behavioral outcomes of Keep It Up!: An eHealth HIV prevention program RCT. *American Journal of Preventive Medicine*. 2018;55(2):151–8.
66. Friedman AL, Brookmeyer KA, Kachur RE, Ford J, Hogben M, Habel MA, et al. An assessment of the GYT: Get Yourself Tested campaign: An integrated approach to sexually transmitted disease prevention communication. *Sexually Transmitted Diseases*. 2014;41(3):151–7.
67. Garbers S, Friedman A, Martinez O, Scheinmann R, Bermudez D, Silva M, et al. Adapting the Get Yourself Tested campaign to reach Black and Latino sexual-minority youth. *Health Promotion Practice*. 2016;17(5):739–50.

testing and counselling was offered free of charge at select Testpoint venues, by peers, approximately eight times per month; these venues included gay clubs, gay cruising areas, various gay festivals, and at the Swedish Foundation for Lesbian, Gay, Bisexual and Transgender Rights offices. A cross-sectional study completed at one venue in 2016 (n=595; aged  $\geq 18$  years old) diagnosed five individuals with HIV, who were all referred to care; four were new diagnoses. More than half of the participants in the sample were foreign-born; 78 countries, not including Sweden, were represented. Additionally, 19.0% (n=113) stated that they would not have tested through the traditional healthcare system if Testpoint was not available (17).

The social network strategy (SNS) assumes that people who engage in high-risk behaviours are clustered in networks with others who practice similar behaviours (16); one study among young men who have sex with men found that network homophily was associated with recent HIV testing (69). In the present study, “recruiters” are enlisted to identify “network associates” within their social networks and bring them in for HIV testing (16, 70, 71). One study describes the results of an SNS program for young Black men who have sex with men (n=1,752; aged 15–34), implemented in Memphis and Nashville by the Tennessee Department of Health from 2013–2016 (16). Nine percent of “network associates” (n=1,752) tested positive for HIV; more than half (n=80; 50.6%) of these were new diagnoses. Of those who tested positive who had been previously diagnosed with HIV (n=78; 49.4%), 47 (60.3%) had not received care in the past 12 months. Twenty-seven of these individuals (57.4%) were reengaged in care (16). While authors considered the project as success as program efficiency surpassed the goal of  $\geq 5\%$  HIV test positivity, they note the substantial number of participants that needed to be re-linked to HIV care and the need for program evaluation (16).

## Factors That May Impact Local Applicability

This synthesis focused on “young” men who have sex with men, a term that varied among papers. Thus, a wide range of ages was captured in the literature, and results cannot necessarily be generalized to all men who have sex with men who are considered “young”. Additionally, the overwhelming majority of studies included in this synthesis were based in the U.S.; as a result, some information may apply to HIV testing practices (e.g., HIV self-testing) that are not currently available in Canada. Furthermore, due to the lack of studies among young men who have sex with men in Canada, it is not entirely clear if there would be other factors unique to Canadian young men who have sex with men associated with STI and HIV test uptake.

68. Washington TA, Applewhite S, Glenn W. Using Facebook as a platform to direct young Black men who have sex with men to a video-based HIV testing intervention: A feasibility study. *Urban Social Work*. 2017;1(1):36–52.
69. Veinot TC, Caldwell E, Loveluck J, Arnold MP, Bauermeister J. HIV testing behavior and social network characteristics and functions among young men who have sex with men (YMSM) in Metropolitan Detroit. *AIDS & Behavior*. 2016;20(11):2739–61.
70. Centers for Disease Control and Prevention. Use of social networks to identify persons with undiagnosed HIV infection – Seven U.S. cities, October 2003–September 2004. 2005. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5424a3.htm> Accessed September 28, 2019.
71. Jordan WC, Tolbert L, Smith R. Partner notification and focused intervention as a means of identifying HIV-positive patients. *Journal of the National Medical Association*. 1998;90(9):542.



## What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations) using terms (gay or bisexual or MSM or gbMSM or men who have sex or queer\* or sexual minorit\* or homosexual\*) in titles or abstracts AND (HIV or syphilis or gonorrhoea or gonorrhoea or chlamydia or STD\* or STIs or sexually transmitted or hepatitis B or HBV or hepatitis C or HCV or STBBI\* or blood borne) in titles or abstracts AND text terms (test\* or screen\* or diagnos\*) AND (youth\* or young\* or adolescent\*) in titles or abstracts. Searches were conducted on September 14, 2020 and results limited to English articles published from 2015 to present. Reference lists of identified articles were also searched. The searches yielded 1,150 references from which 71 were included.