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Use of GetCheckedOnline and testing through healthcare providers among repeat users of British Columbia's digital testing service for sexually transmitted and blood-borne infections: Findings from a cross-sectional survey

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Abstract

Background: Digital testing services for sexually transmitted and blood-borne infections (STBBI) are becoming more common in Canada. There is little evidence supporting the assumption that these services reduce healthcare system burden. To explore this further, we described patterns of provider-based testing among repeat users of a digital STBBI testing service, and their association with access barriers.

Methods: We conducted a cross-sectional survey in November 2022 of repeat GetCheckedOnline.com users (≥2 tests, with 1 test between April and October 2022). We stratified participants into three use patterns of GetCheckedOnline for testing, using ordinal logistic regression to examine associations with barriers reflecting availability, accessibility, acceptability and appropriateness of health services (applying weights to adjust for non-responders).

Results: Of 798 participants (17.2% of 4633 eligible), 52.6% only and 35.8% mostly tested through GetCheckedOnline; 14.5% tested more often/equally through healthcare providers. Availability was associated with greater use of GetCheckedOnline (e.g., not having a primary care provider, OR 2.03, 95% CI [1.52–2.73]), and appropriateness with lower use (getting tested part of clinical care, OR 0.07 95% CI [0.05–0.11]). Participants < 25 years, high school educated or less or born outside Canada reported greater use of GetCheckedOnline for testing while 2S/LGBTQ+ and full-time employed participants reported lower use. Most participants (88.0%) would have tested through a provider if GetCheckedOnline were not available.

Conclusion: GetCheckedOnline use was associated with barriers to the availability of provider-based testing. Digital STBBI testing services may improve access to testing and reduce demands on healthcare providers for testing.

Keywords

health services, sexually transmitted infections, internet, screening, British Columbia

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Introduction

The current Canadian primary healthcare access crisis affects both patients and healthcare providers and urgently requires solutions. In 2022, 44% of Canadians reported it difficult or impossible to access non-emergency care.[1] Workforce shortages and rising service demands are leading to increasing workload, overtime and burn-out among Canadian healthcare providers.[2] Digitally enabled health

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services are considered solutions for improving healthcare access in Canada and are valued by patients and providers alike.[3,4] Such services may facilitate patient access to healthcare providers directly (e.g., virtual visits) and support greater patient engagement in their own healthcare (e.g., patient access to health records). However, high-quality evidence of the health system impacts of digitally enabled health services is generally lacking, including examining whether services reduce demand on healthcare providers as well as inequities in service access.[5,6]

Testing for sexually transmitted and blood-borne infections (STBBI) is a case in point, given rising rates of infections,[7] demand on existing services,[8] and access barriers similar to other health services and specific to STBBI testing (e.g., long wait-times for appointments, distance to services, fearing discrimination or judgement from healthcare providers, embarrassment or shame about getting tested).[9–11] Digital STBBI testing services are an established way of providing STBBI testing in many countries[12,13] and are becoming more common in Canada.[14] Typical models for these services include online ordering of home self-test kits, online ordering of kits for self-collection of specimens returned to a laboratory for testing or generating an online lab form to take to a lab.[14]

In British Columbia, Canada, the BC Centre for Disease Control operates GetCheckedOnline.com, a digital STBBI testing service that was designed according to clinical best practices to complement provider-based testing (described elsewhere).[16] Prior research has demonstrated that GetCheckedOnline is acceptable,[17,18] used by people facing barriers accessing STBBI testing,[9] has equivalent rates of treatment and partner notification compared to usual care,[19] and that service utilization increased as a result of the COVID-19 pandemic.[20] The service involves four steps: i) visit the website and create an account using an email address; ii) complete a risk assessment questionnaire and generate a lab form, iii) go to a local laboratory to provide blood, urine and/or self-collected throat and rectal swabs (tested for HIV, hepatitis C, syphilis, chlamydia and/or gonorrhea); and iv) receive results online if negative, or from a nurse if positive to arrange treatment and follow-up. After creating an account, people receive reminders to test and can test repeatedly. GetCheckedOnline is free, does not verify demographic information provided, and users are asked to consent to be contacted for evaluation purposes. As of July 2024, GetCheckedOnline is available in eight communities in BC. In 2022, 16,223 people used the service generating 22,443 tests with 55% of tests among repeat users (Figure 1).

Digital STBBI testing services like GetCheckedOnline are assumed to decrease health-care system burden by shifting asymptomatic, routine testing away from provider-based clinical testing services to online. However, there is little evidence supporting this assumption and limited understanding of how service users use both digital and provider-based testing services. The primary objective of our exploratory study was to describe patterns of use, and perceptions of, digital and provider-based testing services among GetCheckedOnline users. As a secondary objective, we determined whether barriers accessing provider-based

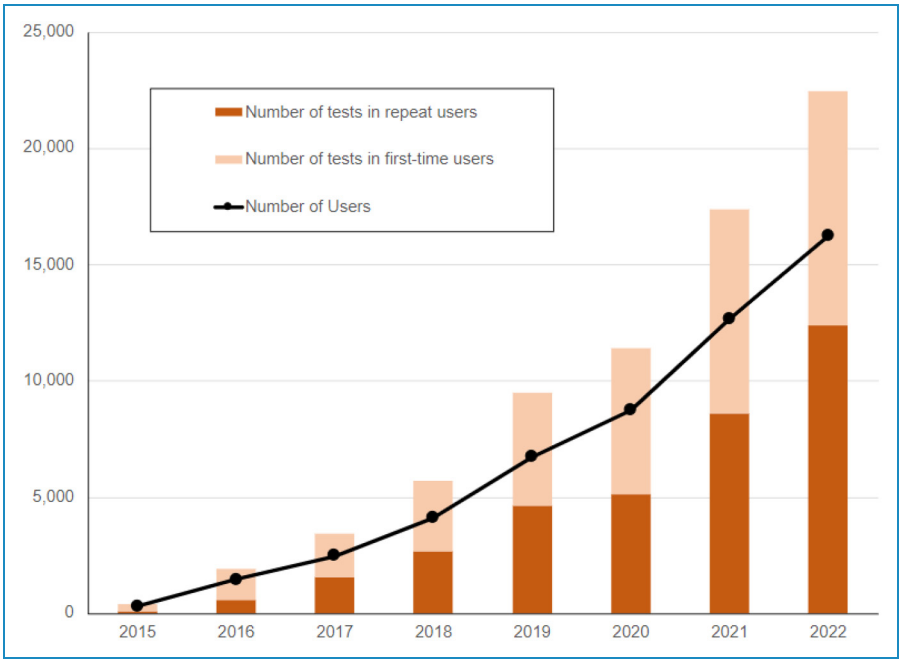

Figure 1. GetCheckedOnline program outcomes, 2015 to 2023.

testing were associated with these patterns. We hypothesized that individuals with these barriers would be more likely to report greater use of GetCheckedOnline for testing.

Methods

We used the STROBE statement for reporting on cross-sectional studies to organize our results.[15]

Study design, population and setting

We conducted an online, cross-sectional survey of repeat users of GetCheckedOnline, who we considered most likely to have established a pattern of use of GetCheckedOnline and provider-based testing services.

Survey instrument

We developed a survey for people who repeatedly use GetCheckedOnline for testing (repeat users). The maximum survey length was 81 questions across five domains including participants' use and perception of GetCheckedOnline, socio-demographic characteristics, access to and use of provider-based STI testing, sexual behaviour and use of healthcare and technology. Survey questions were informed by prior research findings about GetCheckedOnline mapped to single constructs of the Theoretical Domains Framework,[9,18,20] and selected based on the feedback of program implementers and our Community Advisory Board comprising people from populations affected by STBBI across BC. The survey was pilot-tested with 10 community members familiar with GetCheckedOnline and subsequently modified to enhance language accessibility (for survey instrument, see Appendix).

Recruitment and data collection

Eligible repeat users of GetCheckedOnline met the following criteria: i) had previously consented to be contacted for evaluation purposes; ii) having ≥2 tests through GetCheckedOnline, with ≥1 test between April 7, 2022, and October 7, 2022; iii) created an account prior to this period; and iv) 16 years of age or older. Invitations to the online survey were sent to eligible participants on 21 November 2022, with email reminders at 2, 4 and 7 days until the survey closed on December 6. The survey landing page described the purpose of the study, additional eligibility criteria (able to complete the survey in English) and offer of a $20 honorarium, with proceeding to the survey taken as provision of informed consent. We collected survey data using REDCap electronic data capture tools hosted at the BC Children's Hospital Research Institute.[21] Ethics approval for this study was obtained from the UBC Behavioural Research Ethics Board.

Statistical analysis

Survey data was imported into R version 3.5.2 (2018-12-20) for analysis[22] and participants who reported testing <2 times through GetCheckedOnline were excluded. Our primary outcome of interest was patterns of use of GetCheckedOnline and provider-based testing, based on the question 'What best describes your current way of getting tested for STIs?' which was collapsed into a three-level ordinal variable (ranging from least to most use of GetCheckedOnline compared to testing through healthcare providers): i) test more often through healthcare providers or test equally through GetCheckedOnline and health care providers; ii) mostly test through GetCheckedOnline, sometimes through a healthcare provider; and iii) only test through GetCheckedOnline. For barriers related to accessing testing, we grouped survey variables according to the following health policy context categories from the Health Equity Measurement Framework.[23] *Availability*, or the infrastructure and organization for provision of services, included the variables having a primary care provider, and having a usual place where comfortable getting tested by a healthcare provider for STIs. As availability of providers for testing may have been lower for participants creating their accounts during the COVID-19 pandemic we also included reported time since account creation as an availability variable. *Accessibility*, or an individual's ability to use services when needed, included the variables ease of seeing a provider for STI testing when needed and feeling anxious in clinic waiting rooms when testing for STIs. *Acceptability*, or provision of respectful and responsive services regardless of social location, included the variables comfort discussing sexual history with healthcare providers, and worry about being judged by healthcare providers when providing a sexual history. *Appropriateness*, or providing suitable, evidence-based health services balanced with individual needs and preferences, included the variable for requiring STBBI testing as part of routine clinical care for HIV treatment, HIV pre-exposure prophylaxis or contraception (i.e., where offer of STBBI testing by providers to participants would be routine).

To adjust for non-response bias, we applied post-stratification weights based on program data for age, gender identity and number of GetCheckedOnline tests performed by all repeat users eligible for the study (weighted percentages presented below).[24] We conducted bivariate analyses between our outcome of interest and barriers related to accessing testing and key socio-demographic characteristics using ordinal logistic regression weighted using the same post-stratification weights. We also described reasons for use of healthcare providers for testing among participants reporting using both digital and provider-based testing services.

Results

Of 4633 eligible repeat users of GetCheckedOnline, 798 (17.2%) were included in our final analysis, or 44% of the

1798 eligible repeat users who had previously consented to be contacted for research and invited to this survey (Figure 2). The median age of participants was 33 years, 59.3% were White, 48.0% were women, 66.7% had a sexual identity other than straight/heterosexual and 58.8% had a Bachelors' degree or higher (Table 1). A minority had been homeless or unstably housed in the past year (1.2% and 6.8%, respectively), and 33.6% of participants reported an annual income <$40,000. One-eighth (11.9%) of participants were recent immigrants to Canada.

Most participants had tested three or more times through GetCheckedOnline (80.3%), creating accounts in the past year (14.8%), past 1–2 years (48.0%) and ≥3 years ago (35.8%) (Table 2). Most participants agreed or strongly agreed that they tested sooner through GetCheckedOnline than through a provider (85.6%) and were testing more often than before using GetCheckedOnline (86.3%). While most participants reported that they would have tested through a healthcare provider if GetCheckedOnline had not been available, 12.0% reported they would have done nothing/would not have sought care. Overall, 97.7% of participants reported being mostly or completely satisfied with GetCheckedOnline.

Regarding patterns of use, over half of participants described their usual way of testing for STIs as being only through GetCheckedOnline (52.6%), with 33.0% reporting mostly testing through GetCheckedOnline and sometimes through a healthcare provider, and 14.5% reporting testing more often or equally through healthcare providers. We found greater use of GetCheckedOnline was associated with factors related to availability of provider-based testing including not having a primary care provider and not having a usual place where comfortable getting tested for STIs by a provider (Table 3). Creating an account three or more years earlier (i.e., pre-COVID pandemic) was associated with less use of GetCheckedOnline. Variables related to accessibility and acceptability of provider-based testing were not associated with patterns of use; however, appropriateness of testing through a provider was associated with lower use of GetCheckedOnline for testing (getting tested for STI as part of clinical care). Among 386 participants who reported using a combination of GetCheckedOnline and providers, the most common reasons for testing through a provider instead of GetCheckedOnline included when seeing a provider for another reason (48.6%), when wanting to speak to a provider about sexual health (33.8%) and when having symptoms (29.2%) (Figure 3).

In terms of socio-demographic factors, age < 25, having up to high school education, earning less than $20,000 per

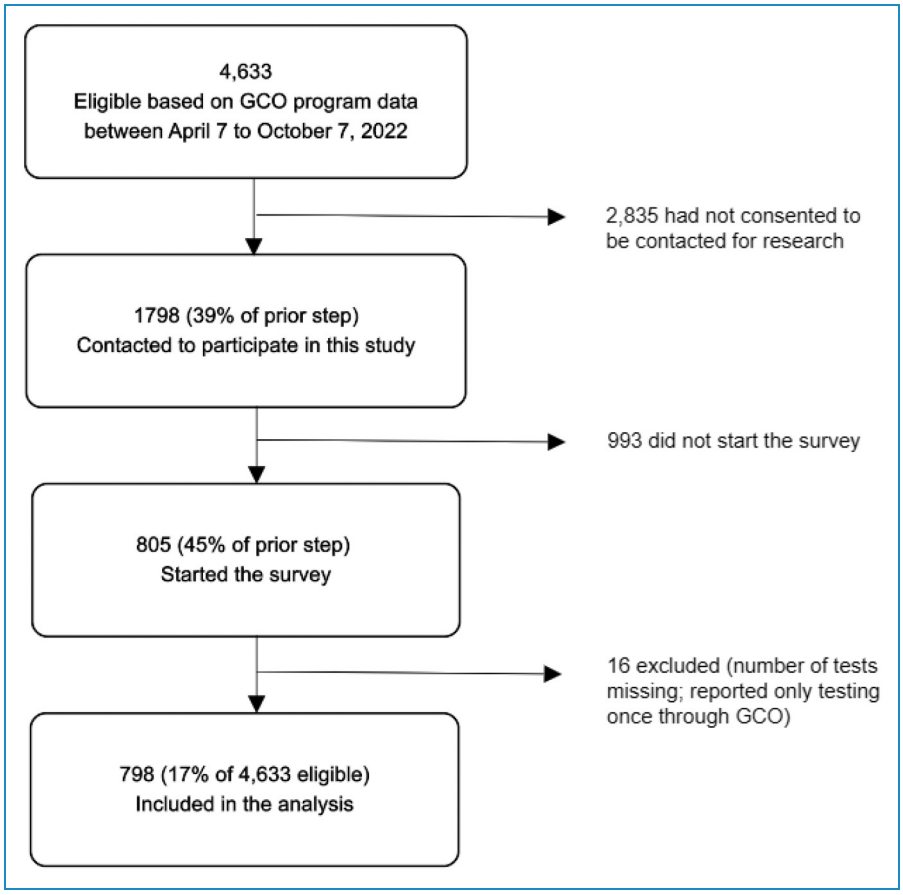

Figure 2. Recruitment outcomes.

Table 1. Description of survey participants who were repeat users of GetCheckedOnline in BC and tested between April 7 and October 7, 2022 ($N = 789$).

Characteristic	n/N[a]	Percent	Weighted percent[b]
Age (median, interquartile range)	33 years (27–41 years)		
Race/Ethnicity			
Indigenous (First Nations, Métis, Inuit)[c]	44/751	5.9%	5.4%
Persons of colour	229/751	29.8%	33.8%
White (only)	467/751	62.2%	59.3%
Not know/prefer not to say	16/751	2.1%	1.7%
Gender identity (not mutually exclusive)			
Woman	361/761	48.0%	—
Man	344/761	45.7%	—
Another gender (agender, genderfluid, genderqueer, non-binary, unsure/questioning, prefer other term)	84/761	11.2%	—
Prefer not to say	9/761	1.2%	—
Sexual identity (not mutually exclusive)			
Asexual	8/761	1.1%	0.8%
Bi (bisexual)	153/761	20.3%	17.6%
Gay	186/761	24.7%	27.0%
Lesbian	6/761	0.8%	0.3%
Straight (heterosexual)	296/761	39.4%	45.3%
Pansexual	69/761	9.2%	4.8%
Queer	92/761	12.2%	7.7%
Heteroflexible (mostly straight)	77/761	10.2%	8.5%
Prefer another term	7/761	0.9%	0.6%
Prefer not to say	7/761	0.9%	0.4%
Education			
Elementary or some high school	5/761	0.7%	0.9%
High school or equivalent	73/761	9.7%	13.4%
Post-secondary school (e.g., certificate, diploma)	202/761	26.9%	26.5%
Bachelor's degree	296/761	39.4%	38.9%

(continued)

Table 1. Continued.

Characteristic	n/N[a]	Percent	Weighted percent[b]
Graduate degree (Master's, PhD, MD, etc.)	170/761	22.6%	19.9%
Prefer not to say	6/761	0.8%	0.4%
Income (before tax) in 2021			
<$20,000	78/761	10.4%	14.6%
$20,000–$39,999	122/761	16.2%	19.0%
$40,000–$59,999	151/761	20.1%	20.9%
$60,000–$79,999	140/761	18.6%	17.4%
$80,000 or more	208/761	27.7%	22.3%
Prefer not to say	53/761	7.0%	5.8%
Housing (not mutually exclusive)			
Homeless (in past year)	7/749	0.9%	1.2%
Temporarily live with someone else because had nowhere to live (in past year)	43/749	5.7%	6.8%
Immigration status			
Born in Canada	517/752	68.8%	67.2%
Immigrated to Canada ≤ 5 years ago	65/752	8.6%	11.9%
Immigrated to Canada > 5 years ago	152/752	20.2%	18.9%
Immigrated to Canada – year unknown	8/752	1.1%	1.1%
Prefer not to say	10/752	1.3%	0.8%
Sexual behaviour and history			
Had three or more partners (past 12 months)	574/747	77%	75%
Had condomless vaginal or anal sex (past 3 months)	347/740	47%	44%
Had past diagnosis of a sexually transmitted or blood-borne infection	382/739	52%	50%

[a]Missing responses excluded.
[b]Percentages shown are weighted percentages (post-stratification weights based on age, gender identity, and number of times tested through GetCheckedOnline).
[c]Four (7%) Indigenous participants identified as Two-Spirit.

year and being born outside Canada were associated with greater use of GetCheckedOnline for testing (Table 3). 2S/LGBTQ+ identity and full-time employment were associated with less use of GetCheckedOnline for testing. Race/ethnicity, gender identity variables and being underhoused were not associated with greater or lesser use of GetCheckedOnline for testing.

Discussion

Approximately 85% of our sample tested mostly or only through GetCheckedOnline, with greater use of GetCheckedOnline associated with barriers related to the availability of provider-based testing, suggesting GetCheckedOnline is improving access to STBBI testing for some repeat users

Table 2. Use of GetCheckedOnline (GCO) and healthcare providers for testing and related outcomes ($n = 789$).

Characteristic	n/N[a]	Percent	Weighted percent[b]
Number of times tested through GCO			
Two times	155/789	19.6%	—
Three to four times	285/789	36.1%	—
More than five times	349/789	44.2%	—
Usual way of getting tested for STIs (not collapsed)			
Only through GCO	362/750	48.3%	52.6%
Mostly through GCO, sometimes through healthcare provider	281/750	37.5%	33.0%
Equally through GCO and healthcare providers	56/750	7.5%	7.6%
Sometimes through GCO but mostly through healthcare providers	47/750	6.3%	6.6%
Only through a healthcare provider	2/750	0.3%	0.3%
Don't know	2/750	0.3%	0.3%
Reasons for testing through a healthcare provider instead of GCO (if sometimes, equally or mostly test through a healthcare provider)			
Seeing provider for another reason and can test at same time	190/386	49.6%	48.6%
Want to speak to a provider about my sexual health	135/386	35.2%	33.8%
When I have symptoms	112/386	29.2%	26.5%
When I need routine testing as part of HIV care (treatment, PrEP)	103/386	26.9%	25.7%
When I need a test that is not offered by GCO	101/386	26.4%	25.1%
When a partner tells me they have an STI	53/386	13.8%	13.5%
Other reason	39/386	10.2%	9.5%
No particular reason	12/386	3.1%	3.5%
Agree or strongly agree with following statements (vs not):			
Through GCO get tested for STIs sooner than I can get tested by a healthcare provider	654/748	87.4%	85.6%
I test more often because of GCO than I did before using the service	642/745	86.3%	86.3%
The last time you tested through GCO, how would you have gotten tested if GCO weren't available?			
In-person visit with a healthcare provider	296/747	39.6%	37.6%
Virtual visit with a healthcare provider	165/747	22.1%	22.4%
Walk-in clinic	173/747	23.2%	24.3%

(continued)

Table 2. Continued.

Characteristic	n/N[a]	Percent	Weighted percent[b]
Emergency department	2/747	0.3%	0.5%
Other	80/747	3.5%	3.0%
I would have done nothing/I would not have sought care	26/747	10.7%	12.0%
Prefer not to answer	5/747	0.7%	0.3%
Satisfaction with GCO service			
Not at all satisfied	2/765	0.3%	0.2%
Somewhat satisfied	15/765	2.0%	2.2%
Mostly satisfied	207/765	27.4%	27.5%
Completely satisfied	532/765	70.4%	70.2%

[a]Missing responses excluded.
[b]Percentages shown are weighted percentages (post-stratification weights based on age, gender identity, and number of times tested through GetCheckedOnline).

of the service. However, 89% of the sample said they would have tested elsewhere (i.e., through a healthcare provider) if GetCheckedOnline had not been available the last time they tested. These findings support the assumption that digital STBBI testing services like GetCheckedOnline reduce the demand on the healthcare system by shifting testing away from provider-based clinical testing services. As expected, testing through providers as a routine part of ongoing clinical care such as HIV pre-exposure prophylaxis was associated with lower use of GetCheckedOnline for testing, and participants commonly reported testing through providers for these and other scenarios where provider-based testing would be recommended.

Few other studies have explored patterns of use of both digital and provider-based services for STBBI testing, and these have been primarily focused on sexual health clinic settings.[25,26] Other surveys have suggested that patient use of digital technologies may reduce demands on healthcare providers (e.g., access to own electronic health information leading to avoided clinic or emergency room visits)[27] or overcome gaps in access to primary care (e.g., telehealth users having lower access to primary care).[28]

While our study suggests that digital STBBI testing services like GetCheckedOnline may decrease the demand on healthcare providers for testing, another common rationale for these services is their impact on health equity, reaching populations facing disparities in resource access.[29] We did find that lower income, lower education, younger age and immigrant status were associated with greater use of GetCheckedOnline for testing, suggesting equitable improvements in access for these groups. While participants identifying as 2S/LGBTQ + had lower use patterns of GetCheckedOnline for testing, this may be related to greater existing access to testing or use of HIV PrEP in this group.

Given the importance of health system contexts, validation of these findings in other jurisdictions and with different service models is needed. Further studies should also better quantify the impact on primary care providers of digital STBBI testing services at scale, including modeling and economic analyses,[30] and understand healthcare provider perspectives on these services. Further work exploring the equity implications of our findings is also needed.

As a long-running digital STBBI testing service in Canada which has been scaled up to multiple geographic communities, our study was well positioned to look at how repeat users access both digital and provider-based testing and included long- and short-term repeat users of the service. Our findings may be generalizable to other Canadian jurisdictions and to similar models of digital STBBI testing services. We also acknowledge that only 17% of all eligible repeat testers during our study period participated in the survey. While we used post-stratification weighting based on the prevalence of key socio-demographic factors of all repeat testers, it is possible that selection bias may have affected our results (e.g., if repeat testers with access to providers were more likely to participate).

Conclusion

Our study suggests digital STBBI testing services improve equity in testing access and supports the assumption that

Table 3. Results of bivariate analysis of patterns of use of provider-based testing and explanatory variables ($n = 742$; 732 for weighted analyses).

	Level 1: Test more often or equally through HCP ($n = 103$)	Level 2: Mostly test through GCO ($n = 281$)	Level 3: Only test through GCO ($n = 362$)	OR (95%CI)
Availability				
Primary care provider:				
Does not have a family doctor or nurse practitioner	30/103 (34%)	76/280 (30%)	152/359 (50%)	**2.03 (1.52–2.73)**
Has a family doctor or nurse practitioner	73/103 (66%)	204/280 (70%)	207/359 (50%)	Ref
Has a usual place comfortable going to get tested by a provider for STIs:				
Strongly disagree/disagree	14/103 (17%)	77/280 (32%)	144/357 (37%)	**1.71 (1.27–2.32)**
Neither/agree/strongly agree	89/103 (84%)	203/280 (68%)	213/357 (63%)	Ref
Time since account creation				
Created account in past year	6/103 (7%)	28/272 (15%)	49/356 (17%)	Ref
Created account 1–2 years ago	37/103 (44%)	115/272 (45%)	148/356 (51%)	0.81 (0.53–1.23)
Created account 3+ years ago	60/103 (49%)	129/272 (39%)	159/356 (32%)	**0.53 (0.34–0.81)**
Accessibility				
Easy to see a health care provider for STI testing when needed				
Strongly disagree/disagree	36/101 (37%)	141/281 (53%)	204/357 (52%)	1.27 (0.96–1.68)
Neither/agree/strongly agree	65/101 (63%)	140/281 (47%)	153/357 (48%)	Ref
Anxious in waiting rooms when testing for HIV/STIs				
Strongly agree/agree	20/101 (26%)	96/281 (35%)	124/357 (36%)	1.23 (0.92–1.65)
Neither/disagree/strongly disagree	65/101 (63%)	140/281 (47%)	153/357 (48%)	Ref
Acceptability				
Comfort discussing sexual history with healthcare providers				
Very uncomfortable/uncomfortable	10/103 (16%)	62/280 (21%)	74/359 (18%)	0.97 (0.68–1.38)
Neither/comfortable/very comfortable	93/103 (84%)	218/280 (79%)	285/359 (82%)	Ref
Worry about being judged by healthcare providers providing sexual history				
Very worried / Somewhat worried	25/103 (28%)	117/278 (41%)	141/359 (38%)	1.13 (0.85–1.50)

(continued)

Table 3. Continued.

	Level 1: Test more often or equally through HCP ($n = 103$)	Level 2: Mostly test through GCO ($n = 281$)	Level 3: Only test through GCO ($n = 362$)	OR (95%CI)
Neutral / A little worried / Not at all worried	78/103 (72%)	161/278 (59%)	218/359 (62%)	Ref
Appropriateness				
Get tested regularly for STI as part of clinical care received from a healthcare provider				
Yes	82/103 (78%)	105/280 (32%)	27/360 (7%)	**0.07 (0.05–0.11)**
No / Not sure	21/103 (22%)	175/280 (68%)	333/360 (93%)	Ref
Socio-demographics				
Race/ethnicity (mutually exclusive)				
Indigenous (First Nations, Inuit, Métis)	6/99 (5%)	19/278 (8%)	19/354 (4%)	0.74 (0.41–1.34)
People of colour	31/99 (43%)	79/278 (28%)	111/354 (36%)	1.01 (0.74–1.37)
White	62/99 (52%)	180/278 (65%)	224/354 (60%)	Ref
Age				
<25	5/103 (14%)	30/278 (25%)	51/355 (30%)	**1.64 (1.05–2.56)**
25–29	18/103 (23%)	65/278 (25%)	91/355 (29%)	1.38 (0.89–2.14)
30–39	47/103 (46%)	100/278 (33%)	109/355 (27%)	0.83 (0.54–1.26)
40+	33/103 (17%)	83/278 (17%)	104/355 (15%)	Ref
Gender identity (mutually exclusive)				
Man (only)	69/103 (71%)	96/278 (42%)	161/358 (57%)	Ref
Woman (only)	26/103 (27%)	145/278 (54%)	158/358 (40%)	0.97 (0.73–1.29)
Genderqueer, genderfluid, agender, non-binary and multiple identities	8/103 (2%)	37/278 (4%)	39/358 (4%)	1.23 (0.59–2.71)
Gender history/experience				
My gender is different from my sex assigned at birth (also called transgender)	5/102 (2%)	13/274 (2%)	16/350 (2%)	1.20 (0.47–3.36)
My gender is the same as my sex assigned at birth (also called cisgender)	97/102 (99%)	261/274 (98%)	334/350 (98%)	Ref
Sexual identity				
Straight (heterosexual) only	17/102 (20%)	92/280 (39%)	169/359 (52%)	Ref

(continued)

Table 3. Continued.

	Level 1: Test more often or equally through HCP ($n = 103$)	Level 2: Mostly test through GCO ($n = 281$)	Level 3: Only test through GCO ($n = 362$)	OR (95%CI)
Two-Spirit / Lesbian, Gay, Bisexual, Trans, Queer Plus (2S/LGBTQ+)	85/102 (80%)	188/280 (61%)	190/359 (48%)	**0.43 (0.32–0.57)**
Highest level of education completed				
Up to high school	6/103 (7%)	25/280 (9%)	47/359 (20%)	**2.59 (1.66–4.16)**
Post-secondary school (e.g., certificate, diploma)	31/103 (36%)	80/280 (26%)	90/359 (24%)	0.84 (0.61–1.17)
Bachelor's degree or Graduate degree (Master's, PhD, MD, etc.)	66/103 (57%)	175/280 (65%)	222/359 (56%)	Ref
Employed full time				
Yes	75/103 (74%)	187/281 (66%)	222/362 (60%)	**0.69 (0.51–0.92)**
No	28/103 (26%)	94/281 (34%)	140/362 (40%)	Ref
Income (before tax), 2021				
$20,000 or more	92/98 (94%)	235/262 (89%)	290/335 (79%)	Ref
Less than $20,000	6/98 (6%)	27/262 (11%)	45/335 (21%)	**2.61 (1.70–4.08)**
Homeless or transient housing (past year)				
Yes	7/103 (9%)	17/280 (6%)	18/357 (7%)	0.98 (0.56–1.75)
No / I don't know	96/103 (91%)	263/280 (95%)	339/357 (93%)	Ref
Immigration status				
Born in Canada	72/102 (67%)	205/280 (75%)	239/357 (63%)	Ref
Born outside Canada	30/102 (33%)	75/280 (25%)	118/357 (37%)	**1.44 (1.06–1.96)**

Notes: Participants with missing data or 'Prefer not to say' responses excluded from analyses of each variable. Percentages are weighted percentages ($N = 732$).
GCO: GetCheckedOnline; HCP: Healthcare Professional; OR: weighted odds ratio (OR > 1 indicates greater use of GCO).
Bold values indicate statistical significance.

they reduce healthcare system demands by shifting provider-based to digital testing services. Our findings have implications for scaling-up overall access to STBBI testing, as the majority of tests conducted through these services may be shifted from health care providers, avoiding costs to the healthcare system. However, further research using population-level testing and health utilization data is needed to more robustly understand the impact of digital STBBI testing services within the broader testing ecosystem. Furthermore, we caution that these patient and health system benefits of digital STBBI testing should not be a reason for replacing or reducing the availability of provider-based testing services – both as an appropriate route of testing and for populations with lower digital literacy. As digital STBBI testing services become more common in Canada, it will also be important to ensure that these services are of high quality, adapt to reflect changes in testing recommendations and provide clinically appropriate information – a challenge that is emerging elsewhere, particularly in relation to for-profit providers of these services.[31]

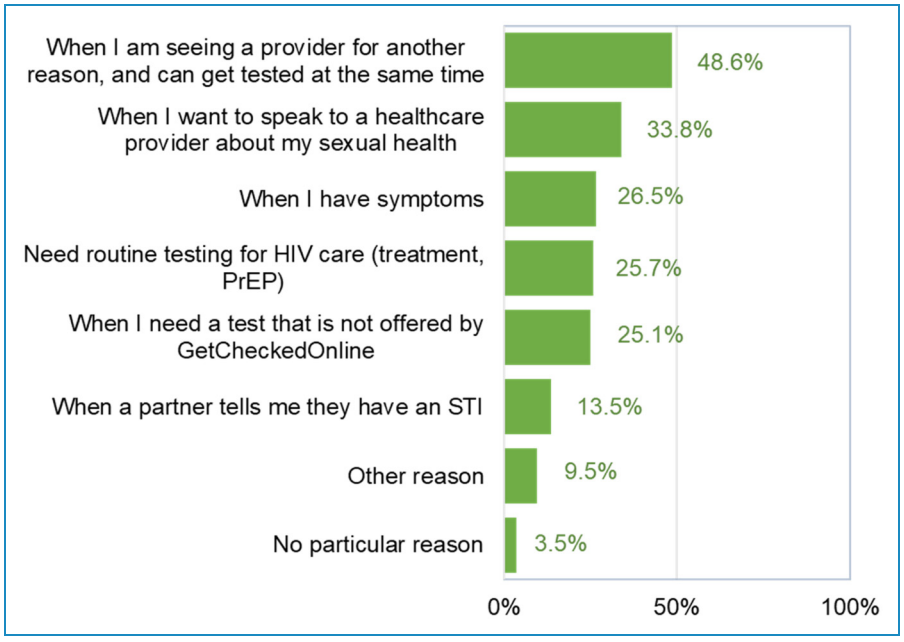

Figure 3. Scenarios for testing through healthcare providers instead of GetCheckedOnline ($N = 386$ participants reporting testing through a combination of both modalities; multiple responses possible).

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Ethical considerations

Ethics approval for this study was obtained from the UBC Behavioural Research Ethics Board (ethics #H18-00437).

Author contributions

MG led all aspects of this study. AA, HC, II, HP, PF, NL, DG and CW contributed to study design with AA, HC, II, and RSR contributing to data analysis. All authors contributed to interpretation of study findings and preparation of this manuscript.

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Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Informed consent

Informed consent was obtained from all participants.

Supplemental material

Supplemental material for this article is available online.

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