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# Reach of GetCheckedOnline among gay, bisexual, transgender and queer men and Two-Spirit people and correlates of use 5 years after program launch in British Columbia, Canada

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## ABSTRACT

**Objectives** Understanding who uses internet-based sexually transmitted and blood-borne infection (STBBI) services can inform programme implementation, particularly among those most impacted by STBBIs, including gender and sexual minority (GSM) men. GetCheckedOnline, an internet-based STBBI testing service in British Columbia, Canada, launched in 2014. Our objectives were to assess reach, identify factors associated with use of GetCheckedOnline 5 years into implementation and describe reasons for using and not using GetCheckedOnline among GSM men.

**Methods** The Sex Now 2019 Survey was an online, cross-sectional survey of GSM men in Canada administered from November 2019 to February 2020. Participants were asked a subset of questions related to use of GetCheckedOnline. Multivariable binary logistic regression modelling was used to estimate associations between correlates and use of GetCheckedOnline.

**Results** Of 431 British Columbia (BC) participants aware of GetCheckedOnline, 27.6% had tested using the service. Lower odds of having used GetCheckedOnline were found among participants with non-white race/ethnicity (adjusted OR (aOR)=0.41 (95% CI 0.21 to 0.74)) and those living with HIV (aOR=0.23 (95% CI 0.05 to 0.76)). Those who usually tested at a walk-in clinic, relative to a sexual health clinic, had greater odds of using GetCheckedOnline (aOR=3.91 (95% CI 1.36 to 11.61)). The most commonly reported reason for using and not using GetCheckedOnline was convenience (78%) and only accessing the website to see how the service worked (48%), respectively.

**Conclusion** Over a quarter of GSM men in BC aware of GetCheckedOnline had used it. Findings demonstrate the importance of social/structural factors related to use of GetCheckedOnline. Service promotion strategies could highlight its convenience and privacy benefits to enhance uptake.

## INTRODUCTION

Two-Spirit, gay, bisexual, transgender, queer and other men who have sex with men (2SGBTQ+ men) are disproportionately impacted by sexually transmitted and blood-borne infections (STBBIs), including HIV and infectious syphilis, in Canada.<sup>1</sup> Given that undiagnosed STBBIs may be

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Population-level estimates of uptake of digital sexually transmitted and blood-borne infection (STBBI) testing services and factors associated with their use are not widely reported, particularly among populations with higher rates of STBBI.

## WHAT THIS STUDY ADDS

⇒ GetCheckedOnline, an internet-based STBBI testing (IBT) service in British Columbia (BC), Canada, was used less by Indigenous and ethno-racial minority men, and people living with HIV, whereas those usually testing at walk-in clinics used the service more.  
⇒ GetCheckedOnline was primarily used due to convenience, efficiency and privacy benefits relative to clinic-based services, and not used because of only wanting to understand how it works and preference for clinic-based services.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ IBT is used by sexual minority men, addressing key barriers to in-person testing services; however, future research should examine access inequities for socially marginalised subgroups.

asymptomatic, cause severe morbidity and increase the risk for HIV transmission, early diagnosis via routine screening constitutes a public health priority.<sup>2-4</sup> However, barriers to accessing comprehensive STBBI screening for 2SGBTQ+ men persist, including long wait times and stigma.<sup>5,6</sup> Internet-based STBBI testing (IBT) services vary in design but are generally considered to address barriers related to accessing in-person, clinic-based services.<sup>7,8</sup> IBT is a feasible and acceptable service model for 2SGBTQ+ men that addresses barriers for this population such as privacy concerns and sexual identity disclosure to healthcare providers.<sup>9-13</sup> In addition, IBT and other testing innovations that reduce in-person interactions have been prioritised in light of limited clinic-based services and transmission concerns during the COVID-19 pandemic.<sup>14,15</sup>

GetCheckedOnline is an IBT service available in British Columbia (BC), Canada, operated by the BC Centre for Disease Control.<sup>16</sup> GetCheckedOnline launched in 2014 and, at the time of our study, was available in seven communities across three health regions. GetCheckedOnline was designed to reach individuals at higher risk of STBBIs who encounter barriers to clinic-based services and was initially promoted to 2SGBTQ+ men.<sup>17</sup> The process of testing through GetCheckedOnline has been described in detail previously.<sup>16</sup> In short, GetCheckedOnline users create an online account using a code obtained from promotional material or requested on the website and complete an STBBI risk assessment form online. Based on risk assessment responses, testing is recommended for gonorrhoea and chlamydia (collected through urine, rectal swab and/or throat swab), HIV, syphilis and hepatitis C (serology). Test requisition forms can be printed or displayed on mobile devices and brought directly to a local laboratory collection site for specimen collection. Results are available online (if negative) or by phone (if positive) with results managed through a provincial STBBI clinic.

Implementation science generates practical evidence about interventions in real-world settings, by examining “what works, for whom, under what contextual circumstances, and whether interventions are scalable in equitable ways”.<sup>18</sup> These questions cannot be answered by looking at programme outcomes, such as number of tests conducted or diagnoses made, which are common in research on IBT programmes (including our earlier research on GetCheckedOnline). Rather, research which examines implementation outcomes of IBT programmes—such as acceptability and reach—can identify strengths and opportunities in service delivery, by understanding who is and is not using the service and related facilitators and barriers.<sup>19</sup> We have previously demonstrated the feasibility and acceptability of GetCheckedOnline among 2SGBTQ+ men.<sup>20</sup> In a 2016 community survey of 2SGBTQ+ men in Vancouver, 2 years after GetCheckedOnline became available, awareness was higher among participants who were out to their healthcare providers, connected to 2SGBTQ+ organisations, and more frequent social media users.<sup>20</sup> Intention to use was more likely among participants who valued the time-saving benefit of the service and knew existing service users. In a parallel study, interviews with 2SGBTQ+ men who had used GetCheckedOnline identified convenience, privacy and control surrounding specimen collection as the main benefits of using the service.<sup>21</sup> While awareness and acceptability are necessary prerequisites for using the service, we currently do not understand the reach of GetCheckedOnline into the population of 2SGBTQ+ men in BC, such as the number and proportion of men who use the service, and their representativeness—a gap related to implementation evaluations of IBT generally.<sup>22</sup> Understanding who uses and does not use GetCheckedOnline could help identify access inequities for priority subpopulations and inform future programme adaptation and expansion. Our primary objective was to assess the reach (use) of GetCheckedOnline among 2SGBTQ+ men in BC and the correlates of use. Our secondary objective was to describe reasons why 2SGBTQ+ men who were aware of the service had or had not used GetCheckedOnline.

## METHODS

We used the STROBE Checklist for reporting results of cross-sectional studies to inform our description of study methods.<sup>23</sup>

## Study design

This study is based on data from the Sex Now Survey, a repeated cross-sectional survey which gathers data on the health and well-being of 2SGBTQ+ men in Canada (2019 edition, conducted online between November 2019 and February 2020).<sup>24</sup> In order to be eligible, participants had to (1) identify as a man or another gender other than woman (eg, non-binary), or as Two-Spirit; (2) identify as gay, bisexual, queer or another non-heterosexual identity, or as Two-Spirit and/or report having had sex with another man in the last 5 years; (3) be at least 15 years of age; (4) live in Canada and (5) be able to provide informed consent and complete a questionnaire in French or English. The survey covered a variety of question domains relevant to this study, including sociodemographics, sexual behaviour, STBBI testing history, healthcare access and community connection. The 2019 survey also included questions about GetCheckedOnline for participants who lived in the province of BC, specifically on awareness, visiting the website, use and perceptions of the service. A full copy of the survey instrument is available here ([https://www.cbrc.net/sex\\_now\\_2019\\_online\\_survey](https://www.cbrc.net/sex_now_2019_online_survey)).

## Recruitment

Multiple convenience online sampling methods were used to ensure diversity among the sample in terms of age, race/ethnicity, socioeconomic status, gender identity and geographic location. Promotional materials were shared by community-based organisations through newsletters, listservs and social media outlets (eg, Facebook, Instagram, Twitter), as well as through paid advertisements on Facebook, Instagram, sex-seeking apps and websites (eg, Grindr, Squirr, Scruff, Jack'd), porn sites (eg, Pornhub) and community-specific media sites (eg, Xtra, Fugues). All recruitment methods directed participants to the survey on Survey-Monkey. Participants were provided with information about the study and requested to provide informed consent on the first page of the survey, prior to continuing. All survey questions were optional and participants were allowed to withdraw participation from the survey at any time. At the end of the survey, participants could optionally provide an email address to be eligible to win a \$C500 travel voucher via random draw.

## Study variables

Our primary outcome of interest was use of GetCheckedOnline, defined as reporting testing through the service (“Have you been tested through GetCheckedOnline?” with ‘Yes’, ‘No’ and ‘Not sure’ as possible responses; collapsed into ‘Yes’ vs ‘No/Not Sure’). Our secondary outcomes of interest were reasons for using or not using the service. Participants who had used GetCheckedOnline were asked, “Why did you use GetCheckedOnline to get tested?” and could check all that apply from a predetermined list of reasons. Participants who had not used GetCheckedOnline but who had been to the website were asked, “Why have you NOT been tested through GetCheckedOnline?” and could check all that apply from a predetermined list.

Selection of explanatory variables relevant to our outcome of interest was informed by a multilevel implementation science framework that considers five domains of contextual factors which impact implementation outcomes of a programme: (1) *social-structural level* (eg, race/ethnicity, income); (2) *provider-level* (eg, being ‘out’ to healthcare providers); (3) *organisational-level* (eg, usual testing location, HIV status and pre-exposure prophylaxis (PrEP) access); (4) *individual-level* (eg, number of sex partners, past 6 months) and (5) *innovation-level* (ie, source of GetCheckedOnline awareness).<sup>19</sup> Additional variables were

examined if relevant to Diffusion of Innovations Theory, which we have applied in our previous research.<sup>20</sup> All variables considered are presented in online supplemental table 1.

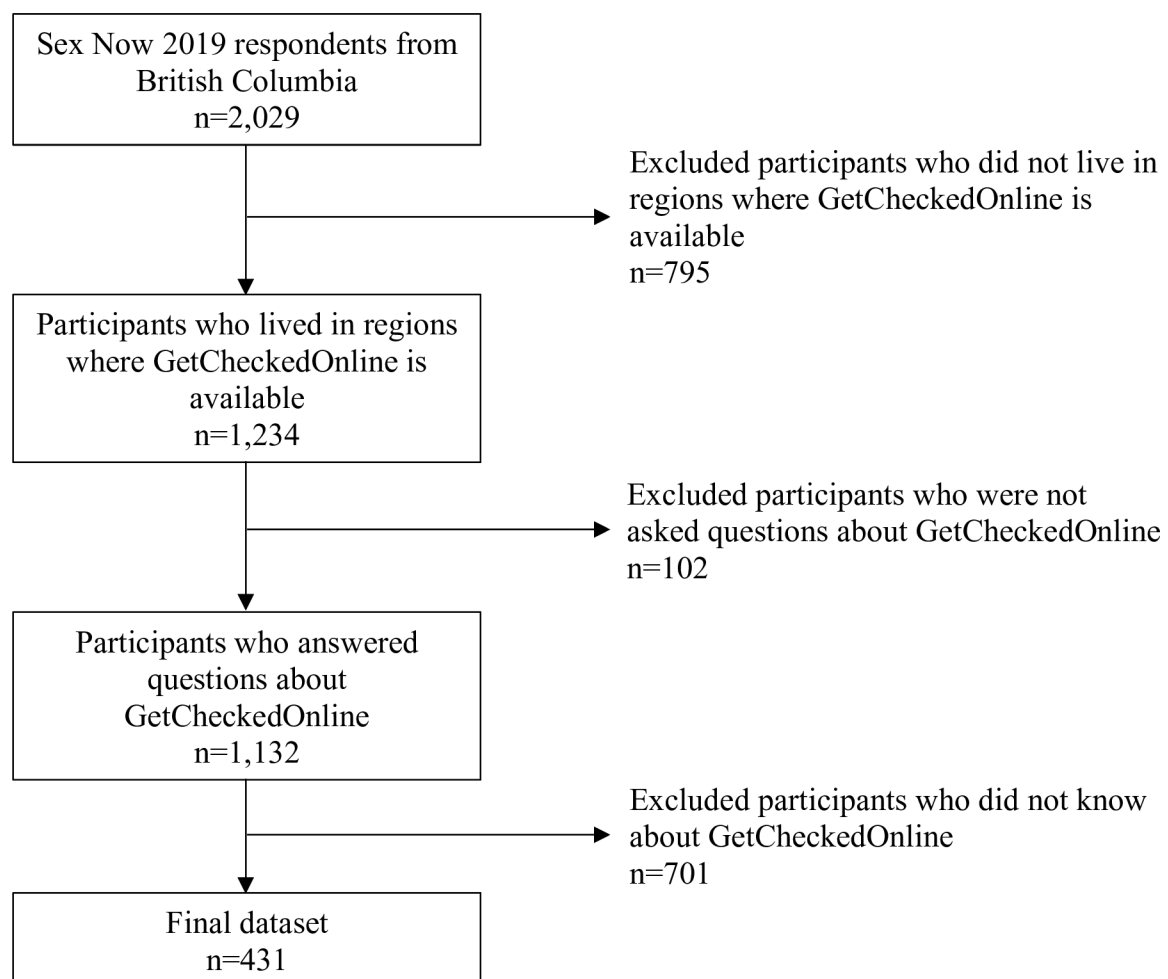
### Analysis

For this analysis, we restricted the sample to Sex Now 2019 participants in BC who lived in regions where GetCheckedOnline was available and who were aware of the service. Participants were assigned to a GetCheckedOnline implementation region in BC (ie, by catchment area for communities in the Vancouver, Island, Interior implementation regions, online supplemental figure 1) by the three first characters of self-reported postal code (ie, Canada Post Forward Sortation Area) using the Postal Code Conversion File+.<sup>25</sup> To assess the reach of GetCheckedOnline, we described the number and proportion of participants who had used GetCheckedOnline and examined the correlates of use through univariate and multivariate binary logistic regression models to quantify the magnitude of association between explanatory variables and use of GetCheckedOnline. Unadjusted ORs (uORs) and adjusted ORs (aORs), including 95% CIs, were estimated. Variables with uOR 95% CIs excluding 1 were considered for inclusion in the full multivariate model. For correlated variables, determined using  $\chi^2$  tests, the variable most conceptually related to the outcome was selected. We included the following variables in the multivariate model regardless of significance level: geographic region (due to differences in available access)<sup>21</sup> and having experienced any barrier to STBBI

testing in the past year (which we have previously demonstrated to be related to interest in use of GetCheckedOnline).<sup>9</sup> Missing responses for each variable were imputed as 'Missing' to retain sample size in the full model. In presenting results, we emphasise variables with significant uORs, as these findings are directly relevant for informing programme promotion and understanding potentially inequitable access to the service. For our secondary objective, we use descriptive statistics. All data were analysed using R V.1.3.1073 (29 July 2020).<sup>26</sup>

### RESULTS

A total of 2029 Sex Now participants were from BC, of which 1234 lived in regions where GetCheckedOnline is available (figure 1). Of those who responded to questions about GetCheckedOnline (n=1132), more than one-third (38.1%; 431/1132) were aware of the service prior to completing the survey. Of 431 participants, the median age was 36 years old (table 1). Most lived in the Vancouver region (78.0%), with 17.9% in the Island region and 4.2% in the Interior region. The majority of the sample identified as gay (84.7%), white (77.3%) and had full-time employment (59.9%). Approximately one-fifth of participants (20.9%) did not have a regular healthcare provider (ie, family doctor or nurse practitioner), 11.4% were people living with HIV, and 33.6% were currently using PrEP for HIV prevention. Only 1.6% had never tested previously for sexually transmitted infections and more than half (52.2%) had experienced a past-year barrier to testing. Three-fifths (61.3%;



**Figure 1** Study sample selection.

**Table 1** Characteristics of participants aware of GCO in implementation regions

Variable	n=431 n (%)
Age, years	
29 and under	116 (26.9)
30–35	93 (21.6)
36–50	121 (28.1)
51	101 (23.4)
Region of GCO availability	
Vancouver	336 (78.0)
Island	77 (17.9)
Interior	18 (4.2)
Sexual identity (not mutually exclusive)	
Gay	365 (84.7)
Queer	119 (27.6)
Bi (bisexual)	75 (17.4)
Pansexual	34 (7.9)
Other (self-described)	8 (1.9)
Asexual	7 (1.6)
Straight	6 (1.4)
Heteroflexible	5 (1.2)
Race/ethnicity (not mutually exclusive)	
African, Caribbean, or black	12 (2.8)
Arab, West Asian (eg, Iranian, Afghan)	6 (1.4)
East Asian (eg, Chinese, Japanese, Korean)	39 (9.0)
Indigenous	22 (5.1)
Latin American, Hispanic	24 (5.6)
South Asian (eg, East Indian, Pakistani, Sri Lankan)	11 (2.6)
Southeast Asian (eg, Filipino, Vietnamese, Thai)	21 (4.9)
White	333 (77.3)
Other	9 (2.1)
Annual income (\$C)	
<\$20 000	59 (13.7)
\$20 000–\$39 999	77 (17.9)
\$40 000–\$59 999	88 (20.4)
\$60 000–\$79 999	75 (17.4)
\$80 000–\$99 999	50 (11.6)
\$100 000 or more	54 (12.5)
Missing	28 (6.5)
Full-time employment	
Yes	258 (59.9)
No	171 (39.7)
Missing	2 (0.5)
Social connection: how many people can you count on for support if you need help or if something goes wrong?	
0–3 people	114 (26.5)
4–6 people	115 (26.7)
7+people	132 (30.6)
Missing	70 (16.2)
Does your regular family doctor or nurse practitioner know that you have sex with men?	
Yes	222 (51.5)
No	42 (9.7)
No regular family doctor	90 (20.9)
Missing	77 (17.9)
Usual STI testing location	
A clinic or service offering testing for gay, bi, queer and trans people	119 (27.6%)
An STI or sexual health clinic	114 (26.5)

Continued

**Table 1** Continued

Variable	n=431
Family physician	93 (21.6)
GCO	25 (5.8)
No usual place	9 (2.1)
Other	36 (8.4)
Walk-in medical clinic	23 (5.3)
Never had an STI test	7 (1.6)
Missing	5 (1.2)
Experienced any barrier in accessing STI testing in the past year	
Yes	225 (52.2)
No	178 (41.3)
Missing	28 (6.5)
HIV status and PrEP use	
HIV-negative, currently taking PrEP	145 (33.6)
HIV-negative, not currently taking PrEP	182 (42.2)
Living with HIV	49 (11.4)
Missing	55 (12.8)
<i>GCO implementation outcomes</i>	
How did you hear about this service? (check all that apply)	
Ad on a website or phone app	121 (28.1)
Printed material (posters, brochures, etc.)	107 (24.8)
Social media (Facebook, Twitter, etc.)	95 (22.0)
From a physician, nurse or clinic	84 (19.5)
From friends	82 (19.0)
At an event (Pride, concert, festival, etc.)	79 (18.3)
From someone at a community organisation	75 (17.4)
Ad on a bus/bus shelter	40 (9.3)
News media (TV, newspaper, Xtra, etc.)	40 (9.3%)
Not listed	33 (7.7)
From a boyfriend/partner	16 (3.7)
From a hookup/casual partner	16 (3.7)
"Heard from another person": Any of physician, nurse or clinic; friends; someone at a community organization; boyfriend/partner; hookup/casual partner	213 (49.4)
Been to the GCO website	
Yes	264 (61.3)
No	165 (38.3)
Missing	2 (0.5)
Tested through GCO	
Yes	119 (27.6)
No	145 (33.6)
Never been to GCO website	167 (38.7)

264/431) had been to the GetCheckedOnline website and 27.6% (119/431) had used GetCheckedOnline. Most had heard about GetCheckedOnline either through an advertisement on a website or app (28.1%), printed materials such as posters or brochures (24.8%) or social media (22.0%).

We examined 20 variables at a *social-structural level*, of which 6 were associated with use of GetCheckedOnline (online supplemental table 1): bisexual identity (reference: gay, uOR 1.78 (95% CI 1.03 to 3.05)), non-white or racialised minority identity (reference: white, uOR 0.46 (95% CI 0.27 to 0.76)), having an annual income <\$C20 000 (reference: ≥\$C80 000, uOR 0.40 (95% CI 0.17 to 0.86)), having full-time employment (reference: not, uOR 1.75 (95% CI 1.12 to 2.77)), being on government assistance (reference: not, uOR 0.23 (95% CI 0.04 to 0.81)) and

being able to count on 4–6 people for support (reference: 0–3 people, uOR 2.55 (95% CI 1.40 to 4.74)). Of three *provider-level* variables, participants who were out about their sexuality to their healthcare provider were less likely to use GetCheckedOnline (reference: not out, uOR 0.44 (95% CI 0.22 to 0.92)). Of six variables at the *organisational level*, two were associated with use of GetCheckedOnline: usually testing for STBBIs at a walk-in clinic (reference: at an STBBI or sexual health clinic, uOR 3.69 (95% CI 1.46 to 9.49)) and living with HIV (reference: HIV-negative, using PrEP, uOR 0.21 (95% CI 0.06 to 0.55)). No STBBI testing barriers experienced in the past year were associated with use of GetCheckedOnline. Finally, of 14 variables at the *individual level*, none were significant. In multivariate analysis, being Indigenous or a racialised minority (aOR=0.41 (95% CI 0.21 to 0.74)), living with HIV (aOR=0.23 (95% CI 0.05 to 0.76)) and usually testing at a walk-in clinic (aOR=3.91 (95% CI 1.36 to 11.61)) remained significantly associated with use of GetCheckedOnline (table 2).

Among people who had used GetCheckedOnline (n=119), the most commonly reported reasons for using GetCheckedOnline were as follows: it is more convenient than going to a clinic or doctor's office (78%), it saves time (74%), preferring to get test results online (55%) and not needing to see a doctor or nurse (52%) (table 3). Over two-thirds (69.7%, n=83) of those who had used GetCheckedOnline reported being likely or very likely to get tested through GetCheckedOnline again in the future.

Table 3 also describes reasons for not using GetCheckedOnline among participants who had only been to the website (n=145). The most commonly reported reason for not testing through GetCheckedOnline after having visited the website was that participants were just checking it out to see how the service works (48%). Other common reasons for not testing through GetCheckedOnline were preferring to get tested at their usual place (eg, doctor's office, clinic) (37%), not needing to get tested at the time (29%), preferring to get tested by a doctor or nurse (28%) and receiving regular testing at a clinic/doctor's office due to being on PrEP (26%). Only 24.1% (35/145) of those who had been to the GetCheckedOnline website but never tested were likely or very likely to get tested through GetCheckedOnline in the future.

## DISCUSSION

Our study assessing the reach of GetCheckedOnline among 2SGBTQ+ men in communities where the service was available found that among participants aware of the service, 27.6% had used GetCheckedOnline. Of variables significantly associated with use of GetCheckedOnline, the majority reflected the social-structural domain of implementation. Use was more likely among participants with bisexual identity, and less likely among participants reporting non-white racialised identities, less community support, having lower annual income, being on government assistance and having no full-time employment. Organisational- and provider-level variables were also associated with GetCheckedOnline use, wherein, 2SGBTQ+ men who usually tested at walk-in medical clinics and those not out to their providers were more likely to use GetCheckedOnline, while HIV-positive men were less likely to use GetCheckedOnline (presumed due to regular STBBI testing as part of HIV care). We found no associations at the individual level. Further, we found that the main reasons for using GetCheckedOnline were saving time, preferring to get results online and not needing to see a doctor or nurse. In contrast, the major reasons for not using GetCheckedOnline were just checking it out to see how it works,

preferring to get tested at their usual place, not needing to get tested at the time and preferring to get tested by a doctor or nurse.

The majority of research on IBT focuses on outcomes related to acceptability and feasibility, and our study is one of the first to use a population sampling approach to assess reach, factors associated with use and reasons for using and not using IBT. Additionally, our study used implementation science theory based on a multilevel framework, which particularly helped to demonstrate the importance of the social-structural domain on use of GetCheckedOnline among 2SGBTQ+ men in BC. However, our survey's non-probabilistic sampling approach may have over-represented certain 2SGBTQ+ men subgroups (eg, gay-identified and higher income men) and may not be generalisable to all subpopulations of 2SGBTQ+ men.<sup>27</sup> While our team's previous research reported no differences in GetCheckedOnline awareness between in-person and online survey participants,<sup>20</sup> the current study's web-based survey design may have led to sampling bias and possible overestimation of GetCheckedOnline use given participants' familiarity with online technology. Last, our sample size may have compromised the statistical power of our analyses leading to potential Type II errors in assessing differences among small sub-groups. Importantly, we recognise that the COVID-19 pandemic, which occurred after our study period, may have impacted reasons for use of IBT.

Our findings demonstrate that the reach of GetCheckedOnline is high among 2SGBTQ+ men after 5 years of programme implementation; however, important access inequities persist for some population subgroups. Further GetCheckedOnline programme adaptation requires an in-depth understanding of the cultural appropriateness and safety of IBT and potential barriers in accessing IBT for 2SGBTQ+ men with multiple socially marginalised identities, particularly in relation to testing need. Bisexual men, and those not out to their providers about their sexual identity, were more likely to have used GetCheckedOnline, suggesting that this testing model offers a level of cultural safety and appropriateness for specific subgroups of 2SGBTQ+ men. Those who usually tested at walk-in clinics were more likely to use GetCheckedOnline, as these services may offer similar perceived benefits and be preferred for similar reasons. These results are consistent with findings on intention to use IBT, as bisexual men may be more likely than gay men to use GetCheckedOnline due to greater discomfort discussing their sexual identity with providers and stigma when accessing gay-tailored services.<sup>9 28 29</sup> Previous research also indicates that higher intention to use IBT is linked to discomfort when testing through providers.<sup>8 20</sup> Moreover, 2SGBTQ+ men living with HIV may be less likely to intend to use IBT as they access specialised care for HIV treatment that includes STBBI testing.<sup>9</sup> In addition, significant differences in GetCheckedOnline use as a function of community support suggest that community-level factors may facilitate IBT use by promoting users' positive health behaviours (eg, routine testing).<sup>30</sup> However, some of our findings were unexpected, including that use of GetCheckedOnline by 2SGBTQ+ was not associated with experiencing barriers to testing in the past year. While this is novel in the context of our previous findings, this may relate to our sample; participants aware of GetCheckedOnline may be highly connected to and experienced with accessing STBBI testing services.

As a secondary objective, we described reasons for and against GetCheckedOnline use among this population. Specifically, saving time, getting results online and not needing to see a doctor or nurse were the most commonly reported reasons for using GetCheckedOnline. These findings align with reported

**Table 2** Factors associated with GCO use among 2SGBTQ+ men who have previously tested for STI that were entered into our multivariate model

Variables	Have used GCO n/N %	Have not used GCO n/N %	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Region of GCO availability				
Vancouver	86/336 (25.6)	250/336 (74.4)	Reference	Reference
Expansion regions (Island and Interior)	33/95 (34.7)	62/95 (65.3)	1.55 (0.94–2.51)	1.68 (0.87–3.21)
Experienced barriers to STI testing in past year				
Yes	64/225 (28.4)	161/225 (71.6)	1.11 (0.71–1.73)	1.00 (0.56–1.79)
No delays or skipped STI testing in the pastYear	47/178 (26.4)	131/178 (73.6)	Reference	Reference
Missing	8/28 (28.6)	20/28 (71.4)	1.11 (0.44–2.62)	1.26 (0.40–3.69)
Sexual identity				
Gay only	68/250 (27.2)	182/250 (72.8)	Reference	Reference
Bisexual	30/75 (40.0)	45/75 (60.0)	<b>1.78 (1.03–3.05)</b>	1.21 (0.59–2.44)
Queer (except queer-bi) or other	21/106 (19.8)	85/106 (80.2)	0.66 (0.37–1.13)	0.60 (0.29–1.17)
Race/ethnicity				
White	97/303 (32.0)	206/303 (68.0)	Reference	Reference
Non-white racialized identities	22/124 (17.7)	102/124 (82.3)	<b>0.46 (0.27–0.76)</b>	<b>0.41 (0.21–0.74)</b>
Missing	0/4 (0.0)	4/4 (100.0)	N/A	N/A
Income, annual (\$C)				
<\$20 000	10/59 (16.9)	49/59 (83.1)	<b>0.40 (0.17–0.86)</b>	0.45 (0.14–1.37)
\$20,000–\$49 999	32/129 (24.8)	97/129 (75.2)	0.65 (0.37–1.15)	0.74 (0.35–1.53)
\$50,000–\$79 999	34/111 (30.6)	77/111 (69.4)	0.87 (0.49–1.54)	0.78 (0.39–1.55)
≥\$80 000	35/104 (33.7)	69/104 (66.3)	Reference	Reference
Missing	8/28 (28.6%)	20/28 (71.4)	0.79 (0.30–1.92)	1.33 (0.37–4.42)
Employed full-time (30+ hours/week)				
Yes	82/258 (31.8)	176/258 (68.2)	<b>1.75 (1.12–2.77)</b>	1.53 (0.79–3.04)
No	36/171 (21.1)	135/171 (78.9)	Reference	Reference
Missing	1/2 (50.0)	1/2 (50.0)	N/A	N/A
Number of people you can count on for support				
0–3 people	21/114 (18.4)	93/114 (81.6)	Reference	Reference
4–6 people	42/115 (36.5)	73/115 (63.5)	<b>2.55 (1.40–4.74)</b>	1.90 (0.91–4.08)
7+people	35/132 (26.5)	97/132 (73.5)	1.60 (0.87–2.98)	1.72 (0.83–3.67)
Missing	21/70 (30.0)	49/70 (70.0)	1.90 (0.94–3.83)	0.48 (0.06–3.11)
Out to healthcare provider				
Yes	48/222 (21.6)	174/222 (78.4)	<b>0.44 (0.22–0.92)</b>	0.79 (0.30–2.17)
No	16/42 (38.1)	26/42 (61.9)	Reference	Reference
Does not have regular family doctor or nurse practitioner	29/90 (32.2)	61/90 (67.8)	0.77 (0.36–1.68)	1.15 (0.42–3.28)
Missing	26/77 (33.8)	51/77 (66.2)	0.83 (0.38–1.83)	4.80 (0.83–29.55)
Usual STI testing location				
A clinic or service offering testing for gay,bi, queer and trans people	31/119 (26.1)	88/119 (73.9)	1.19 (0.66–2.18)	1.32 (0.67–2.61)
An STI or sexual health clinic	26/114 (22.8)	88/114 (77.2)	Reference	Reference
Family physician	13/93 (14.0)	80/93 (86.0)	0.55 (0.26–1.13)	0.82 (0.25–1.30)
No usual place	2/9 (22.2)	7/9 (77.8)	0.97 (0.14–4.30)	0.99 (0.13–5.29)
Other	10/36 (27.8)	26/36 (72.2)	1.30 (0.54–2.99)	1.61 (0.61–4.13)
Walk-in medical clinic	12/23 (52.2)	11/23 (47.8)	<b>3.69 (1.46–9.49)</b>	<b>3.91 (1.36–11.61)</b>
GCO	25/25 (100.0)	0/25 (0.0)	N/A	N/A
Never had an STI test	0/7 (0.0)	7/7 (100.0)	N/A	N/A
Missing	0/5 (0.0)	5/5 (100.0)	N/A	N/A
HIV status and PrEP use				
HIV-negative, currentlytaking PrEP	45/145 (31.0)	100/145 (69.0)	1.07 (0.66–1.71)	0.92 (0.50–1.69)
HIV-negative, not currently taking PrEP	54/182 (29.7)	128/182 (70.3)	Reference	Reference
Living with HIV	4/49 (8.2)	45/49 (91.8)	<b>0.21 (0.06–0.55)</b>	<b>0.23 (0.05–0.76)</b>
Missing	16/55 (29.1)	39/55 (70.9)	0.97 (0.49–1.86)	0.52 (0.13–2.23)

BOLD: 95% CI excludes 1.

GCO, GetCheckedOnline; STI, sexually transmitted infection.

**Table 3** Reasons for using and not using GCO

Reason for using GCO among participants who had used the service (Check all that apply) (n=119)	N/N (%)
Reasons related to convenience of GCO	
More convenient than going to a clinic or doctors office	93/119 (78)
Saves time	88/119 (74)
Prefer to get my test results online	65/119 (55)
Clinic was full	10/119 (8)
Reasons related to preference for using GCO over in-person testing	
Don't need to see a doctor or nurse	62/119 (52)
Like being able to take my own swabs	40/119 (34)
Don't need to get a physical exam	30/119 (25)
Don't need to talk about my sex life	29/119 (24)
Don't need to tell anyone I have sex with guys	14/119 (12)
Reasons related to use of GCO enhancing privacy	
More private than going to a clinic or doctors office	32/119 (27)
Can test without using my real name	16/119 (13)
Don't need to see people I know in a waiting room	16/119 (13)
Other	6/119 (5%)
Not sure	1/119 (1%)
Reasons for not using GCO among participants visiting the website but not using the service (Check all that apply) (n=145)	n/N (%)
No need to test	
Just checking it out to see how it works	69/145 (48)
Didn't need to get tested at the time	42/145 (29)
Prefer provider-based testing over GCO	
Prefer to get tested at my usual place (eg, doctor's office, clinic)	54/145 (37)
Prefer to get tested by doctor or nurse	41/145 (28)
Didn't want to take own rectal/throat swabs	5/145 (3)
Testing through PrEP	
I regularly get tested at a clinic/doctor's office because I'm on PrEP	37/145 (26)
Challenges using the service	
Not easy to get to a lab location/ not in my area	13/145 (9)
Didn't have access to a printer/ couldn't download to phone	9/145 (6)
It was too complicated	8/145 (6)
Didn't have a promo or access code	8/145 (6)
Didn't have the time to do it	4/145 (3)
Rectal/throat swabs not available at the time	2/145 (1)
Low trust in service	
Worried about privacy of my information	9/145 (6)
Didn't trust that service was reliable	4/145 (3)
Other	4/145 (3)
Not sure	9/145 (6)
GCO, GetCheckedOnline.	

convenience and privacy benefits of IBT.<sup>6 7 20 21</sup> In contrast, merely checking out the service, preference for one's usual STBBI testing location, not needing STBBI testing and preference for STBBI testing with a doctor or nurse were the main reasons against GetCheckedOnline use. This novel assessment of reasons against use suggests that most GetCheckedOnline non-users do not experience access barriers; instead, they report curiosity about GetCheckedOnline and preferences for existing face-to-face services. Hence, our findings corroborate that IBT is designed to complement, not substitute, face-to-face testing.<sup>21</sup>

In conclusion, we found a high reach of GetCheckedOnline among 2SGBTQ+ men aware of the service, yet our findings

indicate persistent social inequities shaping IBT use. We determined that while reasons for testing with GetCheckedOnline were centred around convenience and privacy benefits, reasons against GetCheckedOnline use were not indicative of access barriers but of preferences for existing services. Based on these findings, future research should investigate how 2SGBTQ+ who are racialised and have lower socioeconomic positions are served by IBT and which IBT service model factors shape these potentialities, as well as identifying possible barriers to IBT use among these groups. Lastly, future promotional efforts to increase the reach of the service should highlight participants' key reasons for GetCheckedOnline use.

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## REFERENCES

- Canada PHA. *Reducing the health impact of sexually transmitted and blood-borne infections in Canada by 2030: A pan-Canadian STBBI framework for action*. Public Health Agency of Canada, 2018.
- Farley TA, Cohen DA, Elkins W. Asymptomatic sexually transmitted diseases: the case for screening. *Prev Med* 2003;36:502–9.
- Ward H, Rönn M. Contribution of sexually transmitted infections to the sexual transmission of HIV. *Curr Opin HIV AIDS* 2010;5:305–10.
- Werner RN, Gaskins M, Nast A, et al. Incidence of sexually transmitted infections in men who have sex with men and who are at substantial risk of HIV infection - A meta-analysis of data from trials and observational studies of HIV pre-exposure prophylaxis. *PLoS One* 2018;13:e0208107e0208107.
- Brogan N, Paquette DM, Lachowsky NJ, et al. Canadian results from the European men-who-have-sex-with-men Internet survey (EMIS-2017). *Can Commun Dis Rep* 2019;45:271–82.
- Hottes TS, Farrell J, Bondyra M, et al. Internet-based HIV and sexually transmitted infection testing in British Columbia, Canada: opinions and expectations of prospective clients. *J Med Internet Res* 2012;14:e41.
- Spence T, Kander I, Walsh J, et al. Perceptions and experiences of Internet-based testing for sexually transmitted infections. *Systematic Review and Synthesis of Qualitative Research J Med Internet Res* 2020;22:e17667.
- Gilbert M, Thomson K, Salway T, et al. Differences in experiences of barriers to STI testing between clients of the Internet-based diagnostic testing service Getcheckedonline.Com and an STI clinic in Vancouver, Canada. *Sex Transm Infect* 2019;95:151–6.
- Gilbert M, Hottes TS, Kerr T, et al. Factors associated with intention to use Internet-based testing for sexually transmitted infections among men who have sex with men. *J Med Internet Res* 2013;15:e254e254.
- De Boni RB, Veloso VG, Fernandes NM, et al. An Internet-based HIV self-testing program to increase HIV testing uptake among men who have sex with men in Brazil: descriptive cross-sectional analysis. *J Med Internet Res* 2019;21:e14145.
- Bauermeister JA, Pingel ES, Jadwin-Cakmak L, et al. Acceptability and preliminary efficacy of a tailored online HIV/STI testing intervention for young men who have sex with men: the get connected! program. *AIDS Behav* 2015;19:1860–74.
- Gilbert M, Salway T, Haag D, et al. A cohort study comparing rate of repeat testing for sexually transmitted and blood-borne infections between clients of an Internet-based testing programme and of sexually transmitted infection clinics in Vancouver, Canada. *Sex Transm Infect* 2019;95:540–6.
- Wilson E, Leyrat C, Baraitser P, et al. Does Internet-accessed STI (E-STI) testing increase testing uptake for Chlamydia and other Stis among a young population who have never tested? secondary analyses of data from a randomised controlled trial. *Sex Transm Infect* 2019;95:569–74.
- Napoleon SC, Maynard MA, Almonte A, et al. Considerations for STI clinics during the COVID-19 pandemic. *Sex Transm Dis* 2020;47:431–3.
- Joint submission by the British Association for Sexual Health and HIV (BASHH) and the British HIV Association (BHIVA). Health and Social Care Inquiry on delivering core NHS and care services during the pandemic and beyond 2020 [updated May 11, 2020], Available: <https://www.bashh.org/news/news/bashh-and-bhiva-respond-jointly-to-health-and-social-care-inquiry-on-covid-19/> [Accessed 10 Jun 2020].
- Gilbert M, Haag D, Hottes TS, et al. The development of a comprehensive, integrated Internet-based testing program for sexually transmitted and blood-borne infections in British Columbia, Canada. *JMIR Res Protoc* 2016;5:e186.
- Gilbert M, Salway T, Haag D, et al. Assessing the impact of a social marketing campaign on program outcomes for users of an Internet-based testing service for sexually transmitted and blood-borne infections: observational study. *J Med Internet Res* 2019;21:e11291.
- Edwards N, Barker PM. The importance of context in implementation research. *J Acquir Immune Defic Syndr* 2014;67 Suppl 2:S157–62.
- Chaudoir SR, Dugan AG, Barr CH. Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. *Implementation Sci* 2013;8:22.
- Dulai J, Salway T, Thomson K, et al. Awareness of and intention to use an online sexually transmitted and blood-borne infection testing service among gay and Bisexual men in British Columbia, two years after implementation. *Can J Public Health* 2021;112:78–88.
- Knight RE, Chabot C, Carson A, et al. Qualitative analysis of the experiences of gay, Bisexual and other men who have sex with men who use Getcheckedonline.Com: a comprehensive Internet-based diagnostic service for HIV and other Stis. *Sex Transm Infect* 2019;95:145–50.
- Glasgow RE, Harden SM, Gaglio B, et al. RE-AIM planning and evaluation framework: adapting to new science and practice with a 20-year review. *Front Public Health* 2019;7:64.
- Elm E von, Altman DG, Egger M, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ* 2007;335:806–8.
- Community-based research centre for gay men's health. Vancouver, BC. Sex Now Survey / Sondage Sexe au present, Available: <http://www.cbrc.net/sexnow>
- Canada S. Postal code conversion file plus (PCCF+)Version 7C, November 2019, postal codes. In: Canada S, ed. *Abacus Data Network; 2020 V1*. n.d.:
- R Core Team. *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing, 2018.
- Salway TJ, Morgan J, Ferlatte O, et al. A systematic review of characteristics of Nonprobability community Venue samples of sexual minority individuals and associated methods for assessing selection bias. *LGBT Health* 2019;6:205–15.
- Durso LE, Meyer IH. Patterns and predictors of disclosure of sexual orientation to Healthcare providers among lesbians, gay men, and Bisexuals. *Sex Res Social Policy* 2013;10:35–42.
- Souleymanov R, Fantus S, Lachowsky N, et al. How Bisexual-identified men use the Internet to seek sex with other men in Ontario: factors associated with HIV/STI testing and condom use. *Journal of Bisexuality* 2018;18:497–515.
- Valente TW, Fosados R. Diffusion of innovations and network Segmentation: the part played by people in promoting health. *Sex Transm Dis* 2006;33(7 Suppl):S23–31.