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Original Research

Community acceptability of STI-X - the rural Victorian STI vending machine pilot

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Abstract

Introduction: Sexually transmissible infection (STI) rates continue to rise across Australian rural and regional areas. Reported STI rates are often misleadingly low due to barriers in accessing testing, lack of service accessibility and affordability. Utilising innovative solutions such as vending machines can improve access by providing an alternative testing option that increases privacy and convenience.

Methods: Community reference groups were assembled to support an STI test vending machine pilot (STI-X) for 12 months across six planned and two temporary regional locations in northern Victoria, Australia. The vending machines were generally situated in publicly accessible areas where consumers could obtain a test kit for chlamydia, gonorrhoea and HIV, complete the specimen collection in a private setting and then post the kit to a laboratory.

Results: STI-X was deemed an acceptable solution for increasing access to specialist sexual health testing. Professionals were supportive of the additional option for individuals who may not use standard healthcare pathways. They identified that the vending machines were easy to use; however, better communication was needed to enhance uptake. Therefore, utilising community-driven promotional approaches, such as word of mouth, are necessary to ensure that information on novel health initiatives reaches the intended audiences.

Conclusion: STI testing vending machines have proved feasible and acceptable to professionals and users in rural and regional Australian communities. This technology would benefit from future research specifically in rural communities to determine whether priority populations will increase their STI testing. Policymakers should encourage innovative solutions in rural communities to combat growing workforce concerns.

Keywords

Australia, health promotion, sexually transmissible infection, STI testing, vending machines.

Introduction

Accessing rural health care continues to present challenges for many people. Issues include decreasing number of services, inconsistency of staffing, increasing cost and continuing infrastructure barriers such as limited public transport[1-3]. Prior to the COVID-19 pandemic, rural general practices were already struggling to attract medical professionals, even though overall numbers in Australia have been increasing[4]. Accessibility challenges are now exacerbated by general practices closing, with many of these closures in communities with few options[5]. For people who need specialised services, such as sexual and reproductive health care, even fewer services are available. This is due in part to a lack of funding and limited specialists[6,7], but also to the fact that sexual health is still stigmatised in many rural communities[7-9]. Shame, embarrassment and lack of knowledge about sexual health inhibit individuals from seeking services[10]. Stigmatisation particularly impacts groups that would benefit most from sexual health services, notably Aboriginal and Torres Strait Islander Peoples, young people and the LGBTQIA+ community.

To reduce barriers in accessing sexual health care, it is essential to find solutions that can help people gain autonomy over their sexual health and access services that they routinely need[11]. Using vending machines to access STI screening kits is one way to empower individuals to take control of their sexual health while providing an added level of convenience and privacy – aspects that are highly valued by rural and regional young people[12,13]. STI screening vending machines have been used internationally since at least 2017 with increasingly promising results[14]. While many locations have opted to provide rapid HIV tests only[15,16], researchers in southern England have demonstrated that more complete STI screens could be dispensed quickly and easily[17,18]. Gobin et al reported, in the largest trial of this technology to date, that STI test kit vending machines were often used by people who infrequently test or who have never tested and thus were viewed as a way to increase access to testing[18]. In other locations, similar findings have been reported with vending machines that screen only for HIV[19]. The Victorian STI-X pilot sought to explore the feasibility and acceptability of vending machine technology in rural and regional areas.

Methods

The pilot

The STI-X pilot involved placing two custom-designed 'smart' vending machines in communities across rural and regional Victoria over a 12-month period. Smart vending machines are digital machines that allow real-time tracking of use, inventory control and protection against excessive dispensing via mobile phone connectivity and a dedicated website.

Six towns/cities were selected across the Hume and Loddon Mallee regions to host the vending machines for a period of approximately 4 months each, with an additional two sites (one being in a different city from those selected) acting as temporary locations due to logistical issues. The sites chosen for each community are shown in Table 1.

Table 1: Selected sites for STI-X pilot smart vending machines, Hume and Loddon Mallee regions, northern Victoria, Australia

Type of service/centre	Planned or temporary site	Number of towns for service/centre	Population
Public library	Planned	2	15,000–20,000 30,000–35,000
Youth service (indoor)	Planned	1	10,000–15,000
Youth service (outdoor)	Planned	1	5000–10,000
Public bathroom	Planned	1	30,000–45,000
Public health centre	Planned	1	40,000–45,000
Specialist community provider	Temporary	1	100,000–105,000
University campus	Temporary	1	40,000–45,000

Community reference groups

Using a quasi-participatory action research framework[20], we chose to use community reference groups as a foundational requirement to determine potential vending machine placement locations, in addition to gathering insight about local marketing strategies aimed at the populations most at risk of STIs in those communities.

Each group comprised four to six professional representatives from sector organisations within five of the seven communities including health, support services, education, Aboriginal health services and local councils. Prospective members were identified from communities of practice, which are run quarterly in various locations across central and northern Victoria by the Centre for Excellence in Rural Sexual Health. We did not establish a group in two communities. One community hosted a temporary placement because of a short delay in availability of the main site. The second, while being a main placement community site, had a small population base, few services available, and was a late addition to the pilot process. Therefore, for both locations, we chose to work closely with the decision-makers for the facility.

At the outset of the pilot, and prior to placement in their respective communities, the members of each group provided advice regarding an appropriate location to place the machine within their town. For towns located geographically further from offices of the Centre for Excellence in Rural Sexual Health, they assisted in identifying a key person who would take responsibility for restocking the machines as needed.

Community reference group members were instrumental in promoting STI-X within their communities via social media and posters displayed in their services. The groups also encouraged participants to provide feedback on their experience of using STI-X, and in some cases assisted users in accessing the machine or posting their specimens.

The STI-X process

The process of testing was designed to be free, simple and fast. The pilot was promoted to users who self-identified as being any of the following: 16–25 years of age, Aboriginal or Torres Strait Islander or a man who has sex with men. However, anyone could access a test kit during the operating hours of the venues hosting the vending machines. The promoted populations were prioritised because they are commonly at higher risk of STIs and often experience more barriers to accessing appropriate services[21].

Users selected a test kit based on anatomy, which included tests for chlamydia, gonorrhoea and HIV. The two test options were a penis test kit and vaginal test kit. Early in the process, we intended to provide a standalone Atomo HIV rapid test and a health promotion pack containing condoms, sexual health information and local service promotion. The latter was considered as an option if someone was interested in the function of the machine but not interested in STI testing. However, this option proved unfeasible for inclusion for two reasons. First, the Australian Therapeutic Goods Administration's requires that the Atomo tests be dispensed in their own packaging and not packaged with other testing supplies. Second, the vending machine can only hold 24 total boxes. Therefore, the decision was made to dual-dispense one Atomo test with one chlamydia and gonorrhoea kit. The chlamydia and gonorrhoea kits contained a personal details form, three flocked swabs (for tri-site testing), a urine collection receptacle (in penis packs only), instructions, a prepaid shipping label to return the box, a pen, two condoms and an item of confectionery.

To obtain a test kit, the user was asked their age, gender, sex, sex of partners, time of last STI test and postcode. These fields were determined to be the essential fields required in order to measure reach and uptake while minimising time spent at the vending machines. In addition, they were consistent with data captured in similar pilot programs in Australia and overseas[16]. The final step required a user to enter their mobile phone number to generate an SMS code, which was then entered into the machine to dispense the test kit. Phone numbers were encrypted and only recognised by the machine, to prevent dispensing multiple test kits to the same user in a short time frame (to minimise waste). For this project, we blocked the same phone number from accessing another test kit for 28 days. The entire process of collecting a kit could be completed within 90 seconds.

After the test kit had been dispensed, a user could take the boxes to a private setting to complete the specimen collection. In six of the locations, a toilet/bathroom was located close to the vending machines. Users then packed their completed swab specimens into the box, sealed it with the prepaid shipping label and posted it to the Melbourne Sexual Health Centre, the state's main publicly funded specialist sexual health service, for testing.

Test results were provided via phone by Melbourne Sexual Health Centre staff, who also arranged treatment, if required, at a local regional health service. The Atomo rapid HIV tests were accompanied by manufacturer information to assist in using the product as well as in finding support if a user received a reactive result. This information was duplicated on a supplemental website that was designed to support this pilot.

Participant recruitment

Participants were purposefully recruited from three stakeholder groups: sexual health professionals, community members and vending machine users. Study e-flyers were distributed via organisation emails and advisory group members to recruit professionals. Community members were recruited through e-flyers circulated among professionals who worked with the target populations, as well as posters displayed in community locations such as public toilets, venues where the vending machines were located, GP offices and council buildings. The third group of users that specifically accessed a test kit from the vending machine were provided a QR code inside each kit that linked to an anonymous online survey. Users could provide their contact details if they were interested in being interviewed for this study. Additionally, this group was not excluded from responding to the posters and e-flyers for community members, as already mentioned.

Participants were invited to participate in either a 30-minute face-to-face group interview or an individual interview, depending on their preference. All interviews were conducted by authors DE or AC using a semi-structured interview schedule that contained between 6 and 12 questions (depending on participant group), most of which were open-ended and allowed the interviewer to probe for further clarification or questioning. The interview schedule consisted of questions about professional and

community perceptions of the project, benefits and challenges/barriers of the project within local communities, communication preferences and the testing process.

Data analysis

All interviews were digitally recorded and transcribed verbatim for thematic analysis. All data were de-identified to protect confidentiality.

Analysis was undertaken by a multidisciplinary team of researchers who have experience in public health (JT), the social sciences (DE) and health promotion (AC). Interview transcripts were independently read and coded by all three researchers before they met to discuss and compare data coding and interpretation (cross-coding/multiple coding)[22]. Data were analysed using a combined deductive/inductive approach whereby themes were derived from previous literature, the research questions and interview schedule, and inductively from emergent and recurrent themes arising from the data[23]. While there was some level of variation among the researchers in their coding frameworks and the language used, there was strong consensus about emerging themes and interpretation of the data.

Ethics approval

Ethics approval for the study was granted by the Human Research Ethics Committee at The University of Melbourne (approval number 29563).

Results

We interviewed a total of 18 participants, with individuals representing all communities that hosted the vending machines. Fifteen participants were professionals associated with organisations represented in the community reference groups (or the decision-maker for their facility) within their respective communities. The other three comprised one interview participant who was a community member from a hosting community with no involvement in the pilot, one participant who was a professional from a neighbouring town, and a vending machine user. The sole vending machine user was the only individual to reply to a request for interview of the seven survey submissions (18 total replies to the survey out of 176 total test kits dispensed) who ticked that they were interested in being contacted at the conclusion of the pilot.

Three main themes emerged: vending machines improved access to testing; communication and promotion; and process of using the vending machines.

Vending machines improved access to STI screening tests

Participants described access to the machine as private, confidential and anonymous

STI-X was reported to provide privacy and confidentiality in ways that traditional testing does not. Living rurally and regionally presents challenges to confidentiality when accessing testing. As one community health officer mentioned, 'we are a small town, so if you are going to the clinic, it's the same clinic your mum, grandma, whoever goes to so there's that bit of reservation maybe to talk about sexual health'.

Approximately half of the participants believed that STI testing was perceived as shameful by their communities and that the machine destigmatised testing. One community health manager felt that the vending machines gave users a sense of 'cultural safety, some privacy, [and] access to take control of their own STI testing when they otherwise … had reasons or barriers in place that they couldn't access it'.

The machines provided acceptable access to STI testing where other options were unavailable

Most participants commented that there was a lack of access to sexual health care in their community. This was either due to the cost of seeing a GP, Medicare ineligibility, or needing to travel long distances to access a health service. One public health manager highlighted that, 'particularly for rural areas that don't have great access, where you can create more opportunities for screening opportunities, the better'. Although the pilot provided an additional pathway, one participant highlighted that it did not offer a truly comprehensive STI screen based on the Australian STI Guidelines.

> *If I go to the Australian STI Guidelines, any asymptomatic person has the four main [STIs]: chlamydia, gonorrhoea, syphilis, HIV. So to me, I look at that and I'm like, you're doing three quarters. So … I kind of struggle with it because I just think what's the point of doing three quarters? You either do the proper one or not at all. (Nurse practitioner)*

In some locations, participants were initially concerned that there would be backlash from the community or that organisations would not want to be associated with STI-X. However, at the completion of the pilot it was reported that organisations and their respective communities viewed the pilot as positive. A youth services coordinator said that 'there [were] quite a few people commenting … great, awesome initiative – that's fantastic'. They went on to comment that they were pleased that their community was supportive of the initiative. A few participants said that they received questions about the initiative and that any concerns were mitigated after they explained the pilot's purpose.

When the vending machines were placed in a public space, they provided more equitable access. The local libraries that housed STI-X gave some privacy but were still accessible to most. One of the library staff commented that they were 'rapt that the library had been considered a safe, trusted place for that type of thing to happen'.

Public toilets were also reported to be good locations for the machine because they were accessible to many and provided an adequate level of privacy. It was acknowledged that it was difficult to find a single setting where all prioritised cohorts would feel comfortable accessing and using the vending machines.

Communication and promotion of the vending machines to the community professionals and end users

Promotional materials need to be distributed more thoroughly and frequently, with varied promotional mechanisms

Several participants said they did not see any promotional material within the community and some agreed that a communications package would make promoting STI-X easier.

An actual promotion pack would make it easier for organisations to then be able to print their own posters, to be able to post things to social media … whether that's printable posters, flyers, if it's social media tiles with a bit of a blurb, a bit of content that you want, would actually be much easier for organisations to be able to put out. (Groups and activity coordinator)

Most professionals did report seeing at least one element of promotional material through either mainstream media, a professional newsletter or social media. Further, at least one participant from each location reported sharing STI-X promotional material. Those participants who reported not seeing any promotional materials said they would have shared them if they were made aware.

Inter-agency communication channels are well established to share information on health initiatives. Almost half of participants said that the networks they attended provided a good opportunity to share information among professionals, whether through meetings or mailing lists and newsletters.

Health messaging needs to be targeted towards both workforce and end users

Participants were asked how general health messages were typically promoted in their communities, to gain a better understanding of distribution pathways. Respondents reported that health messages were generally transmitted in a variety of ways including through word of mouth, social media and traditional print media.

Word of mouth was the most discussed way of communicating in rural towns. Participants highlighted that, in their communities, word of mouth from peers was a trusted source of information, thus there were reports of people accessing the machine from the recommendation of a peer.

Participants commented that one challenge of relying on word of mouth is the relative speed of the message, with more investment needed in promoting the machine prior to its arrival or having the machine in a location for a longer duration to improve uptake.

I think definitely in [a] small community it's word of mouth and if it's okay for one it will get used by another. So, definitely I think we would have had more run of it if you could have got 10 people to use it, that those 10 people went and told 10 people that oh yeah, it was easy and it was quick and I got my results. (Sexual health nurse)

Several participants stated that social media was the preferred form of communication for young people. One youth support officer commented that, in their community, 'putting something up on socials is always handy and getting the community to share it around' is a successful tactic.

Traditional media like print and radio are still used by organisations but their effectiveness was unknown. In one of the towns, a school nurse reported several individuals approaching them based on promotion they had seen in the newspaper, with no reference to social media engagement.

Engaging communities requires widespread, focused and ongoing commitment

The establishment of consumer reference groups provided local knowledge necessary in choosing the locations to place the vending machines. More frequent engagement with the consumer reference group was viewed as a potential tool for improving local promotion of the vending machines. One nurse practitioner who was a community reference group member highlighted that busy schedules and competing priorities meant more frequent messaging was necessary to ensure the continued promotion of the initiative from some of the local services.

I mean even if it's just a quick, I don't know, online meeting for 10 minutes or something to check-in. Because I know unless stuff is in my calendar it just gets forgotten about with one of the million other things you've got to do, but if it's there it kind of reminds me to keep it in mind. (Nurse practitioner)

Participants, particularly clinicians, supported this view but also highlighted that with the short time frame of placement in each location the communication of STI-X needed to be more targeted.

That timing of getting the messaging out there and making sure people were aware for those months, yeah, it needs quite a concerted communication effort, doesn't it, to promote because it's only here for a few months and then it's off to the next. (Public health manager)

The process of using the vending machines

Accessing a test kit was a simple process but there are still additional challenges that need to be addressed

Across all communities, every professional responded that they were impressed with the ease of use and the speed with which an individual could acquire a testing kit. This facet of accessing a test kit was particularly important for both the professionals and user participant as the vending machines were placed in public locations. One participant who had used the vending machine stated that STI-X was 'straightforward to use. It didn't really need any real personal information … it needed the phone number to connect it to you … but it didn't really need any real personal information. It wouldn't have felt as confronting for most people'.

Overall, the STI-X process was well liked; however, one health professional raised that the phone number requirement was a barrier for some users. This participant supported multiple patients to use the machine while placed in their organisation.

… some people that I assisted to use the machine were a little bit wigged out at the prospect of putting their mobile phone number in it. They were sort of saying, what do they need it for? When you explain the process, they understood that. (Sexual health nurse)

Professional participants in the interviews fully understood that the utility of this step was to prevent repeated users emptying the machines, and it was not highlighted by the user participant interviewed.

The touchscreen prompts were easy to navigate but the question of why particular demographic questions (eg sex of partner and sex versus gender of user) were chosen for inclusion in the process was raised for future discussion.

Over the duration of the project, there was a mis-vend or no vend of a test kit, which meant that either one or no box was dispensed. These issues related to a mobile connection issue in interior rooms within buildings and the dispensing column/mechanism. One participant highlighted an issue with a mis-vend but deemed this level of success acceptable with a technologically innovative solution.

Sample submission appears easy, but communication of both positive and negative results would be desirable

After users obtained a test kit, they could complete their sample collection at their leisure in a setting of their choice and then post the swab samples to the laboratory as instructed. One user commented on the clarity of the instructions that provided guidance on completion and submission of the self-collected samples, stating that these, 'were pretty good, straightforward, and clear about what you had to do. I reckon it would've been fairly easy to follow if you didn't have any idea on what you were doing'.

As this was an established pathway in Victoria, no participant raised any concerns with the initial part of this process, but it was highlighted that assuming no contact from a provider indicated a negative result was challenging for users as it could also mean the sample had not arrived at the clinic for processing.

One user of the vending machine highlighted that better communication would help others understand the process, stating that they weren't sure 'how long it would take to come back … so I did email to find out about all that. That wasn't something that was readily available'.

Additionally, there was no mechanism for recording results for the Atomo HIV self-test, thus limiting our understanding of completion rates and reactive rates.

Discussion

Overall, the STI-X project was successful in providing an additional access point for STI testing that was largely accepted by professionals and community members in some rural and regional communities of Victoria. In our pilot, STI-X allowed for testing that was convenient and accessible, while providing a degree of privacy for individuals in areas where STI testing is either stigmatised or where there are limited options. This is consistent with the findings of a similar innovative solution in the UK[17,18], as well as HIV test options in vending machines elsewhere in Australia and abroad[19,24].

Since concerns of privacy are often one of the biggest challenges in rural and regional areas[25], we wanted to reflect our commitment to this throughout the testing process. Most participants were supportive of our approach to making the vending machines visible yet attempting to ensure privacy for users.

The inclusion of syphilis testing was highlighted as one of the areas for further development in vending machine test distribution. Syphilis is included in some vending machines abroad using fingerprick whole-blood specimens[18]; however, at present Australia does not have an approved self-collection syphilis screen/test. While the method used in the UK could be explored in the Australian context, it is unlikely to be suitable in rural and regional areas, where high temperatures and longer postal delivery time frames are the norm. We are working with partners in both the clinical and laboratory settings as we know there are promising methods being trialled, such as dried blood spot and new point-of-care testing options[26], which would be suitable for inclusion in STI-X.

Equally, the process of completing the self-collected specimen samples was viewed as straightforward with the instructions provided within the kit. We highlighted in the instructions that participants could follow up their results after 14 days from posting the sample to ensure the samples were received. This did not occur frequently, although we acknowledge that a process to verify receipt might be useful in the future. In this instance, the testing centre may be able to apply their 'no news is good news' approach to this method of testing.

It is important to recognise the role of communication, particularly word of mouth, in the dissemination of information within rural communities[27,28]. The need for strong communication transcends the user–provider relationship, as poor communication can impact the number of potential users. While we worked extensively with local partners in design, installation and promotion, we recognise that more work is needed in rural communities to ensure information is distributed across as many channels as practicable, for both professionals and prospective users. As part of the rollout in each location, we provided local services with promotion packs, but this did not seem to always permeate the wider local discourse. This became evident when professionals from tangential services in the pilot communities reported not hearing about the pilot or hearing of it late in its placement within the community. As we utilised network contacts from our communities of practice, we overestimated the likelihood and speed that information would spread organically within each community. Part of this may be due to the short time frame that we elected to place a STI-X vending machine within a community. Professionals noted that this may not be sufficient time for the project to spread by word of mouth, which was often identified as having a strong influence on knowledge transmission.

At present, the STI-X vending machines have been removed from service to allow this evaluation to be concluded. The future of the STI-X vending machines is currently being discussed to ensure the robust systems and processes required to make this type of solution viable are sustainable within the wider health ecosystem.

Limitations

Throughout the data collection and analysis, we identified three main limitations of this pilot: the number of vending machines, placement duration and underestimating the time needed to ensure that an effective communication strategy was in place in each location.

For two of the vending machines in this pilot we opted for placement in two different locations concurrently. Therefore, we needed to place them in a general space that any individual could access, limiting opportunities in services that didn't have a suitable shared space that afforded an acceptable level (to the research team) of privacy.

To ensure we gained data from various communities we chose to place the machines in six planned locations across the 1-year pilot, which limited our placement period to approximately 4 months in each city or town. This may have affected initial uptake or

engagement by some members of our priority cohorts, particularly as the identified method of public health promotion was word of mouth.

Finally, although we did produce a promotion pack for services to assist in sharing the details of the machines with their communities, we did not fully account for nuances between the different services and the types of professionals that were part of the community reference groups (eg nurses, who may not speak with the social media team in their organisation). This meant that some of the internal promotion was lost, therefore limiting potential for external promotion. This was particularly challenging when coupled with the 4-month stints.

Conclusion

This pilot has demonstrated that using a vending machine to dispense STI test kits in rural communities shows promise. While uptake of tests in many communities was viewed as satisfactory, more emphasis must be placed on communication, promotion and placement. Increasing the frequency of communication with community professionals will help strengthen community promotion through established pathways where many prospective users find their current local health information. Additionally, a longer placement phase within each community should increase visibility, in cases where many individuals may not frequently visit the location of the vending machine. This will help gain an understanding of whether priority populations will increase their STI testing.

Policymakers should encourage innovative solution pilots in rural communities to combat growing workforce concerns. Many innovative solutions are trialled in metropolitan areas. Unfortunately, rural communities are disproportionately impacted by workforce shortages, thus pilots like STI-X can provide insight into whether these solutions could help mitigate some of the difficulties experienced by these communities.

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Conflicts of interest

The authors report there are no competing interests to declare.

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