Perspectives on digital testing services for sexually transmitted and blood-borne infections from Two-Spirit, gay, bisexual, transgender, and other queer Black, Indigenous, people of colour living in Ontario, Canada

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ABSTRACT

Objectives: Increased sexually transmitted and blood-borne infections (STBBI) testing can reduce the burden of disease among Two-Spirit, gay, bisexual, transgender, and other queer Black, Indigenous, people of colour (2SGBTQ+ BIPOC). However, this population encounters barriers, such as discrimination, when accessing in-person STBBI testing services. Digital STBBI testing, such as self-testing/collection kits ordered online and digital requisitions, may address some of these barriers. Our aim was to understand acceptability of free digital STBBI testing among 2SGBTQ+ BIPOC living in Ontario, Canada.

Design: We approached this analysis using Implementation Science and Critical Race Theory. We conducted interviews and focus groups with 21 2SGBTQ + BIPOC individuals from 2020–2021. Participants were asked about their perceptions of the benefits and drawbacks of digital STBBI testing, populations that would benefit from using these services, and recommendations for how these services may be implemented in Ontario. Interviews and focus groups were transcribed verbatim and analyzed using reflexive thematic analysis.

Results: Six themes emerged. Digital STBBI testing services: (1) May reduce oppression experienced by 2SGBTQ + BIPOC when testing in-person; (2) Should address the unique needs that 2SGBTQ + BIPOC experience due to other intersecting identities they possess; (3) Should adapt their services to suit the varying cultural contexts and living circumstances of 2SGBTQ + BIPOC; (4) Should be accessible to 2SGBTQ + BIPOC who hold diverse or no documentation; (5) Should be offered in multiple languages; (6) May be inaccessible to those without Internet access or devices.

Conclusion: Digital STBBI testing is one strategy that may reduce discrimination experienced by 2SGBTQ + BIPOC when getting tested in-person. However, digital STBBI testing services may not address all the needs of 2SGBTQ + BIPOC. Racism and other forms of oppression embedded into in-person and digital testing services will need to be addressed to meet the needs of this diverse population.

Introduction

The burden of sexually transmitted and blood-borne infections (STBBI), such as gonor-rhea, syphilis, and HIV, is higher among groups that experience marginalization in Canada such as gay, bisexual, and other men who have sex with men (GBM); Indigenous individuals; and members of the African, Caribbean, and Black (ACB) communities (Minichiello, Rahman, and Hussain 2013; Nelson et al. 2019; Public Health Agency of Canada 2015). In Canada, the term 'Indigenous' refers to the original inhabitants of the country and their descendants, and is comprised of three groups: the First Nations, the Métis, and the Inuit (FNMI) (Crown-Indigenous Relations and Northern Affairs Canada, Government of Canada 2009). The term 'Black' encompasses diverse communities who have been racialized due to having dark skin and whose ancestry can be traced back to Sub-Saharan Africa (BC Black History Awareness Society 2023; Cénat 2022). They may be descendants of slaves who were forcibly removed from their homes during the Transatlantic Slave Trade or may have migrated here directly from the African continent (BC Black History Awareness Society 2023; Parks Canada, Government of Canada 2020).

In the Canadian province of Ontario, GBM comprised the largest proportion of new HIV diagnoses in 2021 at 61%, followed by ACB individuals at 25% (Ontario HIV Epidemiology and Surveillance Initiative (OHESI) 2023). Despite representing 3% of the total Ontario population (Statistics Canada 2022), new diagnoses from FNMI individuals comprised 6% of all new diagnoses in the province (Ontario HIV Epidemiology and Surveillance Initiative (OHESI) 2023). Discrimination, exclusion, stigma, social inequities, and systems of oppression, such as colonialism, are responsible for this increased burden in these populations (Public Health Agency of Canada 2018), with Two-Spirit, gay, bisexual, transgender, and other queer Black, Indigenous, people of colour who have sex with men (2SGBTQ + BIPOC) being disproportionately at risk due to unique experiences of intersecting oppressions (Negin et al. 2015; Nelson et al. 2019; Wilson et al. 2016). 'Two-Spirit' is a term that was originally coined by Indigenous LGBTQ + leaders at the Third Annual Intertribal Native American/First Nations Gay and Lesbian Conference in Winnipeg in 1990 (Pruden and Salway 2020). It is used as both a community organizing strategy for the Indigenous peoples of North America and self-description of diverse sexualities, gender identities, roles, and/or expressions outside of colonial terminology (Pruden and Salway 2020).

One way to reduce the burden of STBBI in these communities is through increased testing, which reduces infection spread over time by identifying and treating positive cases (Public Health Agency of Canada 2021). However, 2SGBTQ + BIPOC living in Ontario report race and ethnicity-specific barriers, such as experiences of racism by

healthcare providers and staff at testing sites when accessing in-person STBBI testing services (Hassan et al. 2023). As the provision of alternate forms of STBBI testing increased amid the COVID-19 pandemic (Kersh et al. 2021), newer forms of STBBI testing, such as digital STBBI testing models, may have the potential to address some of the barriers that 2SGBTQ + BIPOC experience.

In Canada, three types of digital STBBI testing options exist: self-collection, self-testing, and laboratory-based testing (Rapid Response Service 2022). In the self-collection model, participants order self-collection kits online, which includes a urine collection cup to test for gonorrhea, chlamydia, and trichomoniasis (Switch Health 2024). Participants collect the specimens in their own homes before mailing them out (Switch Health 2024). HIV self-testing is self-collected and individuals receive their testing results minutes after providing their specimens within their own home (Rapid Response Service 2022). In laboratory-based testing, individuals are able to generate their own test requisitions online for HIV, syphilis, gonorrhea, chlamydia, Hepatitis-C, trichomoniasis, and herpes simplex virus 1 and 2 (BC Centre for Disease Control 2024; TeleTest 2022), and then visit a collection site with said requisition (Rapid Response Service 2022). Of these options, only HIV-self testing kits are freely available in Ontario, but are offered in limited quantities through select organizations (Rapid Response Service 2022). Laboratory and self-collection testing options in Ontario are only offered at a cost and/or through a referral from a healthcare provider (Rapid Response Service 2022).

Previous studies have found digital STBBI testing services to be acceptable among key populations living in Canada, such as GBM and ACB individuals (Knight et al. 2019; O'Byrne et al. 2023; O'Byrne, Musten, and Ho 2022). In the Canadian province of British Columbia (BC), GBM who have used the laboratory-based digital STBBI testing service, *GetCheckedOnline*, have stated that benefits include: convenience, privacy, control over specimen collection, and receiving results online (Knight et al. 2019). Similarly, 92% of individuals who completed a post-test survey on using the INSTI-HIV self-testing kits in Ontario reported being satisfied with the service, with 80% of respondents reporting that the kits were easy to use (O'Byrne, Musten, and Ho 2022). Researchers have also found that these kits increased access to HIV testing for ACB individuals, as 30% of ACB individuals reported it was their first time testing for HIV (O'Byrne et al. 2023). Thus, we were interested in examining the acceptability of a publicly funded and freely available digital STBBI testing service, like *GetCheckedOnline*, among 2SGBTQ + service users living in Ontario.

We approached this analysis incorporating principles from Implementation Science and Critical Race Theory. Implementation Science is a field that investigates how to best deliver evidence-based interventions to those who need them with greater speed, fidelity, efficiency, quality, and relevant coverage (Kemp et al. 2018). Studies using implementation science principles to examine HIV prevention strategies have been conducted in various settings with diverse populations (Nwaozuru et al. 2021; Steen et al. 2015). Researchers have used these principles to develop and implement novel HIV/AIDS prevention, treatment, and care strategies with the hopes of ending this epidemic (Eisinger, Dieffenbach, and Fauci 2019; Marrazzo, Dombrowski, and Mayer 2018). One systematic review of HIV prevention and treatment strategies in the US has found that most implementation science studies have examined acceptability (satisfaction) and feasibility (ease of implementation) of HIV prevention and treatment interventions,

with few examining appropriateness (relevance for a given consumer), such as specific populations affected by HIV (Shangani et al. 2021). By focusing on 2SGBTQ + BIPOC, we aimed to explore whether digital STBBI prevention strategies may be appropriate to meet the health needs of this diverse population.

Critical Race Theory (CRT) postulates that racism is embedded in all societal practices, advances the interests of white individuals, and intersects with other systems of oppression (intersectionality); race is socially constructed and differs temporally and contextually; and BIPOC have unique voices due to experiences of oppression (Delgado and Stefancic 2017). Activists and scholars have been discussing racism's implications for health outcomes since at least the 1980s (Ford and Airhihenbuwa 2018). CRT has been used to investigate health issues affecting BIPOC, such as diabetes (Mitchell et al. 2020) and HIV/AIDS (Ford and Airhihenbuwa 2018; Freeman et al. 2017). Using CRT, Freeman and colleagues (2017) found that structural racism is embedded into HIV care settings, leading participants to view healthcare settings as dehumanizing, to have distrust of medical providers and institutions, to feel excluded from the decision making process regarding their own health and well-being, and to feel pressured to take anti-retroviral therapy while having their other health needs ignored. Similarly, Black GBM living in Ontario have experienced judgement and discomfort due to racism when getting tested for STBBI (Hassan et al. 2023). For FNMI communities, the historical trauma of colonialism has been found to produce adverse health outcomes, with one study finding that FNMI individuals reported being treated differently in healthcare settings because of their Indigenous identity and socioeconomic status, which led some to avoid seeking care as a result (Tang and Browne 2008). Our study extends research in this area by looking at how digital STBBI testing models address the health needs of 2SGBTQ + BIPOC living in Ontario.

Using these two approaches, we were interested in the perspectives of 2SGBTQ + BIPOC living in Ontario with regards to how digital STBBI testing services could best serve them given the historical and ongoing forms of oppression they experience, such as racism and cisheterosexism. Our objective for this study was to answer the following question: How can digital STBBI testing models address the testing needs of 2SGBTQ + BIPOC living in Ontario, Canada? Given the historical and ongoing experiences of racism, colonialism, and other intersecting forms of oppression, we assume that 2SGBTQ + BIPOC people have distinct testing needs that affect access to in-person clinical STBBI testing services.

Materials and methods

This study is a part of a larger one examining the feasibility of introducing a publicly-funded digital STBBI testing service in Ontario, which also included interviews and focus groups with stakeholders who are health care providers and staff at STBBI testing sites. Principles from community-based participatory research (CBPR) were incorporated into the study design, where members of the population of interest in the study are co-creators of knowledge and empowered to be involved in various stages of the research process (Coughlin, Smith, and Fernandez 2017). One way we have done this is by creating a community advisory board (CAB) of GBM who live and work in Ontario and convene three to four times a year to provide feedback on

study design and findings. Additionally, many members of the research team are GBM with diverse intersectional axes of identity, including some who are BIPOC. Thus, BIPOC GBM were involved in all aspects of this study: design, recruitment, data generation, data analysis, and knowledge translation.

Sampling and recruitment

We used purposive sampling, where participants are selected based on certain characteristics to answer the research question (Ritchie, Lewis, and Elam 2003). Individuals were eligible to participate if they: were ≥18 years old, identified as GBM, and had tested for STBBI in the past 12 months. Participants were recruited via social media (Facebook, Twitter, and Instagram) and through flyers distributed to AIDS service, local Pride, and community-based organizations serving sexual and gender minority populations in Ontario. Individuals who were interested in participating in our study completed an eligibility screening questionnaire; those who met the eligibility criteria were invited to participate. Individuals who received invitations were provided an electronic consent form. Those who gave written consent completed a sociodemographic survey before being scheduled for an interview or focus group.

Data generation

We conducted semi-structured in-depth interviews and focus groups in two phases. The first data generation phase occurred from June 2020 – September 2020 and the second from September – December 2021. After consulting with the CAB, we felt that Black and Indigenous individuals were underrepresented in the initial phase, so we purposely recruited individuals from these communities during the second phase to ensure their perspectives were centred in our work.

Interviews and focus groups were conducted by two to three members of the research team using the platforms Microsoft Teams or Zoom. Focus groups and interviews were approximately 60–90 minutes long and participants were compensated $30 CAD for their time. During the interview or focus group, participants were shown a video describing *GetCheckedOnline* and asked what the benefits and drawbacks of such a service would be, populations that would benefit from using this service, and recommendations for the service if implemented in Ontario. Participants were also asked their thoughts on using self-collection/testing kits for STBBI.

Analysis

Interviews and focus groups were transcribed verbatim and stored and managed in Nvivo 12. Participants have been assigned pseudonyms to ensure their anonymity. Data coding was conducted by members of the study team in Nvivo and analyzed using reflexive thematic analysis (Braun and Clarke 2019). Reflexive thematic analysis differs from other types of thematic analysis by: emphasizing the researchers' roles in making meaning from the data and using a theoretical approach to the analysis (Braun and Clarke 2019). This approach also underscores the researcher's subjectivity as an analytic resource and reflexive engagement with theory and data (Braun and Clarke 2021).

Data was sorted into themes by the lead author (JD) highlighting the perspectives of 2SGBTQ + BIPOC on digital STBBI testing services, such as self-testing/collection kits ordered online and digital requisitions for laboratory testing. JD is a PhD candidate that has completed coursework in qualitative theory and research methods. JD consulted the other co-authors and CAB members when sorting the data, who have expertise in 2SGBTQ + health, qualitative theory and research methods, Implementation Science, CRT, and provision of STBBI services. Most co-authors and CAB members identify as GBM with some also identifying as BIPOC. Co-authors and CAB members all reflexively engaged with these various identities and their occupations when providing feedback on the themes, findings, and the present manuscript.

Results

Participant characteristics

We conducted 10 focus groups (two to six participants per group) and eight individual interviews. Some focus groups were smaller than others due to cancellations and scheduling conflicts, however the smaller focus groups still provided rich discussion, and has been used in prior research (Grace et al. 2022). The sample consisted of 38 2SGBTQ + service users, of which 21 were 2SGBTQ + BIPOC and are the focus of this study (See Table 1 for participant characteristics). Of the 21 BIPOC participants, 15 participated in focus groups, five participated in interviews, and one participated in both a focus group and interview. Black participants comprised nearly a quarter of our sample, with First Nations/Indigenous participants comprising nearly a fifth. Almost all First Nations/Indigenous participants described themselves as being Two-Spirit. The majority of participants identified as men and as cisgender, with transgender, non-binary, or Two-Spirit participants comprising about a fifth of the sample. Additionally, most participants were between 25–29 years old, had completed some form of post-secondary education, and had been tested for STBBI in the past year.

Overall 2SGBTQ + BIPOC participants found digital STBBI testing services to be an acceptable alternative to in-person testing. They believed it would help reduce experiences of racism and homophobia when getting tested for STBBI in-person and that GBM, and 2SGBTQ + BIPOC in particular, would benefit from using digital testing services as a result of intersecting oppressions they face. However, participants also reported that digital testing services could be improved by considering their other social locations, contexts, and diverse forms of identification, with technological and linguistic barriers also being noted by participants. Social locations are defined as the locations within society an individual occupies based on characteristics such as age, gender, race/ethnicity, class, sexual orientation, etc. (Williams et al. 2016). Individuals occupy multiple social locations, which intersect to create unique experiences (Delgado and Stefancic 2017). Thus, study findings were organized into six themes based on these perspectives: reducing individual experiences of oppression, intersecting identities, adaptations to culture and living circumstances, identification documents, linguistic diversity, and technological barriers. We have organized the findings in this way to demonstrate, using CRT and Implementation Science, how digital STBBI testing models may be able to address racism and other forms of oppression that 2SGBTQ + BIPOC experience, and how digital STBBI testing models can be improved to meet the needs of this population.

Table 1. Participant characteristics (n = 21).

Age	
18–24	5/21 (24%)
25–29	12/21 (57%)
30–39	2/21 (10%)
40+	2/21 (10%)
Race/ethnicity	
Black-African	4/21 (19%)
Black-Caribbean	1/21 (5%)
Black-Caribbean and white	1/21 (5%)
First Nations/Indigenous	4/21 (19%)
East Asian	2/21 (10%)
Indo-Caribbean	1/21 (5%)
Latin American	3/21 (14%)
Middle Eastern	2/21 (10%)
South Asian	1/21 (5%)
Southeast Asian	2/21 (10%)
Sexual orientation	
Gay	9/21 (43%)
Gay and demisexual	1/21 (5%)
Gay and Two-Spirit	1/21 (5%)
Bisexual	1/21 (5%)
Pansexual	3/21 (14%)
Queer	2/21 (10%)
Questioning	1/21 (5%)
Straight	1/21 (5%)
Gender	
Man	15/21 (71%)
Non-binary	2/21 (10%)
Two-Spirit	2/21 (10%)
Prefer not to answer	2/21 (10%)
Cisgender/transgender	
Cisgender	12/21 (57%)
Transgender	4/21 (19%)
Two-Spirit	1/21 (5%)
Do not know	1/21 (5%)
Prefer not to answer	2/21 (10%)
Unknown	1/21 (5%)
Highest level of education	
Did not finish high school	2/21 (10%)
High school	3/21 (14%)
Post-secondary certificate or diploma	7/21 (33%)
Bachelor's degree	7/21 (33%)
Above a bachelor's degree	2/21 (10%)
Most recent HIV test	
≤ 3 months ago	9/21 (43%)
4–6 months ago	7/21 (33%)
7–12 months ago	3/21 (14%)
Over a year ago	2/21 (10%)
Most recent STI test	
≤ 3 months ago	12/21 (57%)
4–6 months ago	5/21 (24%)
7–12 months ago	3/21 (14%)
Over a year ago	1/21 (5%)

Reducing individual experiences of oppression

Black and Indigenous participants have previously reported experiencing racism when getting tested for STBBI in-person (Hassan et al. 2023). One benefit of digital testing models that participants noted was that it would be likely to reduce racist, homophobic, and other experiences of discrimination when getting tested in-person. When asked

about populations that would benefit from digital testing services, Bennett (27, Black-African) shared:

> I feel like racialized LGBT members could benefit. You know, if they don't feel like they can go to an inclusive clinic, because, speaking from my own experience, sometimes white doctors are not very friendly or inclusive. So, I think bypass that experience altogether.

Bennett's past experiences of exclusion and coldness from white doctors, has informed his belief that other 2SGBTQ + BIPOC could benefit from digital STBBI services by being able to avoid this type of experience.

When asked why they wanted to participate in the study, Jack (29, Black-African) stated: 'being Black and hyper visible creates this hypervisibility, so I really was interested in the idea of thinking about ways to mitigate that.' Here Jack is implying that digital STBBI testing services could potentially alleviate discomfort due to being hyper-visible as a Black person.

When participants were asked if GBM would specifically benefit from using digital testing services, Sean (24, Black-Caribbean and white) responded by saying that everyone would benefit but indicated that, 'we face the most discrimination when getting tested'. By 'we' Sean means 2SGBTQ + individuals, however they later stressed the importance of digital testing services attending to the needs of other communities such as BIPOC individuals.

When asked why GBM would benefit from using a digital STBBI testing service, Bennett (27, Black-African) highlighted that the anonymity of digital testing would help reduce the stigma they face. Peter (27, First Nations) also named stigma as a reason why someone would choose to use a digital STBBI testing service over in-person STBBI testing services. Jaden (28, First Nations) shared a similar sentiment when asked why 2SGBTQ + BIPOC would benefit from using a digital STBBI testing service: 'There's no space for judgement, you're doing it yourself, nobody else has access to it.'

Corey (26, Black-African) provided a related response when asked which communities would benefit from using a digital testing model. He too believed communities of colour would benefit and when asked why, Corey mentioned that health care providers may not be understanding or try to 'gaslight' one's experiences and stated, 'It would mean that people of colour don't have the barrier of having to deal with shitty healthcare practitioners.' Corey is explaining that the failure of healthcare practitioners to understand the needs of BIPOC service users, and the denial of their lived experience, means that BIPOC would be more inclined to use a digital STBBI testing service to avoid such experiences. Therefore, digital STBBI testing services may prevent BIPOC from experiencing negative interactions with health care providers when getting tested.

Intersecting identities

While many BIPOC participants did discuss how racist and homophobic experiences would make them more likely to use digital STBBI testing services, some participants also highlighted how digital testing services should consider their other identities and social locations they inhabit. CRT describes this as intersectionality, when individuals' multiple marginalized identities are considered, and how these different axes of

marginalization intersect with racism to produce diverse experiences in BIPOC (Delgado and Stefancic 2017). For instance, when participants were asked what support they would need in using a digital testing model like *GetCheckedOnline*, Sean (24, Black-Caribbean and white) responded with:

> As a Black disabled trans person, I don't go to any place unless I know that a black disabled trans person has been there and felt safe there. Because usually places that are supposed to be safe just aren't … So, if I find that other folks in the community feel like this is good for our community, I'm more likely to trust it … I guess the reputation within the community is important.

This quote illustrates that Sean has diverse needs with respect to other identities they possess, such as being transgender and disabled, and developers of digital testing models should recognize this when promoting their services to communities of colour, with community buy-in requiring that it meets the testing needs of folks with diverse intersecting identities. Sean later said they would want to use a digital testing service to minimize the transphobia they experience when getting tested in-person.

When asked who would benefit from using a digital testing service, Isaac (24, Black-African) discussed how there are different priority populations in Ontario who all are disproportionately affected by HIV in comparison to the general population:

> All these priority populations kind of overlap as well. Like you can be an Indigenous woman who's an in-intravenous drug user or like a gay man who's also African-Caribbean or Black and does intravenous drugs or whatever … so I would give those groups as an example of communities or populations that might benefit from this type of service.

Here, Isaac specifically stated that those who belong to multiple communities that are disproportionately affected by HIV would stand to benefit from using a digital STBBI testing service.

Another instance where intersectionality came up was when participants were asked how they would feel about a digital testing service like *GetCheckedOnline* using their account and testing data for research purposes. Sean (24, Black-Caribbean and white) stated that 'as it is anonymous, as long as my name, isn't in it, I'm OK with them collecting the rest of the information, including location, including my intersectionalities and identities and status.' Here, Sean explicitly named intersectionality when describing that they are content with their different intersecting identities being included in research derived from personal data stored in a digital testing service.

Jack's (Black-African, 29) response to being asked if he would be comfortable having his personal data stored online supported Sean's claim. He stated that, 'There's an understudy around blackness and queerness in general in sexual health, so if like my data is being used to kind of promote and help … then I think it's a positive thing.' Here Jack was stressing the importance of examining the intersecting experiences of being both Black and queer to improve the sexual health of individuals who are members of both these communities.

Age was a social location that was discussed within participants' accounts. During an interview with Sunny (28, First Nations/Indigenous), when asked when they would prefer using digital STBBI testing services over in-person STBBI testing services, they stated 'Anytime … getting older and stuff, I just, I can't do that kind of stuff. I used to be comfortable doing it younger, now as being older, it just – I don't know why, I just

don't feel comfortable.' By 'that kind of stuff' Sunny means that as they get older, they are no longer comfortable using STBBI testing services in person. When asked if there was a specific reason as to why they're uncomfortable testing in-person as they get older, they could not name one. Despite being uncertain as to why they experience discomfort when getting tested in-person as they get older, this moment indicates that age is another factor to consider beyond race, sexual orientation, and gender identity when promoting digital STBBI testing services to 2SGBTQ + BIPOC.

Adaptations to culture and living circumstances

Another theme that emerged is that digital STBBI testing providers need to consider the diverse contexts of 2SGBTQ + BIPOC when designing and promoting these services to members from these communities, as adaptations to pre-existing digital models may need to occur for 2SGBTQ + BIPOC to actually use them. In terms of recommendations for promoting and implementing digital testing services, Sunny (28, First Nations/Indigenous) suggested that digital STBBI testing services should be advertised in Indigenous and Two-Spirit specific organizations. Corey (26, Black-African) also recommended reaching out to BIPOC, queer, and BIPOC queer groups specifically, to promote digital STBBI testing services. Peter (27, First Nations) mentioned that digital testing service providers should use the Medicine Wheel and provide sage to their clients to support their cultural needs (Mashford-Pringle and Shawanda 2023).

One cultural consideration that Corey (26, Black-African) wanted us to be aware of was that self-collection/testing at home may not be possible if 2SGBTQ + BIPOC are also living with family:

> I find that like if I lived with my parents or if I lived with like my homophobic aunt and uncle, that would be a, a little awkward collecting like urine samples and stuff and sending them to a lab. I would just prefer to go there and lie about where I'm going … because it's like why are you taking so long in the bathroom? Um, and having to come up with a lie, especially in that cultural context, if you tell them like hey, mind your own business, they're going to be like you're rude … that would be a barrier.

In this instance, Corey would prefer a laboratory-based digital STBBI testing service, like *GetCheckedOnline*, rather than using a self-collection/testing kit, as laboratory-based testing offers a bit more privacy for him than self-collection/testing does. It would also avoid having uncomfortable conversations with family members who are homophobic.

When also discussing self-collection/testing kits, Dylan (34, Indigenous) believed that these types of digital testing methods would be beneficial for Indigenous communities living in rural or fly-in areas. However, he did express some concern with both options as well:

> I guess another sort of barrier would be, who pays for that? If I'm sending a package – you know if [name of testing laboratory] is sending a package up to [name of reserve] that's going to be a $30 package, how do I get it back to them? Is it going to be a pre-paid envelope or box that it gets sent in, and then I just drop in back off at the post office? Or am I expected to pay that $30 to $50 just to send an envelope?

Here Dylan is wondering about the potential logistical and monetary challenges associated in both receiving and sending self-collection/testing kits, which may still pose a barrier to those trying to access these types of digital testing services.

Identification documents

Many participants believed that digital STBBI testing services should be available to those who hold no or different types of identification documents. Darren (27, Latin American) alluded to the idea that digital STBBI testing services should be available for those who live in the province without any form of legal documentation:

> Many people came with a like not work permit or anything. They came as tourists and they have work by cash. And they have illnesses, and they are like all the time with problems because they are not able to access to any services. So I think these could be very positive because if we combat HIV, no matter who no matter what, it's for everybody.

This sentiment was also shared by Henry (31, Latin American) who mentioned newcomers as a potential group that could benefit from using digital testing services.

For Corey (26, Black-African), it was important for digital STBBI services to also consider the fact that as an international student, he is not a resident of the province and therefore would not be eligible for the provincial health insurance plan. So, when asked if he would feel comfortable using his health card or another identity card when using a digital STBBI testing service, he responded, 'I know they said that I don't have to disclose my status but I'm still going to because international students don't have OHIP. Um, so that complicates things any time I'm doing anything healthcare related.' Thus, digital STBBI testing services should be designed to account for individuals who are not registered through the provincial health insurance plan but instead may have coverage through their university.

Jaden (28, First Nations) also believed that digital testing services should be accessible to those with differing forms of document such as FNMI Canadians who hold Indian Status cards, which provide benefits, programs, and services for these communities (Ministry of Indian Affairs, Government of Ontario 2021): 'A lot of online forums specifically don't have a spot for like status card and things like that. I know that's been a barrier for me in the past.' This quote exemplifies the need for digital STBBI testing services to be inclusive of those with different forms of documentation and those with no documentation at all.

Linguistic diversity

One shared sentiment among many participants was that digital testing services should be available in multiple languages. Darren (27, Latin American) mentioned this when suggesting that digital testing services should be available to those who are undocumented. Emile (24, Middle Eastern) agreed and proposed that digital testing services should be translated into multiple languages for other refugees and newcomers to use them. Austin (26, East Asian) also expressed this concern after watching the video describing *GetCheckedOnline*:

> I think one barrier for some people is the language barrier. Because a lot of people in Toronto, their first language is not English – so they might have some problems understanding the questions or understanding some of the terms there. So, if there's not someone next to them to translate or help them to understand the questions, he might have some problems to fill out the forms or print the pdf and for those instructions.

Thus, Austin believes digital testing services come with some access barriers as well, such as limited language options.

After watching the video about *GetCheckedOnline*, Isaac (24, Black-African) was not sure if the service was also available in Canada's other official language of French, while Jack (Black-African, 29) asked if *GetCheckedOnline* would be available in French to serve Canada's Francophone community. Cain (28, Middle Eastern), however, explicitly advocated that digital testing services be available in languages beyond the country's official languages, with all three highlighting the importance of making digital testing services available in multiple different languages.

Technological barriers

Another commonly cited barrier to using digital testing services for 2SGBTQ + BIPOC was having access to the Internet, cellular data, computers, smartphones, and/or tablets. When asked if there were any barriers to digital testing, Bennett (27, Black-African) stated: 'If you don't have access to a consistent internet connection that would definitely be a barrier, and especially if it wasn't secure, maybe a shared device.' Douglas (24, Southeast Asian) also highlighted computer and internet access as barriers to using digital testing services. Emile (24, Middle Eastern) noted that many individuals do not have access to a phone, the Internet, or a printer for printing out the requisitions needed to use a laboratory-based digital testing service. Finn (40, Southeast Asian) also reiterated that it is necessary to have a phone and access to the Internet to be able to use the service and noted this as a barrier. Both Isaac (24, Black-African) and Jaden (28, First Nations) also mentioned computers, printers, and cellphones as being a downside or concern to digital testing services. Lastly, Anthony (28, Black-African) expanded upon what other participants discussed by highlighting that beyond not having access to a computer or a cellular phone, individuals who are not 'tech savvy' or who do not 'know how to go online, to register or even have like an email address' would lack access to digital STBBI testing services.

Discussion

The purpose of this study was to determine how digital STBBI testing models can address the testing needs of 2SGBTQ + BIPOC living in Ontario, Canada, with six themes emerging from the interviews and focus groups.

First, many participants believed that digital STBBI testing services may be able to reduce some experiences of discrimination they face when getting tested for STBBI in-person. 2SGBTQ + BIPOC living in Ontario do indeed report negative experiences when using in-person testing services, such as racist microaggressions from service providers (Hassan et al. 2023). Digital testing services may avert this by reducing the number of people an individual encounters during the testing process. However, laboratory-based models, still permit for negative experiences to occur, and indeed such events were also reported by 2SGBTQ + BIPOC participants in a similar study (Hassan et al. 2023). Thus, service providers of digital testing services should still strive to be anti-racist and anti-oppressive when delivering services to this population.

Second, digital testing service developers need to consider the other social locations and identities that 2SGBTQ + BIPOC possess and ensure these services address needs that go beyond preventing racism and homophobia. For instance, one of the participants

noted they would only use a digital testing service if other Black, transgender, disabled individuals had also used it, highlighting the need for promotional efforts and providers being sensitive to the multiple identities and social locations individuals occupy. Recommendations from a similar study with transgender participants included training service providers in transgender health (Stewart et al. 2022), and we too argue that providers of digital testing services be trained in providing services to diverse 2SGBTQ + BIPOC individuals and to diverse groups of individuals more broadly.

Third, participants reported that digital testing services should adapt their services to some of the contexts that 2SGBTQ + BIPOC inhabit. This has been supported by a systematic review examining the barriers and facilitators of digital health interventions in culturally and linguistically diverse populations, where the researchers identified the following cultural barriers noted by participants across studies: lack of cultural representation, limited recognition of cultural concerns, and cultural norms not being considered (Whitehead et al. 2023). Participants in our study shared similar concerns by expressing that it was important that digital testing providers work with pre-existing groups and organizations serving 2SGBTQ + BIPOC communities when promoting digital testing services. Laboratory testing service models should be offered in addition to self-testing/collection, as some 2SGBTQ + BIPOC may not have privacy in their own home to self-test/collect. Self-testing/collection should also be offered free of charge and come with stamps and pre-addressed envelopes to make it easier for 2SGBTQ + BIPOC living in rural and remote communities to get tested for STBBI.

In addition, one First Nations participant highlighted integration of cultural medicines, which could be useful in the case of self-testing/collection kits where community organizations, particularly those already serving Indigenous communities, could provide traditional medicines to participants who request it along with self-testing/collection kits. Indeed, one initiative in BC provides medicine bundles to FNMI individuals living in the province, which includes an HIV-self-testing kit, a list of community resources, safer sex supplies such as condoms and lubricants, and the following Indigenous medicines: sage, sweetgrass, tobacco, cedar, lavender, Labrador tea, bear grease, and Devil's club salve (Community-Based Research Centre 2023). Digital testing service providers in Ontario could adopt a similar approach when delivering self-testing/collection kits to individuals from FNMI communities.

Fourth, participants wanted digital testing services to be available to those with diverse forms of identification documents and those who held none. This is supported by other studies in North America, where researchers have found that the inability to acquire or maintain identification documents poses barriers to accessing health services (Sanders et al. 2020). Additionally, healthcare access further varies depending on the type of migration status held, with undocumented immigrants reporting the most barriers to access compared to both permanent residents and those with refugee status (Campbell et al. 2014). Documentation related to migration status may be of particular importance to BIPOC, as two-thirds of BIPOC living in Canada have migrated to this country, with half residing in Ontario (Statistics Canada 2018). Furthermore, some BIPOC individuals not born in Canada were more likely to use a digital STBBI testing service, like *GetCheckedOnline,* when compared to white individuals born in Canada (Dulai et al. 2023). Moreover, one Indigenous participant mentioned having issues when using their Indian Status card to access services. Thus, digital STBBI testing services should aim

to reduce barriers to access for 2SGBTQ + BIPOC by accepting diverse forms of documentation or not require them for testing purposes.

Fifth, participants asked that digital testing services be available in multiple languages. At least one other study has indicated that digital STBBI interventions should be available in languages that meet the needs of the target population (Lee et al. 2020). Linguistic barriers noted across studies of digital health interventions more broadly include low English language literacy and lack of availability of participants' native languages (Whitehead et al. 2023). We recognize it would be logistically challenging to translate digital STBBI testing services in Ontario into multiple languages, however, one solution could be to include a list of interpreter resources available in multiple languages should service users need it. Additionally, the *GetCheckedOnline* study team is planning to conduct research looking at making the service accessible to different linguistic communities in BC.

Lastly, participants noted that there are still technological barriers to using digital testing services. This is in line with other studies which have reported that limited skills in using technology and costs of phones and data as barriers to digital health interventions (Whitehead et al. 2023). This could also be remedied by partnering with community organizations who can provide computers for members of the public to use to print out digital requisitions, create digital testing accounts, and look up their results online. Alternatively, a testing service where service users order self-testing/collection kits over the phone may also be able to meet some of the concerns expressed by 2SGBTQ + BIPOC in this study.

Digital STBBI testing services may be an appropriate alternative to in-person testing services for 2SGBTQ + BIPOC living in Ontario as they can address some of the Implementation Science principles of delivering evidence-based interventions with greater speed, fidelity, efficiency, quality, and relevant coverage (Kemp et al. 2018). For instance, participants noted that coverage of digital STBBI services should include rural and remote communities, which may be particularly relevant for FNMI individuals, as nearly a third of FNMI individuals in Ontario live in rural communities (Statistics Canada 2017). In addition, participants provided suggestions on how the quality of digital STBBI testing services could be improved by working with community organizations serving 2SGBTQ + BIPOC communities in their promotion and implementation, accepting diverse forms of documentation, and providing cultural supports.

Examining this issue using a CRT perspective, participants noted the pervasiveness of racism within clinical and laboratory settings, and that digital testing services may be able to reduce such experiences by limiting the people one interacts with. They also highlighted the other intersecting identities they hold and other experiences of oppression they face, and wanted digital testing services to meet other needs they may have related to their identities beyond their race.

Strengths and limitations

One strength of this study is the community-based approach, which allowed 2SGBTQ + BIPOC to be involved in all stages of the research process. The CAB in particular was instrumental in suggesting how to best recruit individuals from Black and FNMI communities, which in turn led a large number of participants identifying as members

from said communities; another strength of this study. Participants were also diverse in terms of other social locations, such as ethnicity and gender identity, which ensured that varying perspectives on digital STBBI services were included. Furthermore, because we conducted these interviews virtually, we were able to include perspectives from participants living outside the Greater Toronto Area (where most of the study team is based). Lastly, the option of participating in a focus group or interview, may have increased participation in this study for those who preferred one over the other, thereby increasing diversity in thought than if only one qualitative method was used.

Despite these strengths, most individuals who participated in this study came from the two largest urban centres of the province: the Greater Toronto Area and the National Capital Region (Ottawa). Thus, participants living in other parts of Ontario, particularly those in rural or remote areas, may have had differing viewpoints not expressed in this study. Additionally, most of the participants were in their twenties. Future studies investigating digital testing for 2SGBTQ + BIPOC should examine the intersection of age to obtain perspectives from older and younger individuals and how perspectives and needs may change across the life course. Also, the fact that these interviews were conducted virtually may have limited participation from individuals who do not have access to a device or Internet connection to participate. Furthermore, because participation in this study required individuals being comfortable enough to use technology, there may be an overrepresentation of viewpoints in favour of using digital testing services. Moreover, since participants were recruited using social media and flyers distributed to AIDS service, local Pride, and community-based organizations serving sexual and gender minority populations, the perspective of 2SGBTQ + BIPOC who do not use those platforms or who are not connected to these organizations may have been missed. Lastly, the interviews and focus groups were only conducted in English, which may exclude differing perspectives from 2SGBTQ + BIPOC who may be more comfortable in or only speak languages other than English.

Future directions

As digital testing expands in the province, future studies should gather information on 2SGBTQ + BIPOC's thoughts on digital testing services that become available, if said services are meeting their needs, and how they could be improved. Additionally, anti-racist and anti-oppressive training of service providers of both pre-existing and upcoming STBBI testing services is needed to reduce the negative experiences that 2SGBTQ + BIPOC experience when getting tested. STBBI testing centres should also implement and enforce zero-tolerance policies for providers and staff who discriminate or stigmatize clients from historically marginalized communities such as 2SGBTQ + BIPOC.

If a service like *GetCheckedOnline* is to be implemented in Ontario, service providers should ensure that it is both widely and freely accessible to 2SGBTQ + BIPOC living in various regions of the province. Promotion efforts should include reaching out to pre-existing organizations that serve 2SGBTQ + BIPOC so they can better support facilitating uptake of these services. Developers of digital testing services should also provide various types of support that 2SGBTQ + BIPOC may need to better use these services. Furthermore, policy makers should investigate increasing access to digital devices more broadly, as well as developing consistent funding mechanisms to support some of these initiatives.

Conclusion

2SGBTQ + BIPOC believe that digital STBBI testing may be able to reduce some of the experiences of discrimination they face when getting tested for STBBI in-person, however, there are still ways these services could be improved to best meet the needs of these diverse communities. Digital testing services are not a panacea and will not address every barrier that 2SGBTQ + BIPOC face when accessing in-person STBBI testing services. However, if digital STBBI testing services are to be implemented in Ontario, they should incorporate some of the recommendations relayed by participants in this study to better improve access for this segment of Ontario's population. Similarly, the issues plaguing in-person STBBI testing services for 2SGBTQ + BIPOC cannot go unaddressed in favour of relying solely on digital STBBI testing models to serve these communities. Most importantly, structural racism and other forms of oppression need to be dismantled within institutions, such as testing sites, to prevent further harm from occurring to 2SGBTQ + BIPOC communities.

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