Key informant perspectives on a centralised contact tracing system for sexually transmitted infections

Catriona Murray, Sally B Rose, Amanda Kvalsvig, Michael G Baker

ABSTRACT

AIM: To meet the demand of contact tracing requirements associated with Aotearoa New Zealand's COVID-19 pandemic response, a national contact tracing service was established. Contact tracing for sexually transmitted infections (STIs) like chlamydia, gonorrhoea and syphilis is usually done at the clinic level, and evidence suggests it is under-resourced and often incomplete.

METHOD: We considered the utility of a centralised contact tracing service for STIs by interviewing key informants. Interviews took place between December 2021 and March 2022, and were audio-recorded, transcribed and analysed using thematic analysis.

RESULTS: Twelve key informants from disciplines including sexual health, primary care, public health, research and contact tracing participated. Perceived benefits of a centralised system included efficiency, standardisation and reduced demands on clinician time. Potential challenges and considerations included concerns about trust and privacy, the importance of cultural safety, meeting the needs of priority populations and lack of local-level knowledge.

CONCLUSION: A centralised contact tracing service could enable a more consistent and comprehensive approach to contact tracing for STIs and alleviate some of the burden on already stretched clinicians. However, successful contact tracing requires high levels of trust and for some populations this may be best achieved through trusted local providers, who could be supported, if needed, by centralised expertise.

Contact tracing played a vital role in limiting the transmission of COVID-19 during Aotearoa New Zealand's (Aotearoa) pandemic response.[1] Contact tracing is defined by the World Health Organization as *"the process of identifying, assessing, and managing people who have been exposed to a disease to prevent onward transmission"*.[2] This process helps identify other potential cases and is used in the control of infectious diseases including tuberculosis, measles, HIV and other sexually transmitted infections (STIs) such as syphilis, gonorrhoea and chlamdyia.[3] Initiation of contact tracing (or partner notification) for STIs is the responsibility of the diagnosing clinician. All contacts at risk need to receive testing.[4] Cases often choose to tell contacts themselves ("patient referral") or providers may do so anonymously on their behalf ("provider referral"). For STIs, these processes are usually referred to as partner notification rather than contact tracing. The terms have been used interchangeably in this report. STIs are diagnosed in a range of services in Aotearoa including general practice, family planning, youth and student health services, maternity and prison services. New Zealand Sexual Health Society guidelines recommend that in situations where contact tracing is complex, support is sought from sexual health or public health services.[4]

In the United Kingdom (UK) and United States (USA), regional responses to COVID-19 involved re-deployment of skilled contact tracers working in sexual health to support COVID-19 contact tracing efforts.[5] In some instances this diversion of expertise came at a cost to STI case management, leaving a shortage of staff to manage an already high and increasing workload.[6] Unlike the UK or USA, there was no dedicated workforce of specialised sexual health contact tracers with capacity to be reassigned in Aotearoa. Contact tracing for COVID-19 was initially undertaken by the 12 public health units (PHUs), but as the workload soon exceeded capacity a National Close Contact Service was set up to support PHUs (March 2020).[7] That service was also quickly overloaded,[7,8] and with additional resourcing, the National Investigation and Tracing Centre (NITC) was established, which supported PHUs in their contact tracing and took on a "finding service" to locate individuals who, to that point, were uncontactable. To facilitate this national work, a cloud-based national electronic database (the "National Contact Tracing Solution") was developed to store details of cases, contacts

and exposure events, and to assist in locating individuals by linking to contact details held in the National Enrolment Service.[8,9]

While some research looked to sexual health contact tracing experience to inform approaches to contact tracing for COVID-19 in the first years of the pandemic,[10] we consider here how Aotearoa's experience with COVID-19 contact tracing might inform the future of STI control. Aotearoa has ongoing high rates of curable STIs including chlamydia, gonorrhoea and syphilis[11,12] and, with the exception of HIV and syphilis,[13,14] there has been no significant undertaking to reduce STI prevalence. Evidence from clinic-based studies suggests partner notification for chlamydia and gonorrhoea is often incomplete, under-resourced and needs to be improved in Aotearoa.[15–18] We sought key informant views on whether contact tracing for STIs would benefit from a centralised approach as used for COVID-19, with particular consideration of effectiveness for priority populations in Aotearoa (Māori, Pasifika, and gay, bisexual and other men who have sex with men [GBM]).

Methods

Participants

Purposive sampling was used to select potential participants to take part in a one-off key informant interview, and included people working in roles or services where STI contact tracing is undertaken, and/or were known to be knowledgeable on this topic. This included individuals working in primary care, sexual health, public health and research roles. A target of 12 interviews was set due to time constraints of the project, with 21 invitations sent out (three declined or passed the request to a colleague; six did not reply). Ethical approval was granted by the University of Otago Human Ethics Committee (reference D21/313, 14 October 2021).

Data collection and analysis

Interviews were conducted by CM between December 2021 and March 2022; 10 via Zoom and two in-person (audio-recorded with permission). CM has a background as a clinician in family planning, where sexual healthcare is a core part of service delivery. Interviews followed a semi-structured schedule and sought participant views on use of a centralised workforce for STI contact tracing as part of a wider discussion about contact tracing. The data presented here relate to discussion about a centralised system, while the rest of the data are reported in a separate paper to enable full presentation of participant views.

Data were analysed using reflexive thematic analysis guided by Braun and Clarke's six-phased approach.[19] At the conclusion of each interview, brief reflective notes were made to facilitate recollection of the circumstances of the interview. Participants were asked if they wanted a copy of the transcript so they could check that it was an accurate account. The interviews were transcribed verbatim and read by CM and SR while listening to the audio recordings. CM did the initial coding looking for sections in the transcripts that related to the issue, and coded these with their explicit or implicit meaning. The codes, along with supporting quotes, were stored in a Microsoft Excel file and reviewed by SR. Themes were developed and refined. Quotes were selected by CM and SR to illustrate salient points.

Box 1: Interview questions related to use of a centralised system for STI contact tracing.

Question prompt
A National Investigation and Tracing Centre has been set up for COVID-19 that supports public health units to do contact tracing.
• Do you think it would be useful to have a centralised workforce like this to help with STI partner notification?
• What do you think would be good about a centralised service for partner notification and what problems or risks do you think there might be?
• What are your thoughts about the logistics of passing people's contact details and diagnoses to another service while maintaining trust and confidentiality?
• What do you think the key considerations are for a centralised service to work well for Māori, Pacific peoples and gay and bisexual men?

Results

The characteristics of the 12 participants are described in Table 1. The mean interview duration was 38 minutes (range 28–50 minutes). An alpha-numeric code (shown in brackets after roles) was assigned to each participant to denote their role or expertise when presenting illustrative quotes. Some comments have been edited for brevity and to ensure anonymity (e.g., names, fillers and repetitions removed).

Views of a centralised system for contact tracing

The data centred around four key themes: i) potential benefits of a centralised system, ii) concerns and considerations, iii) meeting the needs of priority populations and iv) sharing experience gained from COVID-19. The extent to which participants working in clinical roles undertook comprehensive contact tracing was variable and impacted by time, resources, type of STI and status as a notifiable disease. There was consensus that more effective approaches are needed, with some

Table 1: Characteristics of participants interviewed as key informants (n=12).

Characteristics	n
Region of residence	
Auckland	4
Rural North Island	1
Wellington	6
Christchurch	1
Role	
Sexual health physician (SHDr)	2
Sexual health nurse, nurse specialist (SN)	3
General practitioner/public health physician (GP/PH)	2
Manager (M) [a]	3
Public health researcher (PHR)	2
Population expertise [b]	
Sexual health service attendees	5
Primary care patients [c]	2
Māori	3
Pasifika	1
Men who have sex with men (MSM)	4
People with or at risk of HIV	3

[a] Managers included people working in sexual health, HIV and contact tracing
[b] Some people are included in more than one category
[c] Primary care: inclusive of family planning

Table 2: Theme 1: potential benefits of a centralised STI contact tracing system.

Potential benefits	Illustrative quotes
Efficiency, consistency and clarity: Participants suggested that a centralised system would provide a systematic approach with adoption of standard national guidelines and would save clinics from establishing and staffing individual systems. A national free phone number for patient queries that is always staffed would be beneficial.	*Guidelines around how it's done, what can be done, what can't be done, to make sure that patient confidentiality and privacy is maintained. It can be a bit of a minefield, you know, to go down and we're not all setting up our own individual training. So there's one standardised system for the whole country. (M2)*
Specialised training: Currently, clinicians receive very little or no training in contact tracing and the legal and practical boundaries are not always clear.	*It could have advantages, because you're kind of sharing the same workforce. Specialised, specially trained people doing it. (SN2)*
Improve capacity of clinical services: A national service would require less clinician time and relieve pressure on already stretched sexual and public health services.	*The challenge is nobody has the capacity to do it. GPs don't. I understand in most regions the PHUs don't even see it as part of their work to do STI contact tracing. (M3)*
Trust and acceptability: Public awareness of the national model used for COVID-19 contact tracing may facilitate acceptance and trust of a national STI contact tracing system.	*I mean, the whole nation has got experience of the contact tracing network for COVID … maybe they would have more trust in such a system now from the experience from COVID. (M2)*
Anonymity: Some people prefer that a contact tracer does not know them personally.	*No relationship is actually very beneficial because you're not known to the family … we've learned that some people don't want to be linked back to their GP. (M1)*
Mobile populations: A national approach could provide services for highly mobile populations more effectively than a local approach.	*I think the other limitation is, each DHB [District Health Board] has their own contact tracing system and so there's no national reference point of, you know, like people are, particularly among MSM, sexual contacts are quite mobile. (M3)*
Potential to provide a national picture of transmission networks: Ability to collate and analyse national-level data would facilitate timely auditing and improvements.	*We need to get a clearer picture of what's happening and how successful different strategies are and how we can improve those strategies and kind of improve contact tracing. (SN2)*

supporting one well-delivered national contact tracing system; others felt a choice of approaches would enable a more patient-centred response.

Themes 1 and 2: potential benefits, concerns and considerations

The potential benefits of a centralised system identified by participants are drawn together in Table 2. Concerns that would need to be addressed if a centralised approach were utilised for STI contact tracing are summarised in Table 3.

Theme 3: meeting the needs of priority populations

Trust, relationships and cultural responsiveness were seen as key to meeting the needs of priority populations. Participants noted that for many Māori, the experience of ongoing and historic racism and related deep-rooted mistrust of the health system impacts on willingness to engage with health services. Establishing trusting relationships between providers, cases and contacts was identified as essential to effective engagement.

From a Māori point of view that trust with the provider is probably even more important. And I think continuity of care is particularly important for Māori, more so than others because of the systemic, multi-generational trauma that these people, on the whole, have experienced. (GP/PH2)

Table 3: Theme 2: concerns and considerations for a centralised STI contact tracing system.

Concerns and considerations	Illustrative quotes
Lack of trust, privacy and confidentiality concerns: Suspicion from both patients and clinicians about third-party involvement and possible privacy breaches. This could be mitigated by providing explanation of the privacy and confidentiality arrangements and raising public awareness to build confidence in a national service.	*There's a kind of trust model between the provider and the person. So I would see a potential barrier if it was central, you've then got a hand over. (SHDr1)* *We've* [the NITC] *also had a number of incidents where the trust has been so high that families have contacted us voluntarily to say things are not quite as they should. (M1)*
Appropriate training and skills: It is critical that staff employed as contact tracers are appropriately trained, have good communication skills and understand and respect the communities they are interacting with.	*Having someone that both is skilled enough to know what's required to be done, but to be done in a way that is going to support the mana and hold the integrity of that person up … you're not going to learn that from a book, you're going to learn it from knowing the community. (GP/PH2)*
Immediacy: The pathway and time required to link with an external provider for contact tracing may not always be appropriate. Some circumstances require swift intervention.	*A pregnant woman who turned up in hospital ready to give birth who's had no antenatal care, and they have got syphilis. That needs to be dealt with there and then—you wouldn't want to be passing that on to a contact tracing team. It needs to be done immediately. (SN1)*
Continuity of care and links with local services: A national service might not have local knowledge and relationships that allow cases to be linked to services in a timely way. Potential suspicion of an unknown provider may decrease engagement.	*There's no real connection to the community. And, if I will be diagnosed here, for example, and then someone calls me from a random call centre, following up on my contacts, it might not go down so well. (SN2)*
Sensitivity and stigma around STIs: Individual and societal attitudes towards COVID-19 are quite different to STIs. Normalising and destigmatising STIs is crucial.	*It's way more sensitive than COVID-19 as a breaking bad news thing because of the implications of what that news means and the stigma associated with it. (GP/PH2)*
Cultural safety and considerations for priority populations: It is critical that the social and cultural norms of Māori, Pasifika and GBM are understood and met.	Addressed in theme 3.

Interacting with contact tracers who are known to, and have existing relationships with, Māori was deemed likely to have the most success in reaching people for contact tracing:

> *The best people that generally contact these marginalised communities isn't going to be the public health unit. It's going to be the nanny who works with the clinic who knows the community, who knows that [name] attends the RSA at five o'clock on a Sunday and doesn't have a phone number but answers his Facebook Messenger. (GP/PH2)*

However, a participant suggested this was not necessarily the case for Pasifika people, citing the example that a lack of any pre-existing relationship between the contact tracer and case was often preferred with respect to COVID-19 contact tracing:

> *The other learning is that for Pasifika, a lot of them do not want Pasifika people ... they are a very close, close-knit community and there's a suspicion that the information will be shared. Some people prefer a completely fresh face that's nothing to do with that community whatsoever. (M1)*

Several participants regarded community-generated solutions as having more potential for success than a centralised approach. Having the skills to approach contact tracing in a way that supports the mana and upholds the integrity of individuals was identified as key.

> I think it would be really good if you can upskill Māori health workers to be whānau champions in this area. Maybe build close relationships with those Māori providers ... especially the nurses and the community workers, because they know the community and they know the language that they use. (PHR2)

Some interviewees expressed concern over whether a centralised approach would be sensitive enough to the needs of GBM. A non-judgemental approach, which reflects understanding of and respect for the community, was regarded as critical to ensure GBM feel safe and supported to facilitate disclosure. Those in contact tracing roles need to ensure that their language, terminology and tone is appropriate and suggested that employing some GBM contact tracers would help this.

> We consistently do get this feedback, that there is value in knowing that the person you're talking to has lived experience, you're not talking to someone who doesn't get it, or who's going to cast judgment. (M3)

Some participants explained that many cases have sexual contacts that are difficult to follow-up ("anonymous contacts") and that the proportion of anonymous contacts is higher among GBM due to the way sexual encounters are often facilitated using hook-up apps (which do not require names or contact details), at cruising sites or at public parks. In some situations, carefully considered interventions by those with local knowledge and cultural awareness may be needed.

> If it's someone who's in the GBM context at a cruising park, you can't contact them other than being there, so if it's really important to get someone, you need some specialists in the community or peer educators to know where to go and to do that carefully and sensitively. (PHR1)

Theme 4: experience gained from COVID-19

Participants reflected on the public's willingness, on the whole, to co-operate with contact tracing for COVID-19, suggesting a collective understanding of the advantages of quarantining contacts for community benefit. They felt this could potentially translate into a willingness to engage with contact tracing for STIs. There was recognition that contact tracers had developed skills and been effective in supporting people to disclose information about their contacts. Participants expressed a desire for the lessons learnt from COVID-19 contact tracing to be shared with other providers.

A participant involved in the NITC identified a number of strengths of the service, including: good staff training, use of a structured but flexible approach and the ability to review, adapt and improve processes. They explained that the NITC team had gained expertise in delivering information, supporting people to make choices and refer if needed. Staff were trained to quickly develop rapport, establish trust and had developed ways to engage and encourage people to share pertinent information.

> The case investigators become experts in reading people very quickly, and knowing ... what are the hooks to get them to engage with the information, get them to trust. (M1)

The NITC optimised approaches; analysing optimal times to phone people, when to call back and what to include in a text message to facilitate contact. Some people reportedly felt more confident talking to a "stranger" than to someone already known to them (e.g., their GP) because it felt more private. However, it was also noted that having a trusted brand and established reputation as a contact tracing service became an important way to reassure those people being contacted that it was not a hoax call.

A participant involved with the NITC stressed that they had sought guidance and worked closely with Māori and Pasifika providers to ensure contact tracers tailored their approach to the needs of Māori and Pasifika. Examples of this were: establishing relationships before asking for information, giving feedback to show they were being heard and use of "storytelling".

Discussion

Key informants in this study saw value in the use of a centralised STI contact tracing system. Benefits identified included improved efficiency and consistency, reduced demands on clinician time and provision of a more comprehensive overview of transmission networks nationally. Concerns were raised that staff must have the knowledge, skills and understanding of cultural norms to communicate effectively with priority groups. Privacy and confidentiality were seen as paramount; lack of trust was identified as a potential concern for Māori and GBM, as was reluctance of cases and clinicians to release details of sexual contacts to an external provider. The potential for missed opportunities to link contacts with testing services and lack of local and contextual knowledge were also identified as limitations of a centralised service. Some participants expressed support for improved access to locally based expertise for STI contact tracing, particularly for Māori, whose experience of and trust in colonial systems that have maintained stark health inequities may not be good.[20] In the same way that Māori and Pacific communities designed and implemented successful approaches to COVID-19 vaccination, STI contact tracing services designed by and for Māori and Pacific communities are needed.[21]

Information shared about the NITC suggested that the concerns raised by many key informants had been considered and addressed or could be overcome if contact tracing for STIs was centralised. Referring clinicians would need a clear understanding of staffing, training, operational, privacy and data collection processes to have confidence in referring their patients to a centralised contact tracing service. Establishment or extension of a national service to accommodate STI contact tracing would need to involve co-design alongside priority groups.[21] Participants' support for a centralised service to assist with STI contact tracing aligns with calls made by other sexual health physicians to "*utilise the newly created COVID-19 contact tracing workforce*".[22] Furthermore, the *Aotearoa New Zealand Sexually Transmitted and Blood Borne Infection Strategy 2023–2030* identified improved "*capability and capacity to undertake contact tracing, including by using digital tools and learnings from COVID-19 contact tracing successes*"[23] as a priority area for health service quality improvement.

The centralised STI contact tracing service could involve some or all the following elements that have been utilised in other countries or situations:

i.   Utilise Aotearoa's NITC (or a similar model) to undertake high volumes of straightforward contact tracing where there is low overall risk to public health. For example, there were 32,326 chlamydia cases in 2019, and 26,045 in 2020;[12] many of these would have contacted partners themselves, but some would have opted for their clinician to assist with the contact tracing.

ii. Provide expert contact tracing for situations where there is elevated public health risk or other complexities that may require cultural, medical and/or legal expertise. This approach would align with use of "disease intervention specialists" who are affiliated with public health departments in the USA to provide "partner services" to people diagnosed with infectious syphilis, HIV and drug-resistant gonorrhoea.[24] This would also be similar to the specially trained workforce of sexual health advisors in the UK who provide expert partner notification services, although they are based in sexual health or genitourinary medicine clinics.[25]

iii. Develop internet-based partner services, which are well developed in the USA and have the potential to reach otherwise "anonymous contacts".[26,27] Such approaches require a high level of understanding of social media, technology and privacy and therefore may be best suited to a centralised system where expertise can be concentrated. There is also potential for central co-ordination of other digitally based partner notification services such as SXT, which is currently used in only one region of Aotearoa; its impact would be increased by universal uptake.[28]

The recent health system reforms aim to provide equitable services. The 12 PHUs have been brought together into a National Public Health Service, and the National Contact Tracing Solution established for COVID-19 has been extended to manage measles. This provides an opportunity for STI contact tracing to be prioritised within these newly established services. In Aotearoa, the network of STI providers is fragmented with poor provision of services in rural areas.[29] A national STI contact tracing

workforce could provide a consistent expert telehealth service, either directly to cases and contacts or by supporting local clinicians.

Strengths and limitations

Given experiences with COVID-19, mpox[30] and the health system reforms, this qualitative exploration of whether a centralised contact tracing system would work for STIs is timely, and has not previously been considered in Aotearoa literature. Participants were selected for their specific knowledge of clinical practice, public health and priority populations for whom effective contact tracing strategies are critical. The interviewer (CM) had clinical experience in sexual health and contact tracing so was able to tailor interviews to draw out salient information related to participants' expertise. Limitations include the narrow geographical spread of participants, with input from only one rural provider, which might have narrowed the scope of perspectives. Attempts were made to interview a range of key informants but we did not secure participation by Pasifika interviewees, although some participants had extensive experience working with Pasifika. Our target of 12 interviews was set due to project constraints (time and scope of a dissertation), but data generated were sufficiently rich in breadth to provide us with a range of views on the topic. Future work could explore in more detail STI contact tracing in rural locations, primary care (where most chlamydia and gonorrhoea cases are diagnosed) and issues related to young people, who are disproportionately impacted by STIs. Understanding priority group perspectives on a centralised STI contact tracing system is needed and should be sought in future work.

Conclusion

This study has identified potential benefits of a centralised STI contact tracing service. Although simple in its objective, contact tracing for STIs can be complex to carry out successfully. The best outcomes may be achieved by the establishment of a centralised STI contact tracing service that also provides training and support for local practitioners. The lessons learnt from the COVID-19 public health response must be shared with other disciplines. Adequate resourcing and prioritisation are required to reduce the high and inequitable rates of STIs, and to facilitate a rapid response to new or emerging infections that can be spread via sexual contact.

AUTHOR INFORMATION
Catriona Murray: Masters Student and Public Health Registrar, Department of Public Health, University of Otago Wellington, New Zealand.
Sally B Rose: Senior Research Fellow, Department of Primary Health Care and General Practice, University of Otago Wellington, New Zealand.
Amanda Kvalsvig: Associate Professor, Department of Public Health, University of Otago Wellington, New Zealand.
Michael G Baker: Professor, Department of Public Health, University of Otago Wellington, New Zealand.

CORRESPONDING AUTHOR
Catriona Murray: Masters Student and Public Health Registrar, Department of Public Health, University of Otago Wellington, New Zealand.
E: catriona144@gmail.com

REFERENCES
1. Baker MG, Kvalsvig A, Crengle S, et al. The next phase in Aotearoa New Zealand's COVID-19 response: a tight suppression strategy may be the best option. N Z Med J. 2021 Nov 26;134(1546):8-16.
2. World Health Organization. Coronavirus disease (COVID-19): Contact tracing [Internet]. Geneva, Switzerland; 2021 [cited 2022 Dec 5]. Available from: https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-contact-tracing.
3. Hossain AD, Jarolimova J, Elnaiem A, et al. Effectiveness of contact tracing in the control of infectious diseases: a systematic review. Lancet Public Health. 2022 Mar;7(3):e259-e273. doi: 10.1016/S2468-2667(22)00001-9.
4. New Zealand Sexual Health Society. Partner Notification and Contact Tracing [Internet]. 2021 [cited 2022 Dec 5]. Available from: https://sti.guidelines.org.nz/wp-content/uploads/2021/10/Partner-Notification-final-Sept-2021-v2.pdf.
5. Chu CT, Rogers BG, Maynard MA, Napoleon SC, Chan PA. Implementing testing approaches for SARS-CoV-2 to address health disparities: lessons learned from sexually transmitted infections. Sex Transm Infect. 2021 Mar;97(2):81-83. doi: 10.1136/sextrans-2020-054678.
6. Spring J. How Covid-19 Has Hurt the Effort to Track STDs [Internet]. Smithsonian Magazine; 2021 [cited 2022 Dec 5]. Available from: https://www.smithsonianmag.com/science-nature/how-covid-19-has-hurt-effort-track-stds-180976912/.
7. Cumming J. Going hard and early: Aotearoa New Zealand's response to Covid-19. Health Econ Policy Law. 2022 Jan;17(1):107-119. doi: 10.1017/S174413312100013X.
8. Verrall A. Rapid Audit of Contact Tracing for COVID-19 in New Zealand [Internet]. Wellington, New Zealand: Manatū Hauora – Ministry of Health; 2020 [cited 2022 Dec 5]. Available from: https://www.health.govt.nz/publication/rapid-audit-contact-tracing-covid-19-new-zealand.
9. Manatū Hauora – Ministry of Health. National Contact Tracing Solution (NCTS) Focus: NCTS – Contact Tracing: Privacy Impact Assessment. Wellington, New Zealand: Manatū Hauora – Ministry of Health; 2020 [cited 2022 Dec 5].
10. Brown J, Ring K, White J, et al. Contact tracing for SARS-CoV-2: what can be learned from other conditions? Clin Med (Lond). 2021;21(2):e132-e136. doi: 10.7861/clinmed.2020-0643.
11. Saxton PJW, McAllister SM, Thirkell CE, et al. Population rates of HIV, gonorrhoea and syphilis diagnoses by sexual orientation in New Zealand. Sex Transm Infect. 2022;98(5):376-379. doi: 10.1136/sextrans-2021-055186.
12. The Institute of Environmental Science and Research Ltd. New Zealand Sexually Transmitted Infection (STI) surveillance [Internet]. 2022 [cited 2022 Dec 5]. Available from: https://www.esr.cri.nz/our-services/consultancy/public-health/sti/.
13. Manatū Hauora – Ministry of Health. National HIV Action Plan for Aotearoa New Zealand 2023-2030 [Internet]. Wellington, New Zealand: Manatū Hauora – Ministry of Health; 2023 [cited 2023 Aug 5]. https://www.health.govt.nz/publication/national-hiv-action-plan-aotearoa-new-zealand-2023-2030.
14. Manatū Hauora – Ministry of Health. National Syphilis Action Plan: An action plan to stop the syphilis epidemic in New Zealand. Wellington, New Zealand: Manatū Hauora – Ministry of Health; 2019 [cited 2023 Aug 5]. Available from: https://www.health.govt.nz/publication/national-syphilis-action-plan.
15. Rose SB, Garrett SM, Pullon SRH. Overcoming challenges associated with partner notification following chlamydia and gonorrhoea diagnosis in primary care: a postal survey of doctors and nurses. J Prim Health Care. 2017 Jun;9(2):136-144. doi:

10.1071/HC17006.

16. Rose SB, Garrett SM, Stanley J, Pullon SRH. Chlamydia trachomatis and Neisseria gonorrhoeae Retesting and Reinfection Rates in New Zealand Health Care Settings: Implications for Sexually Transmitted Infection Control. Sex Transm Dis. 2020 Mar;47(3):151-157. doi: 10.1097/OLQ.0000000000001112.

17. Morgan J, Donnell A, Bell A. A multi-setting audit of the management of genital Chlamydia trachomatis infection. N Z Med J. 2010 May 28;123(1315):42-54.

18. Azariah S, McKernon S, Werder S. Large increase in opportunistic testing for chlamydia during a pilot project in a primary health organisation. J Prim Health Care. 2013 Jun 1;5(2):141-5.

19. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77-101. doi: 10.1191/1478088706qp063oa.

20. Reid P, Cormack D, Paine SJ. Colonial histories, racism and health-The experience of Māori and Indigenous peoples. Public Health. 2019 Jul;172:119-124. doi: 10.1016/j.puhe.2019.03.027.

21. New Zealand Sexual Health Society. The Aotearoa Statement [Internet]. 2022 [cited 2022 Dec 5]. Available from: https://www.nzshs.org/events/the-aotearoa-statement.

22. Morgan J, Mathew T, Azariah S. Eliminating congenital syphilis from Aotearoa New Zealand. N Z Med J. 2021 Oct 22;134(1544):8-12

23. Manatū Hauora – Ministry of Health. Aotearoa New Zealand Sexually Transmitted and Blood Borne Infection Strategy 2023–2030 [Internet]. Wellington, New Zealand: Manatū Hauora – Ministry of Health; 2023 [cited 2023 Aug 5]. Available from: https://www.health.govt.nz/publication/aotearoa-new-zealand-sexually-transmitted-and-blood-borne-infection-strategy-2023-2030.

24. Hartley J. Disease Intervention Specialist Training: An Evolving Part of the Public Health Workforce [Internet]. NACCHO; 2016 [cited 2022 Dec 5]. Available from: https://www.naccho.org/blog/articles/disease-intervention-specialist-training-an-evolving-part-of-the-public-health-workforce.

25. Society of Sexual Health Advisors. I Want To Be A Health Adviser [Internet]. 2022 [cited 2022 Dec 5]. Available from: https://ssha.info/resources/i-want-to-be-a-health-adviser/.

26. Hightow-Weidman L, Beagle S, Pike E, et al. "No one's at home and they won't pick up the phone": using the Internet and text messaging to enhance partner services in North Carolina. Sex Transm Dis. 2014 Feb;41(2):143-8. doi: 10.1097/OLQ.0000000000000087.

27. Tahir D. A New Use for Dating Apps: Chasing STIs [Internet]. Medscape; 2022 [cited 2022 Dec 2]. Available from: https://www.medscape.com/viewarticle/984776.

28. SXT. Partner Notification [Internet]. 2022 [cited 2022 Dec 5]. Available from: https://sxt.health/au/pn/about.

29. KPMG, University of Otago. Value for Money review of Sexual and Reproductive Health Services [Internet]. 2013 [cited 2022 Dec 5]. Available from: https://www.nzshs.org/recommended-research-publications/211-value-for-money-review-of-sexual-and-reproductive-health-services/file.

30. Ghebreyesus TA; World Health Organization. Why the monkeypox outbreak constitutes a public health emergency of international concern. BMJ. 2022 Aug 9;378:o1978. doi: 10.1136/bmj.o1978.