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Health provider perspectives on establishing service linkages for treatment and follow-up from an Australian, web-based STI testing service: a qualitative study

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ABSTRACT

Background. Web-based, testing for sexually transmitted infections (STI) is becoming increasingly available. However, treatment pathways from web-based services are often not well-coordinated, contributing to treatment delays and access gaps. This study investigated clinician perspectives on building service linkages with a new, web-based, STI testing service in Victoria, Australia. **Methods.** We interviewed 16 clinicians from regional/outer metropolitan areas who are part of government-funded, primary care programs to strengthen sexual health services in Victoria. Interviews enquired about: clinician attitudes, considerations for managing referrals, compatibility with clinic systems, and broader policy/healthcare system factors. **Results.** Clinicians were enthusiastic, perceived web-based services as complementary (not competition), and believed local treatment pathways were important for patient choice/access. They felt that administrative aspects of handling referrals from an online service could be managed without problems. To inform treatment, clinicians recommended that referral letters from the web-based service list all tests ordered, dates, and complete results. Tensions were raised regarding the utility and appropriateness of including treatment guidelines and pre-prepared prescriptions in referral letters. Respondents reported that most clinics did not stock injectable antibiotics, raising concerns by clinicians about potential treatment delays and privacy challenges related to patient-led procurement at pharmacies. **Conclusions.** Our study suggests that clinicians are receptive to local treatment pathways being designed as part of web-based STI testing services, and strengthened service linkages could improve client access, particularly outside urban areas. Capacity-building and additional resourcing of local partner clinics may be needed to support decentralised, patient-centred treatment pathways.

Keywords: Australia, digital health service, primary care, qualitative study, referral system, service linkage, STI screening, treatment management.

Introduction

As in other areas of health care, digital health solutions are becoming part of routine care provision in sexual health. Recent years have witnessed a proliferation of web-based testing services for sexually transmitted infections (STIs) in many high-income countries, including the UK, US, Canada, Australia, and the Netherlands.^{1–3} In countries such as the UK, asymptomatic STI testing is no longer predominately managed through genitourinary clinics, but through publicly funded, web-based STI testing services (e.g. sh24.org.uk). Web-based services tend to offer a variation of either: (1) self-navigated pathology where online users receive an electronic pathology form and then attend an associated pathology service for sample collection; or (2) at-home self-collection where users receive a self-collection kit by mail that they then return by post for laboratory testing.^{4,5} While online STI testing offers the potential to lower service costs in publicly funded health systems^{6,7} and to increase access by responding to demands for privacy and convenience,^{8–10} ‘digital first’ solutions, however, present challenges for care coordination and service linkage between online testing services and in-person treatment providers.^{11–13}

Digital first enable different parts of the service pathway to be delivered in different settings (e.g. at-home screening followed by clinic-provided treatment).¹³ The division of services across settings, however, can lead to service fragmentation and challenges in continuity of care.¹⁴ In many web-based STI testing services, pathways for treatment of positive diagnoses are not well-coordinated.¹⁵ Presently, linkage to treatment in web-based STI testing services is handled differently across services: some provide telehealth and e-prescriptions, some facilitate referrals to clinics, while in others, clients must self-navigate their own treatment pathways. While web-based STI testing services aim to decrease time to treatment,⁵ recent evidence from the UK, which showed that the online service had no effect on time to treatment,¹⁶ suggesting that greater attention to strengthening service linkages is needed.

To date, there has been little focus in the literature on how to effectively facilitate service linkages between web-based STI testing services and clinic-provided treatment services, with little investigation of health provider attitudes, compatibility with clinic systems, and broader policy and healthcare system barriers and facilitators. Further, as treatment providers are typically concentrated in urban centres, there is a need to consider how to facilitate service linkages in non-metropolitan areas to support equity and close-to-home treatment options. As part of a larger project where we are designing and implementing an online testing service to target 16–29-year-olds, we conducted a qualitative study of healthcare providers located in rural and outer metropolitan areas of Victoria, Australia to investigate their attitudes towards the possibility of receiving referrals from a web-based service; administrative and capacity considerations; and recommendations for facilitating treatment linkages.

Materials and methods

Setting

The web-based STI testing service (*Test it*) will test for chlamydia, gonorrhoea, syphilis, HIV, and hepatitis C). *Test it* will be managed by the Melbourne Sexual Health Centre (MSHC), located in Victoria, Australia (population 6.8 million in 2023). The web-based STI testing service will use a self-navigated pathology model where users will complete an online questionnaire that includes questions about their sex history, symptoms, and other risk factors. In most cases, users who report STI-related symptoms will not be eligible to use the service and directed to seek medical attention. Eligible users will receive a digital test request form to bring to a pathology service provider of their choice to complete their STI tests. Users will receive their STI test results electronically by logging in to their *Test it* account. If an STI is detected, users will receive options for treatment, including downloading a referral letter to be treated at a health provider of their choice.

The MSHC is Australia's largest provider of specialist sexual health care in Australia and provides about 60,000 consultations a year.¹⁷ However, MSHC is based in the state capital, Melbourne (population of nearly 5.8 million), and is not readily accessible to those living outside of Melbourne. While MSHC provides a considerable amount of the specialist STI care for Victoria, the majority of STI testing is conducted in primary care clinics, known as general practices in Australia. Both specialist services and general practice services tend to be more highly concentrated in suburbs that are nearer to the city centre, with fewer services located in outer suburbs and regional towns.¹⁸ Additionally, some primary healthcare services are provided by Aboriginal Community Controlled Health Services, which are services operated by the local Aboriginal community to deliver holistic, comprehensive and culturally appropriate care. In order to increase access to specialist sexual health care in Victoria, particularly for regional communities and disadvantaged suburbs of outer Melbourne, the Victorian government has recently funded (at the time of this study in 2023): (1) 11 community-based, sexual and reproductive health (SRH) hubs (seven in regional areas);¹⁹ and (2) a hub-and-spoke system in which MSHC provides capacity-building support to a set of partnered, general practices (three in regional areas, three in disadvantaged outer metropolitan suburbs).²⁰ The state also provides funding for primary care doctors (general practitioners, GPs) to provide confidential medical advice and health care to students through the *Doctors in Secondary Schools* program (currently operating in 100 schools). In some SRHs and schools, GPs are only available on a limited basis. While registered nurse practitioners have authority to prescribe treatment for STIs, only some sexual health nurses hold this higher qualification. The web-based STI testing service to be delivered by MSHC is part of efforts to increase access to testing throughout the state and to establish specialist treatment pathways with local providers who serve non-metropolitan populations.

In Australia, Medicare provides free or subsidised access to a wide range of health services, at low or no cost for Australian citizens and permanent residents. While specialist sexual health care is provided by MSHC free of charge to all users, many general practices charge consultation fees that exceed the value subsidised by Medicare, resulting in out-of-pocket costs for clients. Those living in Australia on temporary visas are not eligible for Medicare and must pay the full cost of services or purchase private health insurance.

Recruitment and sampling

Given the Victorian Government's emphasis on strengthening access to and the capacity of community-based and primary care sexual health services in regional and disadvantaged outer-metropolitan areas, we prioritised engagement of the SRH hubs and MSHC partner clinics (referred to above) in our study. Using contact lists provided by the Department of

Health and MSHC, we invited all 11 SRHs and 6 MSHC partner clinics to participate in interviews. Clinics were contacted by email between June and August 2023 and received two follow-up emails spaced at least 1 week apart. Each clinic determined who among clinic nurses, GPs, and practice managers would participate. Additionally, we recruited school-based nurses using networking and snowballing at an in-person conference focused on regional sexual health in Victoria (SexRurality 2022). Several participants invited other colleagues to join their interview for additional perspectives, resulting in some interviews having two or three individuals in a joint interview.

Data collection and analysis

Semi-structured interview guides (Supplementary material file S1) enquired about:

- Attitudes towards a web-based STI testing service including access to artificial intelligence (AI) tools to support users with STI symptom recognition
- Implementation considerations for managing referrals of clients needing treatment or symptomatic clients needing urgent management
- Capacity to administer injections for gonorrhoea and syphilis
- Financial and billing considerations
- Clinic-based promotion of the online service

Given the dispersed location of participants, interviews were conducted online and lasted about 45 min. Plain language statements and consent forms were emailed to participants and signed electronically prior to interviews. Given the high workload of primary care providers in Victoria, participants received a AUD\$50 gift voucher in gratitude for their time. Each interview included two members of the research team (TL and OW). After each interview, field notes were recorded to assist with identification of preliminary themes. Interviews were digitally recorded and transcribed using an automated transcription service (Otter.ai), and then checked for accuracy. The coding structure was developed jointly by TL and OW based on the field notes, full reading of the transcripts, and joint discussion. OW conducted the primary coding in NVivo 14 with further refining of the codes by TL. We used qualitative content analysis to present descriptive summaries of convergent and divergent views among participants.^{21,22} Ethical approval was granted by the University of Melbourne (2023-25358-41317-4).

Results

A total of 16 individuals (13 women) participated across 10 interviews. Participants represented:

- Four SRH hubs (seven practice/registered nurses, one Indigenous health practitioner, one youth/family team manager)

- Two MSHC GP partner clinics (one practice manager, one GP)
- Five public secondary schools (five practice/registered nurses)

Respondents were located across six regional settings, two outer suburbs, and one Aboriginal Community Controlled Organisation. One GP setting was a private practice, with the rest employed in publicly funded health services. Perspectives from respondents are summarised under the four themes with quotes presented in corresponding tables:

- Overall perceptions of a web-based STI testing service (Table 1)
- Willingness and capacity to support treatment pathways (Table 2)
- Recommendations for referral letters (Table 3)
- Promotion and other recommendations (Table 4)

Overall perceptions of a web-based STI testing service

Respondents across the three service contexts (state-supported SRH hubs, general practices, and school settings) showed much enthusiasm towards the proposal to implement an online STI testing service (Quote-1.1) and valued its potential to improve access and equity in service provision for non-metropolitan areas (Quote-1.2). They did not perceive the online service as competing with in-person services, but helping to fill a gap (Quote-1.3). They anticipated that a web-based service would be particularly attractive for young people who are inclined to do things online and would offer important confidentiality and anonymity for young people in smaller communities and Indigenous communities where health workers 'know everyone' (Quote-1.4). Additionally, one participant raised the potential of the online service to help bridge the divide between reproductive services (which are more geared towards women) and sexual health services (which are more geared towards men who have sex with men in urban areas) (Quote-1.5).

While enthusiastic overall, several noted concerns that the online service could miss out on the benefits of in-person services, including human connection, space to take detailed histories to understand a person's context (e.g. trauma, mental health), and opportunity to offer comprehensive, holistic services at the same time (e.g. contraception, abortion, vaccination, cervical screening) (Quote-1.6). There was also some concern that an algorithm might not be able to provide the right tests for identifying ulcers if relying on pathology tests alone. Those who worked with populations without access to Medicare were concerned that the service would miss those at high-risk of acquiring and transmitting STIs, particularly sex workers without work rights seeking asylum in Australia (Quote-1.7).

Table 1. Overall perceptions of a web-based STI testing service.

Quote number	Theme	Illustrative quote
Q1.1	Overall enthusiasm and positivity	'a terrific thing', 'a great initiative' and 'being 100% behind that idea' (SRH-17, GP-10, School-5)
Q1.2	Importance of equitable access for regional areas	'Being in a regional location, I'm so passionate about making sure that young people have access to the same services that people do in metro areas. So I think it's awesome that you guys are doing this project' (School-18)
Q1.3	Complementary rather than in competition	'I think it's an exciting and really positive development. Yeah, I think it's a great supplement... I think there's definitely room for both. Like I said before, I'm only here a couple of days a week. So I feel like it would be a good, complementary way to be able to offer more coverage for people to have testing...'
Q1.4	Confidentiality for young people and small communities	'They learn online a lot. And so it's just a bit of a confidential way of dealing with an issue that they have. But they still need education in the classrooms, but I just think we might find a lot more younger people, you know, testing for STIs' (School-5)
Q1.5	Bridging reproductive and sexual health services	'And there's so many ways that it [online STI testing] can, you know, positively contribute. I mean, I've said it again and again, the disconnect between the sexual health community that really does focus on more on men who have sex with men and higher risk populations, and the reproductive health community, you know, it frustrates me' (SRH-ID9)
Q1.6	Reservations	'We do a really good job here of kind of getting the big picture stuff with the people that we see. And, you know, we can ask about their mental health, and are they living at home? And, you know, you pick up lots of stuff that, you know, that would get missed otherwise if we're not seeing them' (SRH-2)
Q1.7	Equity concerns	'Newly arrived, people may not have Medicare cards, and people who do not have Medicare cards may engage in sex work quite commonly, to supplement some kind of income, they can't get another way. And we think that will be a huge population group that you've kind of cut out from the testing' (SRH-14/15)

Willingness and capacity to support treatment pathways

Willingness to receive referrals from an online STI testing service

Respondents from all clinics, except one SRH hub, expressed openness to receiving referrals from the online STI testing service for investigation of symptoms and treatment. Acceptability was underpinned by the view that referrals from an online service could be handled in a similar way to other referrals (via walk-in, calling the clinic, booking via an online app (e.g. HotDoc). Respondents were happy for clients to show them a digital referral letter on their phone and then email it to the clinic to create the required paper trail (Quote-2.1). Willingness to receive referrals was also underscored by their concern with providing clients with a choice of close-to-home service options (Quote-2.2), noting it was already commonplace for regional individuals to travel to the city for specialist health services and subsequently arrange for treatment and care to be managed locally. One SRH was disinclined to receive referrals, indicating that they would not be able to cope with the additional load of clients for STI treatment given their limited staff availability and prioritisation of time-sensitive referrals for medical termination of pregnancy (Quote-2.3).

Capacity to provide treatment for referred clients

Respondents indicated their willingness to treat individuals who tested positive for syphilis or gonorrhoea using

the online testing service. While they were willing and trained to administer an antibiotic injection, only some of the services (those with a higher volume of patients with positive STI diagnoses) stocked injectable antibiotics on-site (SRH-1/2, MSHC-8, MSHC-10). Others did not see enough cases to warrant doing so and raised logistical considerations. In Victoria, benzathine penicillin is available for free in the state-funded 'doctor's bags', but comes in boxes of 10, which respondents indicated would exceed their capacity to use (Quote-2.3). Among those who stocked injectable antibiotics, they raised the difficulty of gauging what volume of referrals they might receive from the online service and the need for internal processes to monitor stock and manage timely re-orders to ensure availability, particularly for those who had travelled a distance (Quote-2.4).

For clinics that did not stock injectable antibiotics, respondents noted the client would likely have to purchase them directly from the pharmacy. In doing so, clients may encounter several hurdles in regional areas, including needing to shop around at multiple pharmacies to find it, time delays of 1–2 days for pharmacies to place new orders, and issues around privacy (Quote-2.4). Given these issues, many recommended that clients be directed to clinics with in-house stock of injectable antibiotics or advised to call clinics in advance to check (though acknowledging that the latter option could be a little bit awkward for the client). School-based respondents indicated that school GPs were unlikely to have injectable antibiotics on site and were uncertain about the processes and budget available for procurement (Quote-2.5). Several

Table 2. Willingness to receive referrals for symptomatic clients and capacity to treat clients with positive diagnoses.

Quote number	Theme	Illustrative quote
Q2.1	Acceptability of digital referral letters	'So I get people with their results on their phone a lot in regards to, you know, serology, or even ultrasound results. As long as, I could have them email it to me, then I print it out and put it into their file' (SRH-1)
Q2.2	Importance of provider choice and close-to-home options	'I think giving them the option to refer back to the health centre of their choice, yeah, rather than defaulting to Melbourne Sexual Health Centre. Because I think, for community, it's important that they have a choice in where they choose to get the care' (SRH-19)
Q2.3	No capacity to receive referrals	'Our service wouldn't be able to cope with the additional load that this online screening would place on it. As we said, we operate eight hours a week with vulnerable women in [Catchment]. Clinics are fully booked. The MTOP [medical termination of pregnancy] referrals are time sensitive so they will get higher priority than STI screening follow up' (SRH-14/15)
Q2.3	Barriers to stocking injectable antibiotics	'You can get it free in 'doctor's bags'. That doesn't mean that people will have benzathine penicillin sitting on their shelves. Because they, you know, they get dispensed in boxes of 10. We don't go through a box, you know, all that quickly . . . So it might take a few months before we are asking for the next one. And that's at our clinic which is a higher volume clinic' (GP-8)
Q2.4	Managing volume	'Because we don't know the numbers, we don't know how many people would take up. But, you know, if we're going to offer this service, then we have to ensure that we've actually got the treatment available for people. And considering people might be coming from a long way, you know, and they've been given the understanding that they're coming on the day, and it'll be sorted out today. So there's a few variables and factors involved in this. And I suppose from our end, we're complicated, because we're a multi-site service. So if someone rang up, they might get somebody who has not very much experience in managing this. So that's some of the backend stuff that we'd have to discuss as well' (SRH-1/2)
Q2.4	Barriers to client procurement at pharmacy	'So this brings up issues around privacy. A young person has to go and get a Medicare card and go to a chemist in a local town and purchase ceftriaxone. It isn't on the shelves of every chemist, not even in [regional city]. We've had people who've had to, you know, try three or four different pharmacies to get ceftriaxone. And that's, you know, that's exposing that person, because I don't know if the pharmacist knows every reason why someone has ceftriaxone, doxycycline, azithromycin – they are pretty, you know, pretty run of the mill. If you're in a small country town, and there's only one pharmacist, you know, there's a lot of fear around that. And I think that's very justifiable. And certainly, that may deter people compared to having a consultation on their phone, which is very private, and then coming in [to the clinic], and then just sharing that with a nurse or a doctor, and then saying, Yep, okay, we've got those drugs here. Yeah, that may be more acceptable' (SRH-1)
Q2.5	Barriers to treatment via 'Doctors in Schools' program	'So I don't know whether the GP could get this drug and bring it to the school and give it in that situation? I'm not sure' (School-5)
Q2.6	Treatment costs	'My guess what would make it complicated is if they've got no Medicare, then you get no revenue at all. Helping, I mean, we would still do it. But you know, if they go to Melbourne Sexual Health Centre, they [the patients] get everything for free. Yeah, but otherwise, it's probably no different really, than people just coming in to our clinic' (SRH-2) 'We would just wear the cost of ceftriaxone. We feel that it's an important part of being a good service' (MSHC-10)

school nurses suggested that they could assist with referrals and follow-up to local clinics.

Billing considerations

For referred clients with Medicare, respondents from SRHs and partner GP clinics anticipated that billing for referred clients could be handled without problems under existing Medicare policies. For example, Medicare policies allow for new patients to book sexual health services without needing a preliminary new patient appointment (as typically needed for other health issues). A few mentioned there was some flexibility to treat a limited number of clients without Medicare, their clinics would not be able to absorb the

cost if there were large numbers of unsubsidised patients. (Quote-2.6).

For services that already stocked injectable antibiotics, they felt that their clinic had at least some capacity to absorb the cost of treating referred clients (Quote-2.7). Others mentioned that while benzathine penicillin could be provided free through 'doctor's bags', one SRH hub mentioned that treating gonorrhoea could get costly if there were a lot of cases.

Recommendations for referral letters

Respondents gave suggestions for what information to include in referral letters generated from a web-based service. Key

Table 3. Recommendations to facilitate the referral process between online STI testing service and facility-based treatment providers.

Quote number	Theme	Illustrative quote
Q3.1	Test results – inclusions	<p>‘We would want the results. Like I don’t know that anyone would be happy just to treat someone with a letter saying I’ve been diagnosed with something. Yeah. And if we have to chase them for the results, then it’s time consuming . . . yeah, if the results come in, we’d be very happy’ (SRH-2)</p> <p>‘Down the track, it would be really useful to have the date and time of the investigations in the referral. Because it would help us to kind of contact trace and also kind of trace that person’s history. And we know with syphilis in Victoria, that’s challenging’ (SRH-1)</p>
Q3.2	Treatment guidelines	‘We’d only need treatment guidelines if there was something really special that had to be done . . . But I do think you should add on treatment guidelines for GPs. Yeah. I’m not criticising, they’ve just got to be across so many different topics; whereas, this is our speciality. So we’re all over it’ (SRH-17)
Q3.3	Prescription – advantages	<p>‘A lot of practices will not have a pharmacy on site. And so, then there’s a two-step process. So if a patient rocks up needing benzathine penicillin and they don’t have it in their hands, then potentially they might have to go off and get it and come back. The patients are not going to know which clinics have that stuff sitting in their treatment room. Yeah, which is problematic, you know. I don’t know the way around that. But I suppose one way around it would be for patients to bring their stuff [drugs] with them’ (MSHC-10)</p> <p>‘Like I had this question a little while ago in relation to administration of T [testosterone] for a trans person. And I had a chat to the GPs about whether they’d be fine with me administering T without them being the prescriber. And their attitude was, if they’re coming in with, you know, with the documentation, then yeah. It’s not like it’s a dangerous, you know, psychotropic drug or anything like that; it’s not an opioid, you know. It’s an antibiotic with a clear pathology, so that wouldn’t be a problem’ (SRH-9)</p>
Q3.4	Prescription – disadvantages	‘I don’t think that GPs are going to be happy dispensing or putting out a script without making an assessment. I mean, in case the patient’s penicillin allergic, or the treatment is deemed inappropriate, or they’re pregnant, or you know that there’s some other issue’ (MSHC-10)
Q3.5	AI symptom checker – advantages for patients	‘It would probably help the patient to articulate things better. Like I had a patient who was trying to describe her sore, and, you know, the way that she ended up describing it was sort of hard lumps. And when we looked at it, I was like, oh, no, that’s herpes. It’s not anything that you described it as. So, you know, it could maybe help them with their articulation’ (SRH-9)
Q3.6	AI symptom checker – advantages for providers	<p>‘the symptom checker is a really good additional thing, especially if you’re new, like I’m sort of . . . You know, I’ve done the training, but I’m sort of new to actually being presented with genitals on a regular basis, other than just cervical screening genitals. With the description, you’ve sort of got more of the parameters that make it syphilis versus herpes’ (SRH-9)</p> <p>‘there is a cohort [of GPs] that is completely uncomfortable in the field of sexual health, and do poorly in managing these things. In which case, if I’m thinking of the worst case scenario: people who are time poor, not interested, don’t provide good care. And to get a good outcome in those settings, then it really needs to be something that’s really quick and easy’ (MSHC-8)</p>
Q3.7	AI symptom checker – disadvantages for providers	‘I’d also worry about people falsely diagnosing themselves with something, and then be really alarmed and upset about it. And it might turn up that they’ve just got molluscum contagiosum or something, you know, something that’s not a big deal. From my experience, and [SRH-1] would be the same, I find that, especially young people, but not just young people, if they have symptoms of anything, they automatically think they’ve got the worst thing possible. And that it’s probably not curable’ (SRH-1/2)

Table 4. Promotion and other recommendations.

Quote number	Theme	Illustrative quote
Q4.1	Willingness to promote	‘Certainly in the past, we’ve done some things where we’ve had very specific, kind of short-term, pop-ups like flags on our website for different health promotion campaigns. Yeah, certainly, that would be something that we would be able to do [for the web-based STI testing service]’ (SRH-1)
Q4.3	Reluctance to promote in-clinic	‘Like my big thing is I don’t want people seeing that [an ad for the web-based STI testing service] and thinking “Oh, I have to do that online because obviously my doctor doesn’t do it because they had that poster.” I don’t want people to delay care because they think that by seeing that poster that means we don’t do it or something’ (SRH-9)
Q4.3	Create competition	‘Look, I guess the asymptomatic screening is our bread and butter . . . we have a nurse specifically for doing asymptomatic screening. So I can’t see that I would be referring patients for this service’ (MSHC-10)

recommendations included the need to provide a list of all tests ordered, not just tests with positive results, the date of the investigations, and, the full description of the pathology results (i.e. numerical values). Including such information would make them feel informed to proceed with treatment without needing to re/order tests (Quote-3.1) and to assist with contact tracing and understanding the patient's history (Quote-3.2).

To understand what additional features might be useful, we further enquired about the value of including: (1) treatment guidelines; (2) prescriptions, and (3) predictive diagnoses from an AI symptom checker (ispysti.org managed by MSHC).

Treatment guidelines

As providers in SRH hubs and MSHC partner clinics, most respondents felt that they were well acquainted with current treatment guidelines, but anticipated that GPs who less frequently manage STIs would benefit from having the guidelines presented as part of the information included in the referral letter (Quote-3.3).

Prescriptions

There were mixed views about including prescriptions as part of the referral letter. Advantages included making the process more efficient, for both clients and providers. It would be time-saving for clients (avoiding the need for multiple appointments to first receive a script to fill at a pharmacy, and a second appointment to administer the treatment) (Quote-3.4). Further, it would enable nurse-led administration of straightforward antibiotic treatment without requiring a pre-consultation with the GP (as already being done for some other conditions) (Quote-3.5).

While some felt there would be no problem administering a prescription provided in the referral letter (so long as the pathology results were well documented), others preferred to do their own prescribing. This would allow them to make their own assessment of the appropriate treatment, including consulting the patient about allergies and drug interactions, and engage the patient in a conversation about treatment options (Quote-3.6).

AI support for diagnosing symptomatic clients

For symptomatic clients who were not eligible to use the service and directed to seek medical attention, we enquired if we should provide these clients with a referral letter that included output from an online symptom checker. The MSHC hosts the tool, iSpySTI.org that uses clinical case presentations and mathematical modelling to determine the probability that the client's symptoms are related to a particular STI.

There were mixed views about utility of incorporating results from the symptom checker tool into the referral letter. In an age of internet-based medical advice, respondents noted that such information could be useful for patients by: (1) providing a reputable source for a good 'Dr. Google option';

(2) assisting communication about symptoms between the client and the provider (Quote-3.7); and (3) supporting providers with less experience (Quote-3.8) and/or comfort in sexual health (Quote-3.9). However, others were concerned that it would create alarm and anxiety, particularly in young people, who would falsely diagnose themselves (Quote-3.10). Others thought it would be redundant as a tool for providers as they will still have to do an examination.

Promotion

Respondents expressed a mix of willingness and reluctance to promote the online service through their clinic or school via posters, institutional websites, and social medial platforms. Some respondents were willing to promote using a wall poster, digital poster on closed circuit TV, or on their website as they do for other health topics and services (Quote-4.1), while others suggested that other types of services, platforms, and in person-events might generate higher awareness than in-clinic promotion. To improve synergies between the reproductive and sexual health services and to build on existing tools, one respondent recommended that the online STI testing service be promoted by the state-wide, free phone service that provides options for unplanned pregnancies (1–800 My Options), including through its geo-mapping, service locator tool. There was general reluctance to recommend the online service during patient consultations, suggesting that to do so would compete with their own services (Quote-4.4) and limit future opportunities to meet with clients and provide holistic care. Further, one respondent was concerned that a poster advertisement would give clients the wrong impression that testing services were not available on-site (Quote-4.3).

Nurses from different schools had different levels of flexibility and autonomy in the sexual health content they make available. Schools indicated that sexual health content would need approval by the principal, at a minimum, and perhaps higher levels in some schools. Several suggested that posters would likely be most appropriately placed in sick bays and nurse's offices, rather than at the front entrance or public-facing areas of schools.

Discussion

Within the literature on online STI testing, our study is one of few that focuses on treatment pathways and among even fewer to focus on regional service settings. Our study found that primary healthcare providers working in regional and outer metropolitan areas were willing to support the management of individuals who received positive diagnoses through a new, web-based STI testing service. They felt that the administrative aspects of handling referrals (e.g. booking appointments, patient documentation) from an online service would be largely unproblematic, but raised concerns about

administering online prescriptions, and lack of injectable antibiotics available on-site at smaller clinics.

Our study suggests that clinicians are comfortable managing treatment of patients from a web-based STI testing service, if referral letters contain fulsome information. To this end, they suggested that referral letters include a list of all tests ordered, the date of investigations, and the full results. However, our study found that inclusion of a pre-prepared prescription as part of the referral letter was contentious and raised tensions between promoting client-centred services, empowerment of nurse-led approaches, legal liability and prescribing authority.^{23–26} However, respondents indicated that a pre-filled prescription for injectable antibiotics would streamline the process for clients and enable nurses to administer directly without consulting a GP first. This can be especially useful in smaller practices that are nurse-led or where the GP has limited consultation hours.²⁷ In contrast, others indicated that those with prescribing authority would prefer to make their own assessment of appropriate treatment for an individual, taking into account allergies and a discussion of client preferences. While online prescriptions work well for safe and simple medication (such as azithromycin to treat chlamydia) and save the patient the cost and time of a consultation,²⁸ there are significant legal barriers to offering online prescriptions in many countries, including Australia.^{29,30} For injectable medication (needed to treat gonorrhoea and syphilis), the benefits are less obvious as the client must attend a healthcare provider to receive the injection anyway.

Willingness among outer metropolitan and regional primary care providers to support referral pathways from the online service was underscored by their concern with providing close-to-home treatment options and choice for clients. Providing care closer-to-home is an important principal guiding health care delivery in many countries, guided by evidence that it improves patient satisfaction and lowers cost.^{31,32} However, our study raises important capacity considerations when working with less resourced, lower volume, primary care providers over higher-volume, specialised services often concentrated in city centres. Local providers offer the advantage of being closer to regional clients but may lead to treatment delays and less anonymity if prescriptions need to be first filled at local pharmacies before they can be administered in clinic. In contrast, specialised sexual health services in urban areas are better resourced and more anonymous, but may involve considerable travel time to reach for those located away from city centres. Acknowledging these trade-offs, clinicians in this study highlighted the importance of offering clients a range of referral options that are best suited to the user's circumstances and preferences, which is a recommendation aligned with patient-centred healthcare practices.³³

Beyond patient-level outcomes, the design of treatment pathways from web-based STI testing services can have important implications for broader public health aims.

Centralised treatment pathways may inadvertently contribute to existing service inequities between metropolitan and non-metropolitan areas by referring a large volume of patients back to a single provider. This study is part of an intentional effort to design treatment pathways that support access and equity for regional communities by building on investments by the Victorian Health Department to strengthen the capacity of community-based, sexual health service providers in less-served and disadvantaged areas. As options for digital first services increase, there is a need to consider how web-based services can operate as integrated rather than discrete services with the health services system.³⁴

Limitations

While this study draws on a small sample of clinicians, the interviewees were well-informed about the general service landscape in regional Victoria and outer areas of Melbourne and were able to comment not only on their particular practices but on broader capacity constraints in the service environment. Further, as several interviews were conducted with more than one person present, it allowed for a dialogue between individuals where respondents bounced ideas off each other and challenged the initial response, leading to a richer and more considered discussion. Our sample participants were mainly nurses, reflecting the nurse-led sexual health practice in many regional services. However, additional GP perspectives, particularly those working in general practice settings without specialised sexual health training and without familiarity of online STI testing may have different needs and priorities for what information they would want included in referral letters (e.g. best practice guidelines for STI management, tools for talking to patients about STIs). Although the Victorian health service and policy landscape has shaped the particular findings of this study, findings related to developing referral pathways with less-resourced, regional providers and tensions over prescribing practices are likely to be relevant to other countries and contexts.

Conclusion

Web-based STI testing services are becoming increasingly commonplace; but they are not always well integrated into health systems, leading to service fragmentation and treatment delays. Treatment pathways need to be considered not as an after-thought but as part of the initial design of any web-based STI testing service in order to support coordinated, client-centred, continuity of care. In particular, there is a need to think about how connection to care in regional and other underserved areas may differ from metropolitan contexts and develop implementation strategies to support good client outcomes in these contexts. A decentralised approach to establishing service linkages for treatment and follow-up

may offer clients more options, but also creates challenges for assuring service quality when responsibility for treatment is transferred to other providers who may have little or no affiliation with the web-based testing service. Providing training to health providers to reduce stigma around those treating STIs and addressing system bottlenecks to stocking injectable antibiotics could help improve quality of care in a decentralised referral system. Design of referral pathways for treatment and follow-up will need to carefully consider trade-offs between equity, access, and service quality when considering which local providers to partner with for establishing treatment pathways from web-based, STI testing services.

Supplementary material

Supplementary material is available [online](#).

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Data availability. Data will be available upon reasonable request by emailing the corresponding author.

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