

The Epidemiology of Reported Cases of Infectious Syphilis in Taranaki, 2012 - August 2018

30 August 2018

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Abstract

Aim: *To describe the epidemiology of infection syphilis in Taranaki.*

Methods: *Anonymised information for all cases of infectious syphilis reported in Taranaki from 2012 was requested from the Institute of Environmental Science and Research (ESR). Relevant data were recorded, including gender, age, sexual behaviour, and ethnicity of the cases. If the information was not available this was also recorded.*

Results: *13 cases of infectious syphilis occurred in Taranaki between January 2012 and August 2018. Six cases were diagnosed in 2017 and 7 to date in 2018. There were no cases 2012-2016. The median age was 39. Eleven cases (11/13) were in males and 8 cases (8/11) were in men who have sex with men, of whom 2 were HIV positive. The most common overall reason for testing was presence of symptoms. Most cases were acquired in New Zealand. Context leading to infection was varied. A child with congenital syphilis was also identified but this was not entered as a case because the diagnosis occurred outside Taranaki.*

Conclusion: *There has been a significant upsurge in cases of reported infectious syphilis in Taranaki since 2017. The reason for this is unclear. The epidemiology of syphilis in Taranaki appears to be similar to that seen in other parts of New Zealand although the median age is older. The main burden of disease is among men who have sex with men. It is of particular concern that one of the two Taranaki women with syphilis gave birth to a child with congenital syphilis. Congenital syphilis is a serious condition, and is regarded as a 'sentinel event' for a health system. Prompt action is needed to prevent further transmission.*

Introduction

Syphilis is an infectious disease caused by the spirochete bacterium *Treponema pallidum*. Systemic infection is characterised by three clinical stages and separated by periods of latency. Typically, the primary stage is characterised by a painless genital ulcer (chancre) about three weeks after contact at the site of exposure. The secondary stage occurs within months of the primary lesion (but can occasionally occur concurrently). This stage has a variety of possible presentations including rash, fever, sore throat, malaise, headache and generalised lymphadenopathy. If untreated, patients can

develop tertiary syphilis which typically occurs after a further latent period of several years and involves severe neurological and cardiovascular complications. The usual mode of transmission is through sexual intercourse during the infectious stage of the disease (about one year after infection) but vertical transmission across the placenta can also occur. Congenital syphilis has serious implications for the health of the neonate. Therefore, syphilis screening is included in routine antenatal screening in New Zealand (NZ).

Aside from AIDS, sexually transmitted infections have not been notifiable in Aotearoa. Surveillance efforts have relied on voluntary reporting from sexual health clinics (SHCs), family planning clinics (FPCs) and laboratories. In January 2017, Gonorrhoea, HIV and Syphilis were added to section C of the Health Act 1956. As such, they are now regarded as diseases notifiable to the Medical Officer of Health. However, cases must be anonymised prior to notification.

The number of syphilis cases reported yearly in NZ is increasing. Between 2013 and 2014, the number of cases of infectious syphilis reported by SHCs and FPCs nationwide increased from 82 to 140 cases. Of the cases in 2014, most were reported from clinics in Auckland (85 cases) and Canterbury (27 cases). Most cases were male (95.7%). The most at-risk age groups were 20-24 years (21 cases), 25-29 (18 cases) and 30–34 years (21 cases). Cases were more common in men who have sex with men ('MSM') than in heterosexual males and females. In 2016, 76% of cases were in the MSM group. Most heterosexual and MSM cases were thought to be acquired within Aotearoa (65% and 86.8% respectively). Approximately a quarter of infectious syphilis cases were HIV positive (26.9%).

The aim of this report is to describe the epidemiology of infectious syphilis cases in Taranaki since 2012 and compare this pattern with those described nationwide nationally. This will help determine the best overall strategy for preventing ongoing transmission of syphilis based on the specific requirements of the affected population in Taranaki.

Methods

Anonymised information for all cases of infectious syphilis reported in Taranaki from 2012 was requested from the Institute of Environmental Science and Research (ESR). Relevant data were recorded, including the gender, age, sexual behaviour, and ethnicity of the cases. If the information was not available this was also recorded.

Infectious syphilis was defined as;

- Either primary or secondary syphilis as determined by presence of corresponding clinical symptoms, or:
- Early latent syphilis (i.e. primary or secondary syphilis within the previous 2 years, or sexual contact with a syphilis case within 2 years, or greater than or equal to 4-fold increase in RPR titre in a patient with previously treated syphilis, or seroconversion to reactive treponemal serology within the last 2 years) or:
- Syphilis of unknown duration (RPR titre greater than or equal to 1:16 in the absence of history of syphilis symptoms or previous positive treponemal serology) (1).

Findings

There were no Taranaki cases of infectious syphilis reported to ESR between 2012 and 2016. In 2017, there were 6 cases reported to ESR. An additional case (diagnosed in 2017) has been recently retrospectively reported in 2018. As of 16th August, there have been 7 cases diagnosed in 2018. A seventh case that presented in 2017 was determined not to have infectious syphilis.

Figure 1.

Taranaki quarterly case counts in participating SHCs, January 2015 to August 2018 (from ESR).

2015				2016				2017				2018			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
0	0	0	0	0	0	0	0	2	2	2	0	2	2	2*	-

*as of 16/08/2018

Note: Dates given are dates of *presentation* rather than date of reporting. One 2018 case did not have presentation date recorded on the notification form.

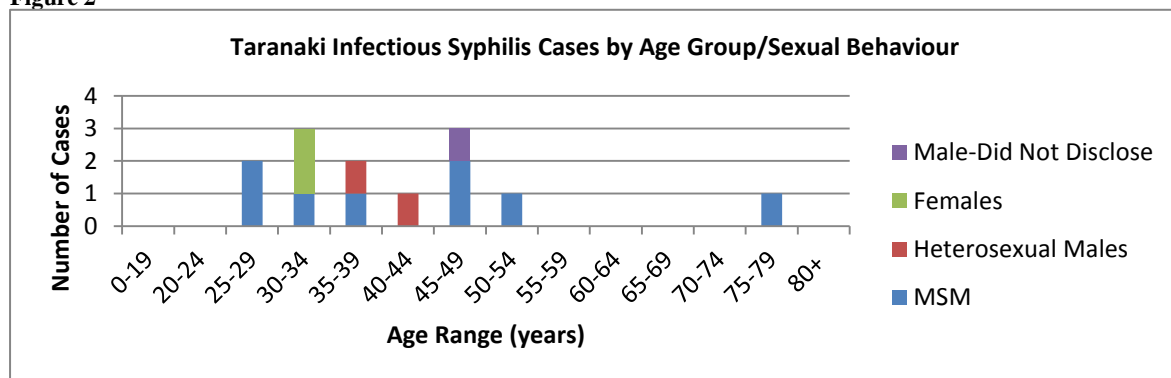
Of the 13 cases, 12 were reported by the Taranaki SHC and one case was reported by the patient's GP. There were no notifications between 2012 and 2017 by other providers (e.g. midwives, hospital-based healthcare providers).

ESR also reported a case of congenital syphilis born to a woman who was initially tested in New Plymouth, delivered in Hamilton and baby and mother then returned to Taranaki. This child was not entered as a case in this series as while the child was connected to a Taranaki woman the birth and diagnosis occurred outside the region.

Age

The median age at presentation in Taranaki was 39 years (range 29 - 48 years). There were 2 cases in the 25-29 age group, 2 cases in the 30-34 age group, 3 cases in the 35-39 group, 1 case in the 40-44 age group, 3 cases in the 45-49 age group, 1 case in the 50-54 age group and 1 case in the 75-79 age group. This information, along with breakdown by sexual behaviour of each age group, is shown below in Figure 2.

Figure 2



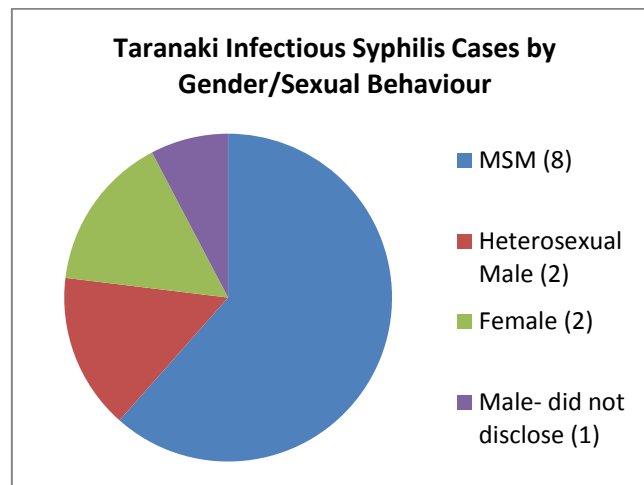
Ethnicity

Six cases identified as NZ European (66.7%), two as NZ European / Māori (22.2%) and one case identified as Māori (11.1%). Of the 6 cases reported in 2017, one identified as Māori (16.7%), 4 identified as NZ European (66.7%) and one as NZ European/Māori (16.7%). Of the 3 cases reported to date in 2018, 2 identified as NZ European and 1 as NZ European/Māori.

Gender and sexual behaviour

The majority of the 13 reported cases in Taranaki were male (11 cases, 84.6%). Of these 8 were MSM. Two male cases had female partners, whilst one case would not disclose this information. Median age for the MSM cases was 42.5 years old. This is represented graphically in Figure 3.

Figure 3



HIV Serostatus

Of the MSM cases reported in Taranaki, 2 out of 8 (25%) had a prior diagnosis of HIV.

Country/region of acquisition

Of the 13 cases, 10 were acquired in NZ and 2 were acquired overseas (Australia and Portugal). For one case the region of origin was not known. Cases were asked to identify the region of NZ in which they most likely acquired the infection. One person identified Wellington, 2 identified New Plymouth, and 1 identified Northland. Three people did not specify this information.

Context leading to infection

One heterosexual male most likely acquired their infection from one of the two female cases. This female contact was their regular partner. This female case identified a casual male contact in Wellington as the most likely source of her infection. The other heterosexual male identified a casual female partner in NZ. The other female case also identified a casual male partner within NZ.

The five MSM (and the case that declined to comment on the gender of their partner) did not identify a likely source. One of these MSM was a sex worker. Two additional MSM named dating sites as their likely source of infection (one was referring to a casual partner from a dating app, whereas the

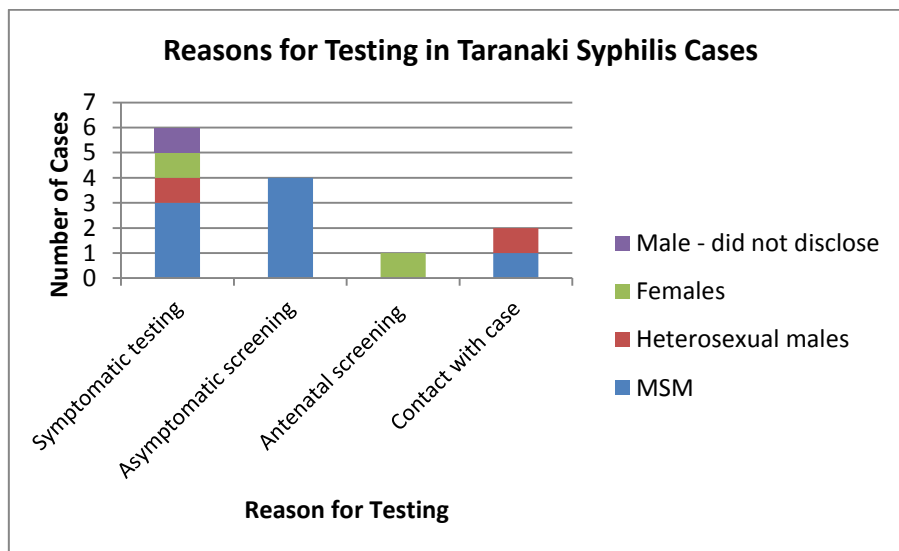
other named a long-term partner who they had met through internet dating). One MSM identified a sex-on-site venue outside NZ as the source of their infection.

Reason for testing

One of the two female cases was diagnosed during antenatal screening, while the other presented with symptoms. Of the two men who did not identify as MSM, one presented with symptoms whilst the other had a history of a rash 3 years ago and contact with a case.

Of the MSM, 4 (50%) presented for asymptomatic screening, 3 were symptomatic, and 1 presented because they had contact with a case. The case that didn't disclose the gender of their sexual partner presented with penile discharge (and had a concurrent diagnosis of gonorrhoea).

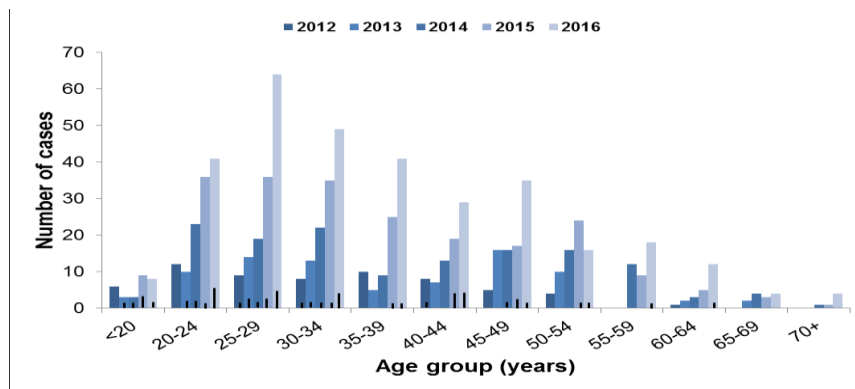
Figure 4



Discussion

There has been a notable increase in 2017-2018 in the number of cases of infectious syphilis reported in Taranaki. The pattern of the Taranaki outbreak in terms of gender, sexual behaviour, and HIV serostatus did not appear to be very different to the nationwide outbreak. It seems that the age of the cases in Taranaki is slightly older than the age groups in which the main burden of syphilis is seen nationally. The national age distribution of infectious cases is depicted graphically in Figure 5 below.

Figure 5. Age distribution of infectious syphilis cases reported 2012-2016



source; Dr Jill Sherwood's presentation: 'Update on STI surveillance: what's up, what's down, who's at risk?' at the 2017 NZSHS Conference, slides available via Public Health Surveillance https://surv.esr.cri.nz/surveillance/annual_sti.php

This may need to be considered in our control strategies as nationally adopted approaches aimed at younger people and their patterns of behaviour may be ineffective. For instance, other centres in NZ have contacted internet dating apps to organise advertising campaigns around syphilis. However, only 2 of our 8 MSM identified internet dating as their likely source of infection, and in one case this was a traditional internet dating service rather than a meet-up app. This pattern may be due to our cases being older than the national average, and less likely to use technology as a way of arranging sexual encounters. It is also possible that the reason that younger people are not represented in the cases that have been notified is that younger people are less likely to present to a healthcare service if they have syphilis. It will be difficult to ascertain whether this is the case. No scientific evidence exists on screening rates in young MSM in Taranaki, although we have been told on an anecdotal basis that these are low. There is some evidence that younger MSM are less likely to have been tested for an STI in the last 12 months (2,3) so this possibility should be strongly considered.

It is clear that the impact of infectious syphilis in Taranaki during 2017 and 2018 has predominantly been on MSM thus far. This reflects patterns both nationally, as reported in the ESR surveillance data, and in other developed countries (4). Any health promotion strategies used to control the outbreak will need to be predominantly focused at MSM. A number of other possible approaches have been proposed and include; making changes to screening guidelines, modifying the environments in which MSM meet partners and making changes to contact tracing protocols. These are discussed in a 2014 Canadian literature review by Sarah-Amelie Mercure and Noemie Savard (5). The appendix of this report reviews such approaches within the Taranaki context. An important consideration with any of these approaches will be the need to avoid increasing any local stigma towards MSM, and for this reason strategies will need to be designed in a careful and sensitive way.

This report has some limitations. It is difficult to tell whether the upsurge in cases represents a true increase in case numbers, or whether this is an artefact of notification becoming compulsory, or whether it represents changing in screening practises. Without individually examining the records of every GP practice in Taranaki, it is not possible to definitively determine that there were no unreported cases. The SHC has reported that they have not diagnosed any cases prior to 2017, and because all cases of suspected infectious syphilis should be referred to a SHC, this should theoretically capture all syphilis cases in Taranaki. However, we acknowledge that there may have been instances in which GPs have not referred patients and other times when patients who are referred to the SHC do not present. These cases will have been missed. As part of the control strategy, efforts should be made to liaise with GPs and other health providers and ensure that they are up to date on notification requirements and best practise.

In order to determine whether increased screening was responsible for the increased number of cases observed, we asked MedLab for data on the number of tests performed annually since 2012. . This data is shown in Figure 6 below.

Figure 6. Laboratory information on syphilis tests in Taranaki by year

Year	Antenatal Syphilis Screening Tests	Non-Antenatal Syphilis Tests	Lab-reported Positive Tests
2012	1856	1861	1
2013	1950	1753	9
2014	1904	1661	5
2015	1871	1631	8
2016	1871	1660	23
2017	1886	1897	30
2018 (To 31 July)	1255	1312	25

This data was plotted in Microsoft Excel against number of positive tests reported by the lab in each year and also against number of cases reported to ESR. Trendlines were then added (the type was chosen by best fit according to R-squared value for each graph). Strong correlations existed between total number of tests and reported cases ($y = 0.0142x - 50.67$ $R^2 = 0.86397$), and non-antenatal tests and reported cases ($y = 2E-05x^2 - 0.0584x + 40.899$ $R^2 = 0.88483$). However, this was determined

using a projected figure for 2018, calculated on the assumption that rates of screening and diagnosis until the end of July would be constant for the rest of the year. Data from 2012-2017 only does not display a strong correlation (R-squared <0.5). Correlation between total number of tests/non-antenatal tests and lab-reported positive values was weak (R-squared <0.5 in each case). Therefore, we have no strong evidence to suggest that the increase in number of cases is related to an increase in the number of tests performed.

The discrepancy between the number of positives reported by the lab and the number of cases reported is concerning. This is not due to repeated tests on the same patients, as in each year in which multiple tests are reported, there were fewer than the discrepancy between reported cases and lab positives. It is possible that false positive tests may contribute to this discrepancy as relatively low syphilis prevalence may lead to a low positive predictive value for syphilis testing. However, this cannot be determined for certain. Also, over half of positive tests were ordered by GPs in each year except 2014, despite the vast majority of reported cases being reported to ESR by the SHC. Therefore, it is possible that syphilis is being underreported by GPs and/or that patients are not being referred to the SHC. We are in the process of designing a survey to be sent to GPs asking them about barriers to diagnosing, notifying and treating syphilis, and the results of this should guide decision-making on the Taranaki syphilis action plan.

Although the majority of cases were men, there were two female cases. This is concerning because one of the women gave birth to a baby with congenital syphilis. We do not have information on this child as the delivery occurred out of Taranaki. Congenital syphilis is a serious condition and according to the CDNA guidelines for public health units (6), such a case is regarded as a 'sentinel event' for a health system.

In NZ, screening for syphilis is part of routine antenatal care. However, in 2015, 30% of pregnant women had not registered with an LMC during the first trimester (7), which is when syphilis screening is typically performed. Efforts need to be made to ensure all pregnant women receive appropriate antenatal care and are screened for syphilis.

Māori represented 18% of the Taranaki population in 2015 (8) but people who identified as either Māori or NZ European/Māori represented 30.7% of the cases that we have identified. Outcomes for Māori are poorer than for non-Māori in a range of health statistics, and this is a result of inequities faced by Māori both in the health system and in NZ society in general (9). The response to this outbreak needs to be culturally appropriate and should consider the specific needs of Māori.

Conclusion

There has been a significant increase in syphilis cases reported to ESR in Taranaki since January 2017. These follow a similar epidemiological pattern to those observed nationwide. The reason for this increased number of cases is unclear but prompt action is needed to avoid further transmission and cases of tertiary and congenital syphilis.

A literature review of possible interventions to reduce syphilis transmission in the context of an outbreak is attached as an appendix to this report.

Acknowledgements

Special thanks to Dr Jonathan Jarman, Dr Jennifer Kidd, the team at Taranaki SHC, Nicola Johnston and Adam Jenkins, Dr Jill Sherwood and Maritza Marull at ESR, and Sally Scouller of Taranaki MedLab for their advice, support and technical assistance.

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Appendix: Possible interventions to reduce syphilis transmission in the context of an outbreak - literature review

Introduction

Taranaki DHB has recently experienced an upsurge in infectious syphilis cases, with 13 cases being notified to ESR over the period of January 2017- August 2018. The case definition for infectious syphilis used in New Zealand (NZ) is: either symptomatic primary or secondary syphilis, 'early latent' syphilis (defined as four-fold or greater increase in RPR titre in a person previously diagnosed with syphilis, or symptoms of primary/secondary syphilis within 2 years, or documented conversion to reactive treponemal serology within 2 years, or sexual contact with a confirmed case of infectious syphilis within 2 years) or 'syphilis of unknown duration' (RPR titre > 1:16 in the absence of previous symptoms or treponemal serology). Investigation is ongoing to determine whether this upsurge in cases represents an outbreak or is a result of changing screening or notification practises. Regardless, this represents a public health problem that needs to be controlled using robust, evidence-based measures.

Existing approaches to control of syphilis outbreaks include:

- health promotion initiatives,
- changes to screening programmes to increase uptake,
- contact tracing and partner notification,
- modification of environments in which risky sexual behaviours are arranged or take place,
- improving diagnosis, management and follow-up of cases by healthcare providers, and
- distribution of prophylactic antibiotics.

These will each be discussed in the context of the unique challenges faced by Taranaki, as tailored approaches have been identified as a factor contributing to successful outbreak control (1).

In 2014, Sarah-Amelie Mercure and Noemie Savard published a review of interventions to prevent and control syphilis among men who have sex with men (MSM), for the Canadian National

Collaborating Centre for Infectious Diseases (2). MSM are over-represented in syphilis cases in Taranaki, representing 61% of all notified cases. This review will therefore be extensively referred to, along with other and more recent evidence.

Methods

Pubmed/Google Scholar searches were used to identify relevant articles. Search terms included combinations of 'syphilis', 'outbreak control', 'health promotion', 'disclosure', 'contact tracing', and 'notification'. Studies identified as useful were read and their findings summarised below. Staff from the Taranaki Sexual Health Clinic (SHC) were also asked for their views about the effectiveness and feasibility of possible interventions in Taranaki.

Findings

Health Promotion

Health promotion initiatives tend to focus on increasing uptake of screening, as initiatives aimed at reducing risky sexual behaviour (either by decreasing number of partners or increasing condom use) are unlikely to have a long term effect (3).

According to Mercure and Savard, several campaigns (namely 'Healthy Penis' in San Francisco, 'Drama Downunder' in Victoria, Australia and 'Stop the Sores' and 'Check Yourself' in Los Angeles) have been shown to increase testing, but no effect on outbreak control has been demonstrated (2). Successful campaigns have involved consultation with stakeholder groups. In Taranaki these could include Rainbow Youth and the AIDS Foundation as well as other LGBT community organisations. However the presence of what appears to be 2 distinct epidemiological groups in the cases in Taranaki so far - namely MSM and heterosexual cases - may pose a challenge for the success of any single targeted intervention. With regard to the heterosexual cases, barriers to STI testing identified in a study of mostly heterosexual adolescents in NZ included structural, social and financial (4). These are similar to those identified by gay men in Australia (5), so an alternative approach may be that an inclusive approach could be targeted at reducing stigma in general rather than at a particular group.

Screening rates for MSM are not clearly described in the literature in Taranaki or NZ in general. If uptake of screening is already high then promoting increased screening may be a relatively inefficient approach. There is some international evidence that they are suboptimal Internationally screening rates are suboptimal for MSM particularly (6,7). Vega et al 2005 (8) found as part of market research that MSM were generally aware of the necessity of HIV screening but less aware of the necessity testing for syphilis. However, syphilis screening is routinely included in asymptomatic screening for

both MSM and MSW according to the NZ national screening guidelines (9) . It may be necessary to confirm that this is being done by the SHC or any GPs who are performing asymptomatic screening. If so, it is possible that increased rates of syphilis testing could be related to increased rates of HIV testing and awareness, and the response may need to consider changing attitudes and practices among MSM regarding HIV screening.

Health promotion is regarded as a cost-effective strategy for controlling population health problems (10). The cost of this initiative is likely to depend on the exact manner in which it is pursued. Costs will arise from the design of the campaign and the distribution of the message. Currently we are working on developing our knowledge about the nature of the MSM community in Taranaki, and contacting community organisations for MSM to determine how to frame and distribute this message. Discussion is ongoing but we expect that this message may be distributed on an informal ‘goodwill’ basis by these organisations, in which case associated costs are likely to be low or non-existent. Health promotion is a responsibility of the PHU, and as such any costs would be borne by the PHU.

Changes to Screening Practises

Routine screening has been identified as an effective method of preventing disability from syphilis (11). Increasing uptake of screening through health promotion has already been discussed, but other approaches that could be considered include screening more regularly or screening different groups. There is evidence to suggest that more frequent screening would be acceptable to MSM (12). However, current screening guidelines in NZ (9) are fairly comprehensive, recommending annual screening for MSM and more frequent screening for higher risk groups (e.g. men with higher partner counts and who have unprotected anal intercourse). These are similar to guidelines used in the USA (7). Therefore there is little room for improvement in the current NZ guidelines.

We have been advised in consultation with the local SHC that they will struggle with the additional strain on resources created by additional screening. This will need to be considered. A study of different screening programs in different high-risk MSM groups found that screening men previously affected with syphilis was potentially more effective at disease detection than screening the 20% of men with the highest rate of partner change if screening was annual or semi-annual (13).

In NZ screening after a previous syphilis diagnosis is 3-monthly until 4-fold dilution of titre then return to routine screening. Screening these men more frequently than annually could be considered. Evidence regarding the relative effectiveness of changing laboratory practice to reverse screening (i.e. treponemal-specific test before non-treponemal test) is mixed (14,15).

Contact Tracing and Partner Notification

The current paradigm for contact tracing in NZ is that it is performed by either the patient or by their healthcare provider. The Medical Officer of Health has powers under the Health Act to perform contact tracing (either themselves or through a nominated representative) if they believe that there is 'significant threat to public health'.

Contact tracing has long been regarded as a cornerstone of syphilis outbreak control. Its potential to prevent the spread of cases is documented through modelling studies and some case studies: in a outbreak on a Native American reservation, contact tracing identified the highest proportion (40%) of cases (16). It is effective particularly in the context of smaller outbreaks (11), making it an approach that should be strongly considered in the management of the cases in Taranaki.

However a number of challenges to contact tracing have been identified in the context of syphilis. A Cochrane Review (17) found no significant differences among multiple methods of contact tracing, however only one study of syphilis was included, and the need was acknowledged for further information around effective approaches to contact tracing concerning syphilis. Mercure and Savard found that "*Traditional partner notification (i.e. patient or provider) has had relatively low feasibility in the context of syphilis outbreaks in MSM communities in industrialized countries, with limited impact*". (2) They identified having a clinic-based public health worker performing contact tracing as a potentially effective way of increasing the success of contact tracing. This may be more difficult in Taranaki as the public health unit does not legally have access to patient notes. Furthermore, we have received a directive from the MoH that contact tracing is not the role of Public Health Units and should be done by the diagnosing clinician/patient instead. Partner notification based on predictive analysis of social networks has also been investigated but is not yet well studied (2).

Un-notifiable partners have been identified as a contributor to suboptimal contact tracing for MSM (18,11) particularly in the setting of online dating apps. Innovative approaches have been used to avoid this problem. Mercure and Savard found that "*There are a number of reports of public health departments sometimes being able to reach a significant number of otherwise non-notifiable MSM contacts through e-mails or pseudonyms on meeting websites, for syphilis or other STIs* (19, 20, 21). Klausner et al 2000 (22) devised an intervention in partnership with a website . People using the service would be encouraged to present. These people would give 'screen names' on presentation, which would be compared to given screen names of contacts of syphilis cases, given by the cases. 42% of named contacts (mean number per index case 5.9) were contacted in this way. It may be possible to contact dating apps used in Taranaki and devise an approach for contact tracing in

partnership with them. However, very few of Taranaki's MSM cases so far have identified internet dating as a likely setting for their infection, meaning that traditional contact tracing may be more effective than has been generally reported in the literature. Other barriers to contact tracing specific to MSM in Taranaki should also be identified, preferably in discussion with stakeholders or the affected cases. Overseas, these include 'shame and fear', concern about consequences for existing relationships, lack of understanding and embarrassment (23). These can potentially be addressed in health promotion campaigns, as already discussed.

Our 13 cases have identified 33 definite contacts between them. It is unclear if sufficient information was provided for all of these contacts to be traced. This is an average of 2.5 contacts per case, although this is influenced by one patient who had a very large number of contacts. There is also one patient who refused to identify their contacts. Time taken on partner notification varies based on patient and case characteristics but it is higher for syphilis cases vs reference cases for STIs (24). The SHC have identified that they currently have no time specifically allocated for partner notification.

Environmental Modification

This involves working with apps/clubs/bars to create a safer environment. Measures can range from providing condoms to closing venues on which risky sexual behaviour is known to occur. This is likely to be of limited relevance in Taranaki, as info given by cases does not identify any particular locations as the source of their infection, and no evidence exists indicating that these measure lead to outbreak control (2).

Disclosure of MSM status and sexual health education for primary care providers

A problem that has been identified in discussion with the Taranaki SHC is willingness of MSM to disclose their sexual practises to healthcare providers (and therefore be recognised as a group that needs screening). Ng et al 2014 (25) established a link between non-disclosure of being MSM to health providers and lower rates of STI testing (although the study also found that those who did not disclose tended to participate in less risky sexual behaviours), as did Stupiansky et al 2017 (26). Coleman et al 2017 (27) conducted a survey of MSM enrolled with Canadian practices and found that PCPs knew their patient's status as MSM in 71.1% of cases, and that "*Being married to or living common-law with another man, more frequent experiences of homosexual prejudice, and higher quality assessment of provider's communication skills were associated with the PCP knowing respondents' sexual orientation*". Limited evidence exists around efficacy of interventions aimed at PCPs to increase disclosure of MSM status. The only educational intervention aimed at PCPs in

sexual health with published evidence of changing practice as a result (28) is the UK SHIP training which is associated with higher rates of HIV screening by GPs (29). This implies that any education intervention will have to be carefully designed to ensure success. Teaching interventions to increase sexual health screening are generally regarded favourably by PCPs (30).

Primary care provider awareness of syphilis

It has been identified that local GPs do not always have appropriate notification forms. Informing GPs about the upsurge in cases and the need for notification has been identified locally as a potential strategy for increasing detection of cases, by generating a lower threshold of suspicion for syphilis. There is limited evidence on the success of raising primary care provider awareness internationally in the context of syphilis. Some evidence exists concerning this approach in other conditions: practice-based education did not improve detection of depression in a January 2000 clinical trial (31). In the context of STIs, a survey of primary care physicians in Singapore found that their management of STIs was ‘adequate’ (32). A survey in Washington State (33) found that 57.5% screened patients for syphilis, and less than half asked new patients about their sexual practices. This proportion may be different in NZ where syphilis serology is included in the guidelines for routine screening, however anecdotally it is the feeling of the SHC staff that practitioners do not routinely perform blood tests as part of STI screening. Therefore, despite the absence of evidence this is an avenue that could be pursued. In terms of content, Peterman and Cha 2018 suggest that “*Provider education is particularly important in areas where clinicians have not seen much syphilis*” and that “*Education should include information on: recognizing clinical manifestations, identifying persons at greatest risk based on local epidemiology, screening (especially pregnant women—early in pregnancy, again at 28–32 weeks gestation, and at delivery), treating patients with signs of syphilis while awaiting lab results, and treating recent sex partners of a case (even if test results are negative)*” (11).

While management of syphilis at the SHC level is optimal, it may be necessary for some cases of syphilis to be managed at the GP level, perhaps through Primary Options for Acute Care (POAC), due to limited resources available for the SHC. At the time of writing we are in the process of writing a questionnaire to determine whether GPs are familiar with protocol for diagnosis and notification of syphilis, and whether they currently have the resources for this.

Prophylaxis

‘Expedited partner therapy’, i.e. giving antibiotics to patients to distribute to their contacts, is currently not legal in NZ. Some studies (34, 17) have identified this as a more successful approach than traditional partner notification. However a similar approach in San Francisco in 2003 did not

have significant enough uptake to influence the outbreak (2). Concerns have also been raised about antimicrobial resistance as a result of this approach.

Improving treatment rates and follow-up to ensure cure

Mercure and Savard suggest that this could be considered but well-developed follow-up algorithms do not exist. (2) It is important to recall people with positive tests for treatment but the success of this is not well described internationally (11).

Conclusion

Strategies that are more likely to be successful in the context of Taranaki outbreak include targeted health promotion initiatives aimed at increasing testing in high-risk groups, and comprehensive contact tracing and partner notification. Interventions that increase disclosure to GPs of MSM status should be targeted, and current capability of GPs to diagnose, treat and notify syphilis should be assessed. Staff from the SHC said that they were unable to carry out any additional work with managing the outbreak because of resourcing constraints. Please see Table 1 for a summary of possible interventions.

Table 1. Summary of possible interventions to reduce syphilis transmission in Taranaki

	Intervention	Comments
1.	Health Promotion Initiatives	<p>Health promotion initiatives tend to focus on increasing uptake of screening, as initiatives aimed at reducing risky sexual behaviour (either by decreasing number of partners or increasing condom use) are unlikely to have a long term effect.</p> <p>Successful campaigns have involved consultation with stakeholder groups.</p> <p>The presence of what appears to be two distinct epidemiological groups in the cases in Taranaki so far - namely MSM and heterosexual cases - may pose a challenge for the success of any single targeted intervention.</p> <p>Health promotion is a responsibility of the PHU, and as such any costs would be borne by the PHU.</p>
2.	Changes to screening practices	<p>Routine screening has been identified as an effective method of preventing disability from syphilis.</p> <p>Current screening guidelines in NZ are fairly comprehensive, recommending annual screening for MSM and more frequent screening for higher risk groups (e.g. men with higher partner counts and who have unprotected anal intercourse).</p> <p>We have been advised in consultation with the local SHC that they will struggle with the additional strain on resources created by additional screening.</p>
3.	Contact tracing and partner notification	<p>The current paradigm for contact tracing in NZ is that it is performed by either the patient or by their healthcare provider.</p> <p>Contact tracing has long been regarded as a cornerstone of syphilis outbreak control. Its potential to prevent the spread of cases is documented through modelling studies and some case studies.</p> <p>It is effective particularly in the context of smaller outbreaks, making it an approach that should be strongly considered in the management of the cases in Taranaki.</p> <p>The SHC have identified that they currently have no time specifically allocated for partner notification.</p>
4.	Disclosure of MSM status and sexual health education for primary care providers	<p>Limited evidence exists around efficacy of interventions aimed at primary care providers to increase disclosure of MSM status.</p> <p>The only educational intervention aimed at PCPs in sexual health with published evidence of changing practice as a result is the UK SHIP training which is associated with higher rates of HIV screening by GPs</p>
5.	Primary care provider awareness of syphilis - improving diagnosis, management and follow-up of cases	<p>Provider education is particularly important in areas where clinicians have not seen much syphilis.</p> <p>Education should include information on: recognizing clinical manifestations, identifying persons at greatest risk based on local epidemiology, screening (especially pregnant women—early in pregnancy, again at 28–32 weeks gestation, and at delivery), treating</p>

		patients with signs of syphilis while awaiting lab results, and treating recent sex partners of a case (even if test results are negative). While management of syphilis at the SHC level is optimal, it may be necessary for some cases of syphilis to be managed at the GP level, perhaps through POAC, due to limited resources available for the SHC.
6.	Prophylaxis	‘Expedited partner therapy’, i.e. giving antibiotics to patients to distribute to their contacts is currently not legal in NZ.
7.	Improving treatment rates and follow-up to ensure cure	It is important to recall people with positive tests for treatment - the success of this is not well described internationally.

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