

# Best practices of using online and geosocial network applications to provide HIV and sexual health information to young newcomer men who have sex with men

## ? Question

What are examples of online interventions providing HIV and sexual health information to young newcomer men who have sex with men originating from the top countries of citizenship among international students in Canada (such as China, India, Vietnam, South Korea, Mexico, Brazil and Nigeria)?

## 🔑 Key Take-Home Messages

- There is a high HIV incidence among young gay men and other men who have sex with men in countries such as China in recent years (1–3). Evidence shows that HIV testing rates among young men have sex with men are, in general, low in China (4), Vietnam (5), and India (6). Studies also show low HIV pre-exposure prophylaxis (PrEP) awareness (7) and low willingness to use PrEP among young men who have sex with men (8).
- Geosocial networking applications are being used by sexual minorities to find partners and these applications may enable both risk behaviour (e.g., having a higher incidence of HIV among app users than non-app users) (9) and risk reduction (1) (e.g., a large proportion of men who have sex with men using such applications to obtain information on HIV and sexually transmitted infections - STIs) (10).
- A vast majority of HIV and sexual health interventions among young men who have sex with men originating from the top countries of citizenship among international students in Canada have been implemented and tested in mainland China. These include

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geosocial networking applications such as Blued (11), WeChat (12), Weibo (13), and QQ (13), and dating applications such as Grindr (14), Manhunt (14), and PlanetRomeo (15). Interventions have been implemented through these applications to display HIV prevention messaging (16), offer anonymous services, and provide location-based information such as nearby gay-friendly physicians and clinics (17).

- Other interventions explore different approaches such as crowdsourcing contests open to the public to create ads for HIV self-testing (18), gamification elements to motivate and engage users (19), as well as monetary incentives to encourage HIV/STI self-testing (20).
- Online-to-Offline models (O2O) describe ways to link online service utilization with subsequent offline clinical service uptake (21). A successful O2O model for HIV service delivery includes collaboration between teams responsible for the online intervention and those providing services offline to ensure timely linkages; social media promotions delivered via multiple platforms; real-time counseling and text/video support through instant messaging platforms; the ability for clients to make online appointments anonymously; and real-time tracking of client data (21).

## The Issue and Why it's Important

In 2019, a total of 2,122 HIV diagnoses were reported in Canada (5.6 per 100,000 population) (22). The highest proportion of all reported adult cases with known exposure were gay, bisexual and other men who have sex with men (39.7%) (22). The 20–29 year age group had the second highest rate at 10.1 per 100,000 population in 2019, only behind the 30–39 year age group that had the highest HIV diagnosis rate at 12.7 per 100,000 population (22).

In recent years, Canada became one of the leading destinations worldwide for international students: in 2019, 827,586 international students held valid study permits (23). Of these, 402,427 new study permits were issued in 2019 (a 15% increase from 2018) (23). Top countries of citizenship among international students include China, India, Vietnam, South Korea, Mexico, Brazil and Nigeria (24, 25). These young people may face certain vulnerabilities and risks related to HIV and other STIs in a new country with different socio-cultural norms and health care services, in addition to their young age and risk behaviour that places them among the most at-risk population groups.

Many young men who have sex with men who have moved to Canada as international students or for other reasons have experience using online and geosocial network applications in their home countries and may continue using them (instead and/or in addition to those

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applications available in North America). These online platforms may present opportunities to develop interventions to advance sexual health education and risk reduction among this population group.

In 2017, men who have sex with men made up “...an estimated 41% of new infections in Latin America, more than 25% of new HIV infections in Asia and the Pacific and the Caribbean, about 20% of new infections in eastern Europe and central Asia and the Middle East and North Africa, and an estimated 12% of new infections in western and central Africa” (26). A 2019 Joint United Nations Programme on HIV/AIDS (UNAIDS) report stated that young people (aged 15–24) made up about 25% of new HIV infections in the Asia-Pacific region in 2018 (1). The report indicated a high HIV incidence in recent years among young gay men and other men who have sex with men in China (1–3).

A 2019 systematic review and meta-analysis found a pooled HIV prevalence of 4.1% among men who have sex with men attending university in China (27). A 2018 systematic review found an increasing trend of HIV incidence over time among men who have sex with men in China from 2005 to 2014 (28). Additionally, results of the meta-analysis found a pooled HIV incidence of 5.61 per 100 person years; authors recommended that interventions particularly target young and less educated men who have sex with men (28). HIV rates have been increasing among young people in China with a 30% to 50% annual growth in the number of newly diagnosed college students over the past several years (29).

Findings related to the low use of HIV prevention methods among young men who have sex with men have been reported in China and other countries. A 2019 study among men who have sex with men in India (n=4179) found that 63% of participants aged 18–23 and 46% of those aged 24 to 29 had never tested for HIV (6). In a 2013 study among 2,077 men who have sex with men in Vietnam where 71.4% of participants were aged 18 to 25, 76.5% of all participants never had a voluntary HIV test (5). A 2012 systematic review and meta-analysis showed that 53% of Chinese men who had sex with men in the examined studies published from 2008 to 2011 had never been tested for HIV in their lifetime and 62% had not been tested in the past 12 months (4).

As mobile phones and computers are becoming increasingly pervasive, technology-based interventions have great potential to reach high-risk groups including men who have sex with men (30). A pooled analysis in a 2019 systematic review of studies consisting of men who have sex with men attending a university in China reported that 77.7% of men found sexual partners on geosocial networking applications or on the internet (27). A 2013 study surveyed Chinese college students living in the U.S. or in China and compared where students received HIV/STI information (31). Results found that a greater proportion of students in the U.S. accessed information online than students in China (31). A 2011 systematic review in China

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reported that in many studies examined, men reported seeking out partners online, ranging from 28.3% to 88.4% of men in each study (32).

Geosocial networking applications such as Blued, HER, and Grindr have become popular among sexual minorities as they provide individuals with ways to socialize, find partners, and receive support (33). Blued was created in 2012 as a mobile phone application for gay men in China and now has over 40 million users worldwide (33), including around 25 million registered users in China (34). Unlike Grindr and other Western gay apps, Blued is a multi-functional platform: users can browse other users nearby like on Grindr, post regular updates about themselves like on Facebook, broadcast and watch live streaming like on TikTok, or start a discussion thread on various topics, like on Reddit (34). There are other gay apps operating in China, but they are much smaller in terms of user numbers (34). Blued has incorporated community-driven HIV prevention messaging into the application and includes basic facts about the virus, as well as information on prevention, testing and treatment options, and how and where to contact related services (35). Interactive quizzes test users' knowledge about HIV (35).

A 2019 study examined the results of a voting feature on the Blued application which allowed users to answer multiple choice questions on sensitive topics such as their sexual behaviours (33). Five questions on the application examined sexual behaviours which had a total of 198,000 votes from users in mainland China from 2015 to 2019 (33). The study found that only 50.2% of participants who voted would take a regular HIV test and 54.3% would not interact with HIV-infected individuals (33). As application users rarely disclosed their HIV status, this can increase the risk of HIV infection among gay men who have sex with men (33).

Such online applications have become a source of both risk and risk reduction (1). For instance, a 2017 systematic review examined characteristics of men who have sex with men who use geosocial network applications across 17 studies in the U.S., China, and Australia (36). Results found that men who used applications were younger, had a higher education level and income, and had a higher rate of engagement in risky sexual behaviours than men who did not use the applications (36). A 2016 study among men who have sex with men in China (n=3,588) found that participants who sought out partners online were more likely to have tested HIV positive than those who sought partners in traditional venues (37). A cohort study in Shenyang, China, from 2015 to 2016 (n=686) found that men who have sex with men who used mobile dating applications had an HIV incidence that was more than four times higher than among those who did not use the applications (9). In addition, 59.4% of users surveyed were willing to receive HIV prevention information via the applications (9).

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A 2018 study among men who have sex with men in China (n=503) reported that gay mobile applications were the second most common platform (after search engines) for participants to obtain STI information (10). Participants reported a high interest (92.4%) and willingness (92.0%) to use a gay-friendly physician finder in gay mobile applications (10). Study authors concluded that such applications may be useful for disseminating STI and physician information to young gay men (10). Similarly, a 2018 study among Chinese college students (n=3,314) found that 77.9% (n=2,583) expressed a willingness to use HIV testing and counselling services, and those who perceived themselves to be at higher risk of HIV infection were more willing to use these services (38).

A 2021 study among men who had sex with men who used Blued in China (n=1,311) found that geosocial networking applications were a proxy for, and not the direct cause of participating in high-risk behaviours (39). Authors suggested that such applications can be used to promote targeted services such as HIV testing and PrEP (39). In China, the extensive use of PrEP remains a challenge (8); Truvada was the first medicine approved for HIV prevention in the country in 2020 (40). A 2020 study among young men who have sex with men in China aged 15 to 24 years (n=495) found that only 26.1% knew about PrEP; among those with PrEP awareness, only 27.9% indicated a willingness to use PrEP daily (8). Authors concluded that promotions for PrEP use should be displayed online and on dating applications (8). Similarly, a 2019 publication regarding PrEP awareness among men who have sex with men in Brazil (n=4,136) found that only 51% of those surveyed were aware of PrEP and that PrEP awareness was lowest among those aged 18–24 at 42.8% (7).

The aim of this review was to explore interventions that provide HIV and sexual health information for young newcomer men who have men with a focus on studies from major sources of immigration to Canada, such as China, Hong Kong (Special Administrative Region of China), Taiwan, India, Vietnam, Mexico, Brazil, South Korea, and Nigeria. The scope of this review includes online and geosocial network applications that are available in these countries and are used by young people originating from these countries, both before and after moving to jurisdictions such as Canada, U.S., Western Europe or Australia.

## What We Found

The large majority of identified studies were conducted in mainland China, whereas a small number of studies explored sexual health interventions in Hong Kong, India, Vietnam, Brazil and Mexico. There were no relevant studies identified from other jurisdictions of interest such as South Korea, Taiwan, or Nigeria.

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A 2021 systematic review of randomized controlled trials examined 22 studies (12 in high-income countries and 10 in low/middle income countries) to determine how effective mobile health interventions were in preventing STIs and encouraging preventative behaviours (41). Results found that content delivered via smartphone applications to participants likely increase STI/HIV testing among men who have sex with men in low- and middle-income countries and that text messaging interventions likely had little effect on condom use in the short term (41).

A 2017 systematic review of online interventions to address HIV among young gay men who have sex with men identified 17 studies, five of which took place in settings such as China, Hong Kong, Peru, and Thailand, with the remainder taking place in the U.S. (42). All of the studies focused on behavioural or knowledge outcomes such as condom use, testing behaviours, and attitudes to HIV/STI risk at the individual level (42). All studies (except one) found a statistically significant effect on at least one primary outcome which suggests promise for online interventions among young men who have sex with men (42). Study authors reported a lack of studies on the different effects of online interventions across subgroups of men who have sex with men such as those living in low income settings, living with HIV, and among transgender men (42).

A 2017 study explored the concept of online-to-offline (O2O) models for HIV service delivery common in studies among men who have sex with men in the West and in Asia (21). O2O is described as “...the linkage between online service utilization and subsequent offline clinical service uptake, i.e., ...identifying vulnerable populations and using a variety of strategies and approaches to encourage, motivate and link people to relevant clinical services” (21). Five recommended components of a successful O2O model include having:

1. collaborations between teams responsible for the online intervention and those providing services offline to ensure timely linkages;
2. social media promotions delivered via multiple platforms to reach a high number of those at risk;
3. real-time counseling and text/video support through instant messaging platforms or applications as opposed to a time-delayed response;
4. the ability for clients to make online appointments anonymously; and
5. real-time tracking of client data to ensure participants are linked to services instead of relying on participants to self-report (21).

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## Interventions: Online and on geosocial networking applications

### China

A 2020 protocol for a randomized controlled trial in China described the development of a mobile health (mHealth) application which will provide partner notification of HIV, syphilis, hepatitis B, and hepatitis C status (43). The purpose of the application is to encourage an interactive method for men who have sex with men to inquire about their partner's HIV and STI status before deciding to meet or have sex (43). The app functions by allowing users to request another user's STI or HIV status which can be confirmed or denied by the user receiving the request (43). The study will also provide participants with weekly health education through the WeChat mobile application on topics such as HIV and STI symptoms, partner notification, testing, prevention, and drug use (43). Another randomized controlled trial protocol published in 2020 aims to examine the use of and distribution of self-testing kits among gay men who have sex with men in China (20). The study will recruit participants on the social media application WeChat and will provide monetary incentives to participants once they upload their HIV self-test results and allow participants to refer their peers via social networks to encourage secondary distribution of HIV self-testing kits (20).

A 2019 randomized controlled trial in Hefei, China (n=100) consisted of a mobile health (mHealth) intervention called "WeTest" which was delivered to participants via the mobile application WeChat to promote oral HIV self-testing (12). Those in the intervention group received two self-testing kits and access to a private WeChat group that provided messages and referrals related to HIV while the control group only received the testing kits (12). All participants were asked to upload a photo of their self-test results, which was sent to the project counselor via secure online portal (12). Study results found that those in the intervention group had a higher testing rate than the control group; thus, authors concluded that the mHealth intervention was feasible and acceptable (12).

A 2019 report from the U.S. Centers for Disease Control and Prevention examined the results of an online HIV testing campaign run by Blued in 2015–2017 which combined push-notification and geolocation capabilities to encourage men in Beijing to get tested (11). Over 15,900 men were tested throughout the campaign for a total of 17,008 cumulative HIV tests; 68% of participants scheduled their HIV tests using links accessed on Blued (11). Results indicated a sharp increase in HIV testing, especially among young men aged 35 and younger who made up 88.2% (n=14,050) of those tested (11). The number of completed tests in 2015 was three times higher than in 2013 and continued to increase substantially over the following two years of the campaign (11). Authors concluded that with the steep increase in testing rates over time, such campaigns on platforms

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that are geolocation-based may be useful in increasing testing among young men who have sex with men in China (11).

A 2019 study evaluated the feasibility of a health services platform among young men (n=34) that could be integrated into the Blued application (17). This online platform included the ability to find local, gay-friendly physicians, provide access to mental health care services, and had a peer communication network that users could access anonymously to ask their peers questions on topics such as sexual health and coming out (17). Results of the study found that 71% of the participants were interested in using the platform and 74% found it easy to use (17).

A 2019 qualitative study in China among men who have sex with men (n=19, aged 18 to 31) examined the features they would prefer in an application focused on HIV prevention (44). Results indicated that participants wanted an application that was targeted specifically to men who had sex with men, allowed for interactivity between the user and the application, had friendly and easy to understand language, was accessible online, and had advertisements at gay bars and gay friendly organizations (44). Participants perceived such an application as a way of “being cared for by society” and could be used to strengthen their motivation to change at-risk behaviours (44).

A 2019 clinical study aimed to facilitate care engagement and initiation of antiretroviral therapy (ART) among newly diagnosed men (n=184, 58% aged 18 to 29) in Beijing (45). The intervention consisted of in-person peer counselling as well as weekly text messaging check-ins inquiring if the participant wanted to talk to a peer counselor (45). Results found that 97% of participants indicated that they wanted to talk with their peer counselor at least once throughout course of the intervention which may indicate increased support needs among newly diagnosed men (45). Topics participants wanted to discuss included information about CD4 tests, starting ART, its side effects, or a physical ailment (45).

A 2019 study examining the feasibility of an HIV self-testing model called “Easy Test” over a three-month period across 14 provinces in China (46). The Easy Test model allowed participants to order HIV self-testing kits online upon providing a deposit (USD 5) which was refunded once the participant submitted a photo of their test result (46). The model was promoted on social media platforms including WeChat, QQ, and Blued and resulted in 879 eligible participants (median age: 28 years), 40% of which had never tested for HIV (46). A total of 77% of participants submitted a photo of their test result, of which 14.3% were positive for HIV (46). Based on the high proportion of first-time testers and photos of completed test results submitted, the model was deemed to be a feasible and efficient method of promoting HIV self-testing (46).

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A 2019 study examined “web-based sexual health influencers” who were described as individuals that had a robust influence on sharing HIV and STI information online to other men who have sex with men (13). Of the 1,031 study participants, 132 were defined as influencers based on their scores on a six-item leadership scale (13). Influencers were found to be more likely to test for HIV and syphilis than non-influencers and were also more likely to use online platforms such as Weibo, WeChat, and QQ to give or receive HIV testing information (13). The study concluded that influencers could be useful in testing promotion models, especially network-based social media interventions (13).

A 2018 randomized controlled trial evaluated the effects of an HIV intervention across eight Chinese cities among young men who had sex with men (n=1381); 82% were 30 years of age or younger (18). The intervention consisted of an online testing service and local promotions which were developed using crowdsourcing via a national contest (Figure 1) (18). Results found an 8.9% increase in the proportion of individuals receiving an HIV test during the intervention period compared with the control periods (18). In a 2020 study crowdsourced posters on HIV prevention (including ones in the aforementioned article) were compared to posters found on the Chinese Center for Disease Control and Prevention (CCDC) (47) online repository (48). Posters were shown to Chinese men who have sex with men to assess their response to the poster features (48). Results found that although the posters from crowdsourcing and the CCDC varied in their visual features, both had elicited positive viewer responses (48). Authors suggested that crowdsourced posters were more cost-effective and could be implemented without sacrificing quality (48).



**Figure 1:** Two HIV promotion images used in the intervention described by Tag et al., 2018 delivered via WeChat (18). Left text: “Let’s test for HIV together. Stop HIV from spreading in our community” (18). Right text: “Son, what’s your rank? HIV test: one line means negative; two or three lines means suspected positive. Please go and get HIV tested” (18).

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A 2016 randomized controlled trial compared HIV testing uptake among men (n=624) across 31 provinces in China who viewed one of two HIV prevention videos (49). The crowdsourced video was developed through a contest open to the public and the winning video depicted a young gay couple getting HIV testing together (49). The marketing video was developed by a health marketing company and featured a cartoon with HIV education messaging (49). Both videos can be accessed in the article's supplementary data (49). Results found similar HIV testing rates among both groups, with 37% and 35% testing for HIV within four weeks after viewing the crowdsourced video and the marketing video, respectively (49). Authors also noted the crowdsourced video intervention cost substantially less per new HIV diagnosis than the marketing video (49).

A 2016 qualitative study examined the ways in which Chinese and South Asian men who have sex with men living in New Zealand (n=44) understood health promotion and HIV/STI issues (16). Results found that participants remembered local HIV health promotion campaigns run by the New Zealand AIDS Foundation called "Get it On!" and "Love Your Condom" both of which promoted always using a condom for sex (16). Participants recalled seeing the campaign ads on posters, via the internet, and on Facebook (16). Although the men understood the benefits of using condoms, they did not always consistently use condoms (16). Testing regularly for HIV was more common among participants who lived in New Zealand for more than five years (16).

A 2016 randomized controlled trial in China examined the use of a fear appeal approach in videos to reduce the prevalence of unprotected anal sex among men who have sex with men (n=396; 55.8% aged 18–25) (50). The trial had three groups: the first watched a video of a doctor presenting STI information followed by a video of men discussing ways to prevent unprotected anal intercourse; the second group watched both of these videos in addition to a video with fear appeal including visual flashes of male STI symptoms; the third control group received factual STI information online (50). Results found that men in the second group scored significantly higher in their level of fear immediately after watching the videos, but there were no differences across the three groups in unprotected anal intercourse three months after the intervention (50). Authors concluded that more research is needed on fear-based approaches for HIV prevention (50).

A 2015 study compared safe sex behaviours among men living with HIV (n=202) in Chengdu, China via allocation to an online intervention or a control arm (51). The intervention consisted of a website that provided: information on ART; one-on-one counselling with trained peers on QQ, and an animation game created to promote safe sex (51). The control arm received standard care without access to the website (51). Results found that those in the intervention group had a significantly higher number of participants that disclosed their

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HIV status to their partners and were more likely to motivate their partners to test for HIV than those in the control group (51).

### **Hong Kong**

A 2018 study examined the effectiveness of a testing campaign called “Get an early check – chrysanthemum tea” over a three-month period in 2015 (52). The campaign included a one-minute viral video which promoted HIV testing and was posted on: the campaign website (53), Facebook (54), and YouTube (52). The campaign also had posters and leaflets distributed to gay bars and saunas and had fake “chrysanthemum tea” vending machines at different events from which people could obtain a gift package with a free condom and a leaflet promoting testing (52). The campaign was evaluated by 153 participants, 56.2% of which were under 30 years of age (52). A total of 45.8% of the participants stated that they had been exposed to the campaign, and of those, 80% intended to take an HIV test in the next year, indicating that the campaign may have been useful in encouraging the uptake of HIV testing among Chinese-speaking men who have sex with men (52).

### **India**

A 2019 study examined the implementation of a peer mobilization pilot where men who have sex with men in Mumbai were encouraged to test for HIV and syphilis at a local clinic via messaging on the gay dating site PlanetRomeo and Facebook (15). Examples of messaging included: “HIV tests make me feel sexy and safe. When was the last time you tested for HIV? To know how to get a test for you and your friends, talk to us” (15). Men who pursued testing as a result of the messaging were given coupons to share with other men in their virtual networks who could use the coupons to get tested (15). Those who shared their coupons were provided with a monetary incentive for every member of their network that was tested (15). The intervention sent out over 5,000 social media messages over six months, and 247 individuals pursued HIV and syphilis testing, two-thirds of which were under the age of 25 and 99% of which had never tested for HIV (15). Results indicated that eight individuals (3.2%) tested positive for HIV and 22 (8.9%) had a high titer for syphilis (15).

### **Vietnam**

A 2018 study found high use of technology among men who have sex with men surveyed in Hanoi, Vietnam (n=205) (30). A total of 91.7% owned a smartphone, 67.8% owned a computer or tablet, 75.1% used technology to find HIV/STI information in the past year, and 50.7% used technology to find a place to get tested for HIV or STIs, also in the past year (30). A 2018 study piloted HIV lay provider testing and HIV self-testing with intense social media outreach to increase testing uptake among men who have sex with men in Vietnam (55). Promotion platforms included Grindr and MTV Vietnam, as well as the use of a community Facebook page called Xóm Cau Vong (Rainbow

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Village) (56) which provided an open space for men who sex with men to connect (55, 57). A total of 1,531 men were surveyed and the majority were under 30 years of age (55). This was the first HIV test for 57.9% and 51.3% of lay testers and self-testers, respectively (55). Although a small number of men were successfully reached online and linked to testing (6.6% of total), these men presented with a high proportion of HIV positive test results (55). Authors concluded that online outreach is important for reaching new and high-risk populations (55).

## Mexico

A 2020 study examined the feasibility and implementation of an online gamification intervention among young gay men who have sex with men (n=62) aged 18 to 35 years in Mexico (19). The purpose of the intervention was to: incentivize HIV and STI testing, normalize discussion with partners about their serostatus, and increase participants' knowledge about HIV and STIs (19). Results found the intervention to be acceptable and feasible (19). Challenges included technical failures during the execution of the intervention and participants' high expectations of the game due to their past experiences with industrially produced games (19). Participants found the gamification components such as badges, points, and prizes to be motivating and fun, and 71% of participants took part in at least one gamification activity to earn points (19).

A 2016 study described the “Tu Amigo Pepe” campaign – a 16-week pilot that included Spanish-language radio announcements, a website, social media outreach on Facebook, text message reminders, and a toll-free hotline directed at young Latino immigrant men who have sex with men (58). The goal of the campaign was to reframe negative attitudes, beliefs, and norms towards HIV testing and to promote self-efficacy towards HIV testing (58). The social media campaign consisted of ads to promote HIV testing and provided specific testing locations (58). Among men surveyed (n=50; mean age 25 years), 90.2% stated that they had ever tested for HIV at the end of the campaign, an 8.2% increase from baseline (58).

## Brazil

A 2019 study described the feasibility and development of an online HIV self-testing strategy among young men who have sex with men in Curitiba, Brazil (14). The online strategy was conducted under a project called “A Hora é Agora” (The Time is Now) which included a larger communication strategy to encourage HIV testing (14). The communication strategy included handouts, distributed at locations where men who have sex with men socialized; partnerships with gay-friendly businesses such as sauna, cafes, and bars; and virtual messages disseminated through Facebook, Manhunt, and Grindr (14). The online strategy was hosted at [www.ahoraeagora.org](http://www.ahoraeagora.org) (59) and included an HIV risk assessment calculator, prevention information, testing locations, instructions on how to use an HIV self-test, and

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a page where users could request to be mailed an HIV self-testing kit (14). Main components of the project included user anonymity, privacy, and the use of targeted messaging (60). Results found that the website had over 17,700 unique visitors in over a one-year period, with a majority being young users (14). A total of 2,526 HIV self-testing kits were delivered and 21.4% of the kits has a result posted online or by mail (14). A total of 37 individuals who used the e-test followed up with confirmatory testing at a health facility, 30 of which were positive (14). Results found the website to be feasible and acceptable by users (14). Such technologies hold potential for engaging young gay men who have sex with men who value privacy and anonymity when accessing HIV services as well as those who are not reached through existing services (60).

## Factors That May Impact Local Applicability

As the studies examine young men who have sex with men across various countries, the results may not be generalizable to all young newcomer men who have sex with men living and/or studying in Canada. Other factors that may influence health seeking behaviour among these men include their level of acculturation, length of residence in Canada, socioeconomic status, social contacts, and place of residence (31).

## What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations) using a combination of text terms (China\* or Chinese or Taiwan\* or Hong Kong\* or Vietnam\* or India\* or Korea\* or Nigeria\* or Brazil\* or Mexic\*) AND title and abstract terms (sexually transmitted or STIs or sexually transmitted disease \* or sexual health or HIV or PrEP or preexposure prophylaxis or pre-exposure prophylaxis or harm reduction) AND text terms (gay or bisexual or men who have sex or MSM or queer or LGB\* or transgender\* or gbMSM\* or same sex) AND {title and abstract terms [newcomer\* or migrant\* or immigrant\* or foreign born or student or mobile population\*] or MeSH terms [exp Young Adult/ or exp Adolescent/ or exp Transients/ and Migrants/] or text terms [young or youth]}. Searches were conducted on December 3, 2020 and results limited articles published from 2010 to present. Reference lists of identified articles were also searched. The searches yielded 1,001 references from which 60 were included.