Australian Government
Department of Health and Aged Care

2022 · Volume 46

Communicable Diseases Intelligence

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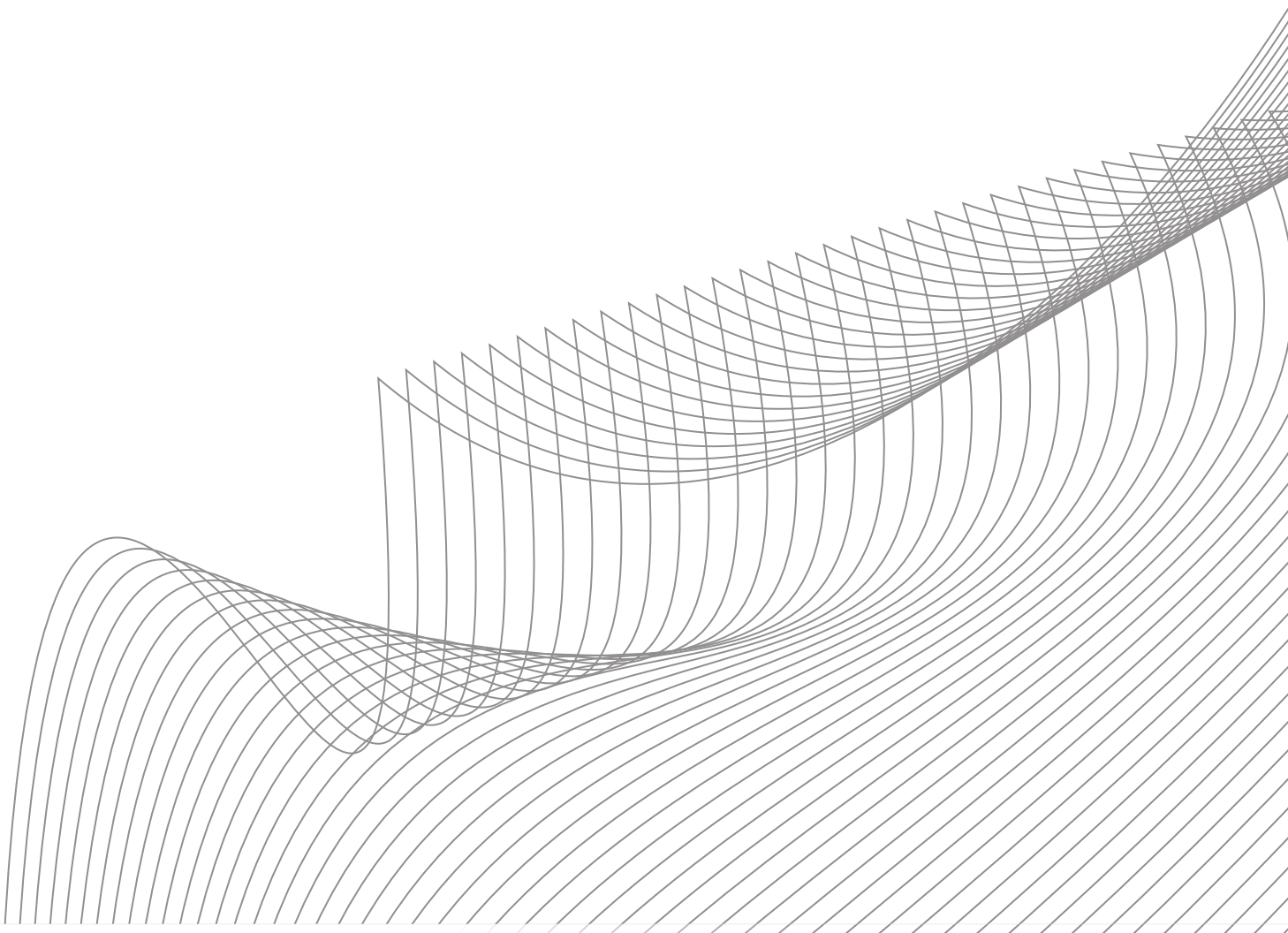
Lorane Gaborit, Ben Polkinghorne, Alexandra Marmor



https://doi.org/10.33321/cdi.2022.46.45
Electronic publication date: 21/7/2022
http://health.gov.au/cdi

Communicable Diseases Intelligence
ISSN: 2209-6051 Online

This journal is indexed by Index Medicus and Medline.

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Original Article

How do general practitioners test and treat gonococcal infections in the Australian Capital Territory? Implications for disease surveillance and control

Lorane Gaborit, Ben Polkinghorne, Alexandra Marmor

Abstract

The incidence of *Neisseria gonorrhoeae* (gonorrhoea) and *Treponema pallidum* (syphilis) infections in the Australian Capital Territory (ACT) has increased since 2014 in people reporting heterosexual exposure. This population is more likely to present to general practice rather than to specialised sexual health clinics, with potential implications for disease surveillance and control. This study aimed to explore: conformity of self-reported clinical practice with sexually transmitted infection guidelines in general practice; gaps in sexual health knowledge and skills; and areas for improved support from ACT Health Communicable Disease Control. A cross-sectional survey of general practitioners (GPs) and nurse practitioners (NPs) practicing in the ACT was conducted in December 2020, using a 17-item questionnaire and semi-structured interviews. Twenty-three GPs and one NP returned completed surveys (response rate 5.3%); four GPs and one NP participated in interviews. In its complex setting of competing demands, GP practice may not always meet national guidelines. In response to clinical vignettes, although all GPs ordered investigations for gonorrhoea, only 25% of these met the gold-standard by including endocervical or vaginal swabs. With respect to assessing antimicrobial sensitivities to guide treatment, only 58% correctly reported following up a positive gonococcal polymerase chain reaction test with a culture. Around two-thirds of respondents (62.5%) identified the appropriate antibiotic therapy and 75% correctly identified the responsibility of the diagnosing clinician to discuss contact tracing with the patient. Suggestions for increased support focussed on education, communication efficiency, and providing a 'safety net' for follow up.

Keywords: Sexually transmitted infections, primary care, general practice, gonorrhoea, syphilis, antimicrobial resistance surveillance

Introduction

Neisseria gonorrhoeae (gonorrhoea) and *Treponema pallidum* (syphilis) are sexually transmitted infections (STIs) of significant public health concern due to their potential to cause severe complications and congenital disease.[1] National STI strategies identify the need for enhanced partnerships between sexual health services and general practice.[2] In the Australian Capital Territory (ACT), STI notification rates are increasing.[3] Additionally, the proportion of gonorrhoea notifications among both men and women reporting heterosexual exposure has risen from 18% of all notifications in 2014 to 33% of all notifications in 2017.[3] The proportion of infectious syphilis notifications reporting heterosexual exposure has risen from 6% to 24% over the same period.[3] These individuals are more likely to present to general practitioners (GPs) for testing than are those reporting same-sex exposure.[4]

In the ACT, cases of gonorrhoea diagnosed in general practice by a positive polymerase chain reaction (PCR) test are less likely to return a positive gonococcal culture than are PCR-positive cases diagnosed by the Canberra Sexual Health Centre (CSHC), due to a difference in the proportion of notifications receiving a test of culture.[4] Between 2009 and 2018, only 25% of gonococcal notifications by GPs were culture positive, compared with 62% of notifications by CSHC, despite the national STI Management Guidelines (STI guidelines) recommending culture to allow for antibiotic susceptibility testing.[4,5] There may be other elements of the STI guidelines that GPs are unable to follow, or are unaware of, and questions about conformity of care have been raised in other jurisdictions[6] and regarding other STIs.[7] Given increasing notification rates of STIs in populations presenting to general practice, there is a need to better understand how STIs are managed in primary care.[4] This study presents findings from a survey of GPs in the ACT, with the aim of exploring conformity of self-reported clinical practice with STI guidelines; gaps in sexual health knowledge and skills; and areas for improved support from ACT Health Communicable Disease Control (CDC).

Methods

A mixed-methods study was undertaken, including quantitative analysis of a written survey and a grounded theory-based qualitative analysis of open-ended survey responses and phone interviews.[8] We developed a 17-item survey, reviewed by three public health nurses and an experienced GP (Appendix A). The survey included both case-based and non-case-based questions, and allowed participants to participate anonymously unless opting-in to a follow-up semi-structured interview. Interviews were conducted over the phone and contemporaneously transcribed, aiming to uncover further knowledge about experiences. Ethics approval was obtained from the ACT Health Human Research Ethics Committee Low Risk Subcommittee (Protocol 2020/ ETH03191).

GPs from all 90 ACT general practices with previous correspondence with CDC were invited to participate by facsimile and email in December 2020, with the option to complete the survey online or on paper. A selection of 20 general practices with a known interest in adolescent health or sexual health received follow-up phone calls or emails to encourage practice managers to distribute the survey. Remaining practices were sent one reminder facsimile. A survey link was also advertised in an electronic newsletter for GP members of the ACT Primary Health Network. Data analyses were performed using Microsoft Excel, descriptive statistics were calculated from responses to closed survey items. The authors qualitatively analysed open-ended responses and interview transcripts to identify key concepts using a process of first-level coding. Labels were manually assigned to words and phrases to represent ideas, which were then organised into recurring themes for discussion.[8] The proportion of responses consistent with the STI guidelines was calculated, based on 2020 guidelines at the time of data collection (Appendix B).

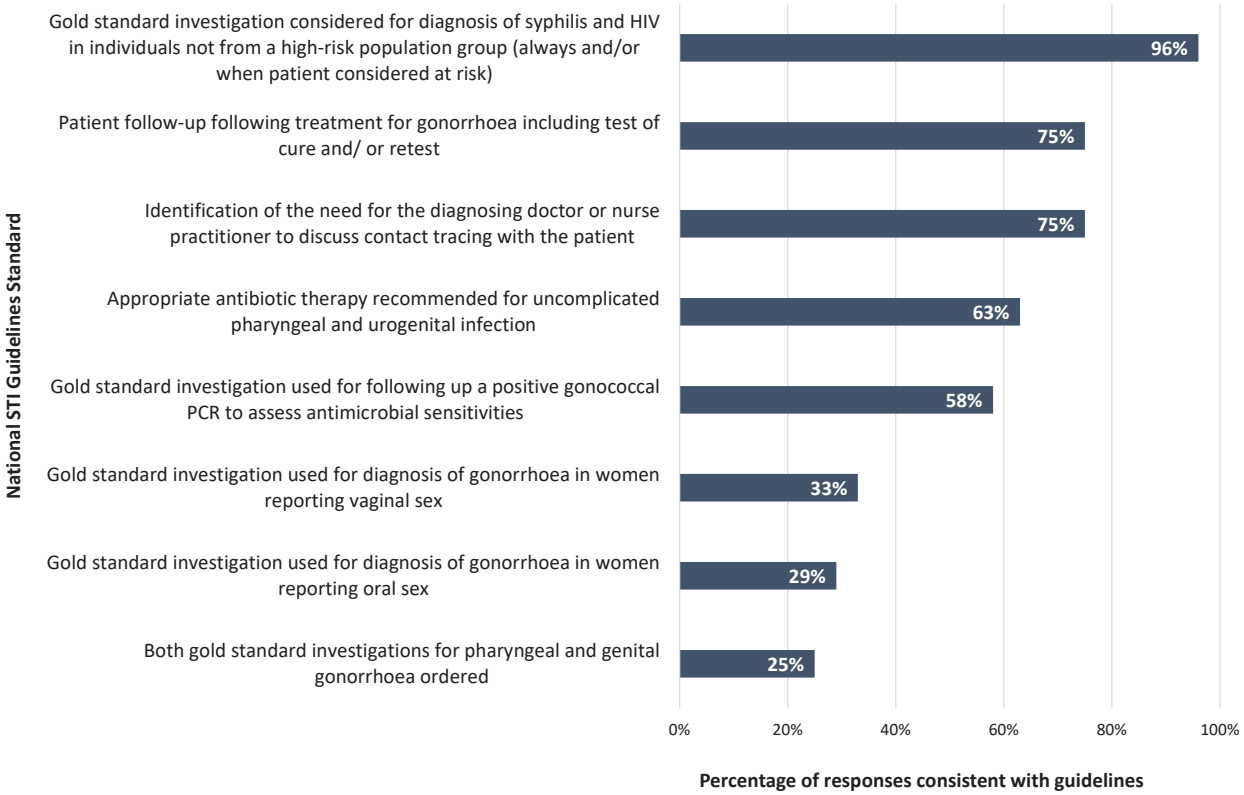
Results

Twenty-three GPs and one nurse practitioner (NP) completed the survey, a response rate of 5.3% based on an estimated five GPs in each of the 90 general practices invited to participate. All required questions were completed. Four GPs and one NP participated in a semi-structured interview. Given the small sample, GP and NP responses were not separated in the analysis. Respondents reported varying levels of conformity to a selection of STI guideline standards (Figure 1).

Experiences with sexual history taking

Almost all respondents (92%) indicated they felt comfortable and confident taking a sexual history; however, 29% agreed they would only ask about sexual orientation or practices when a patient brought it up or reported STI symptoms, and one third agreed that a full sexual history was not necessary to order STI testing.

Figure 1: Conformity of reported clinical practice with selected national STI Management Guidelines in a sample of Australian Capital Territory general practitioners (n = 24), December 2020



When asked to identify the questions to ask in an opportunistic STI screen for a woman presenting for a contraceptive consultation, 12.5% of respondents indicated they would ask few questions, either due to the opportunistic nature of the screen or because they would be inclined to test for the same STIs regardless of responses (n = 3). This experience was reflected among some interview participants who also reported using a generic approach to recommending STI testing to patients. When GPs did report specific questions, the most frequent questions revolved around number of partners (n = 15) and use of protection (n = 13). Fewer than one third specifically asked about the type of sexual activity (n = 7).

STI testing practices and knowledge

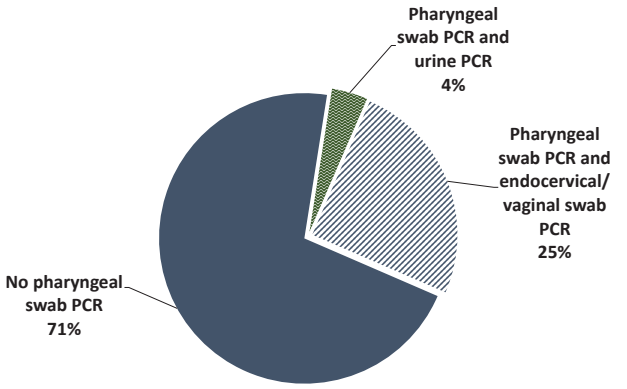
In the context of an asymptomatic STI screen, 79% of respondents reported they always offered syphilis and HIV testing to women who were not pregnant, and 67% of respondents reported the same for men reporting heterosexual exposure. However, 46% of respondents also reported that patients to whom they offered testing sometimes declined to be tested, most commonly due to self-identifying as 'low risk' (n = 10). Urine PCR testing for chlamydia and gonorrhoea was reported 2.4 times more frequently than testing using endocervical or vaginal swabs in a vignette of an opportunistic STI screen for a woman reporting vaginal and oral sex. Fewer than one third (29%) of respondents indicated they would include a throat swab in their screen, including one respondent who specified they would only do so if the patient was symptomatic (Figure 2).

STI treatment practices and knowledge

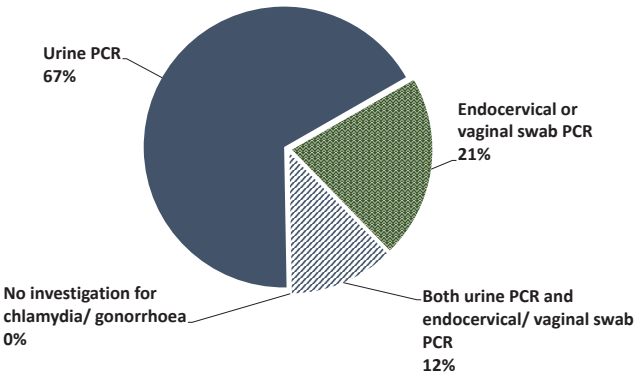
Respondents most frequently identified the online *Australian STI Management Guidelines for use in Primary Care* as their preferred source of information for STI management (n = 18). The Therapeutic Guidelines (n = 15) and CSHC

Figure 2: Distribution of different investigations for gonorrhoea included in an asymptomatic STI screen for a patient reporting a) oral sex and b) vaginal sex

a) Investigations relevant to reported oral sex



b) Investigations relevant to reported vaginal sex



(n = 11) were also frequently listed. Only two respondents identified either CDC or CSHC as their sole source of information. In interviews, GPs reported difficulty keeping up with changing recommendations and suggested this was a barrier to being up to date with guidelines.

In accordance with guidelines, 58% of respondents reported they would follow up a positive gonococcal PCR with a culture before beginning treatment. Of those who reported they were unsure or would not follow up with a culture, 40% were not aware this was required. The majority of respondents (65%) indicated they would treat onsite, most commonly citing, as factors influencing their decision: capacity to administer ceftriaxone; support from a sexual health trained nurse practitioner; a desire not to lose the opportunity to treat; and concerns about the health risks of delaying treatment. The remaining 35% of respondents indicated they would refer the patient to CSHC, most commonly due to lack of onsite access to ceftriaxone. Respondents were asked to identify the recommended treatment of uncomplicated pharyngeal and urogenital gonococcal infection with the assistance of their preferred source of information. The appropriate treatment was identified by 63% of respondents. In follow-up plans, 75% of respondents included additional testing after treatment and 25% included further counselling.

Suggestions for CDC support

Education was overwhelmingly identified as an area for improvement, with respondents suggesting resources such as free refresher courses; clear and easy to locate information online; and up-to-date guidelines distributed by facsimile. With regards to communication, two thirds of respondents identified phone calls as their preferred mode of contact for the purpose of collecting further information about notifiable cases. Among respondents who indicated a preference for other means of communication, finding the time for phone calls was reported to be a barrier. These respondents also reported that faxed forms used by CDC for other notifiable conditions were inefficient and could benefit from integration with practice software. Participants who had experienced answering CDC calls on behalf of other diagnosing doctors expressed challenges answering questions about cases based off clinical notes and suggested the need for greater transparency about surveillance data requirements. A concern was a fear of patients being lost to follow-up and treatment. Participants indicated they were concerned they were unable to confirm whether

contact tracing was being completed, or whether treatment was completed, if patients were referred to the Canberra Sexual Health Centre (CSHC). Requests for further support with contact tracing were raised in feedback, and 58% of respondents reported the misconception that CDC was responsible for contact tracing.

Discussion

Our study addresses an important gap in the sexual health literature, identifying areas where GP practice may not conform with STI guidelines and where public health units could provide improved support.

Gonococcal testing and prescribing practices identified in this study may lead to reduced case ascertainment and inadequate surveillance for antimicrobial resistance. Although all GPs included gonorrhoea in their asymptomatic STI screen, the majority chose to investigate with urine PCR testing only. First pass urine is not as sensitive as self-collected vaginal swabs in asymptomatic females, and omission of pharyngeal swabs may lead to undetected single-site infections, with the oropharynx providing a niche for the development of antimicrobial resistance and a reservoir of infection that facilitates onward transmission.[5,9,10] However, omission of pharyngeal swabs in asymptomatic screening in low risk individuals may be prevalent in other settings, reflecting perceived high cost-benefit, and concerns of potential false-positive results.[11–14] Additionally, few GPs reported they would request a gonococcal culture following a positive PCR result, which has implications for national surveillance of antimicrobial resistance, and for effective individual treatment in the case of potential growth of a resistant organism. This is particularly important in individuals reporting heterosexual exposure, as women have been found to be twice as likely to return results of antimicrobial resistant strains of gonorrhoea compared with men who have sex with men.[11,15]

Knowledge of guidelines was not the only factor affecting survey responses. For instance, among respondents who indicated they would not order a gonococcal culture, most were aware this was required but other concerns informed their decision, such as patient convenience or fear of losing patients to follow-up. Similarly, whilst most participants reported feeling comfortable and confident with sexual history taking, few participants included questions about sexual practices such as oral sex in their screening questions, which in practice could contribute to inadequate testing of exposed body sites. While previous studies have concluded that limited time, limited clinician understanding of associated benefits, and clinician concern about broaching sexual health with patients all hinder capacity to deliver evidence-based sexual health care, our findings also suggest that clinician and patient preferences, attitudes and beliefs play an important role.[16]

In light of GP suggestions and concerns, we recommend state and territory public health units consider integrated online disease notification systems which incorporate treatment guidelines and existing GP software, or use facsimile to distribute current treatment guidelines to GPs following notification of STIs. Specialised sexual health clinics could also develop processes to inform GPs of patient outcomes following referral, to help close the loop on patient follow up. As a result of this study, in our own jurisdiction a referral proforma has been developed by the CSHC to be faxed to GPs following review and treatment of their patients. This proforma includes information about patient attendance, condition treated, treatment provided, recommended follow up and status of contact tracing.

Our study is primarily limited by response bias. We assume that GPs with a special interest or recent involvement in sexual health would have been more likely to respond, and these groups were actively encouraged to participate in our recruitment strategy. This may have led to the confidence and compliance of GPs with STI guidelines being overestimated. Analysis at the clinic level is not possible as respondents were able to participate anonymously. Additionally, the overall response rate was low, which is not

surprising given the well-established challenges in maximising response rates from GPs.[17] The low response rate and focus on a single jurisdiction limits the generalisability of the results. Finally, the study is not an audit, and is limited by scope, as the results are based on survey responses which may differ from true clinical practice. Despite these limitations, our results provide an insight into the knowledge and practices of an engaged cohort of ACT GPs.

Conclusion

The growing involvement of GPs in testing and treating STIs is a welcome shift; however, optimising conformity of care and addressing clinician concerns will be critical for enhancing patient and population health outcomes. Given the limitations of this study, further research should aim to more comprehensively characterise differences in clinical practice between general practice and specialised sexual health centres, and to examine how clinician preferences, attitudes and beliefs shape STI health care delivery and disease surveillance.

Acknowledgements

We would like to thank the general practitioners and nurse practitioners involved in this study. We would also like to acknowledge Rachael Crane, Julia Smythe, Milica Stefanovic, Dr Karin English, Dr Naomi Clarke, Dr Anne-Marie Svoboda and Alison Kingsbury for contributing to the development and implementation of the project. We also recognise the feedback and contributions of the Canberra Sexual Health Centre, including Dr Sarah Martin and Dr Alexandra Tyson.

Funding statement

The ACT Health Vacation Study Program provided financial support in the form of a scholarship payment to the first author for the duration of the six-week project.

Conflict of interest statement

The authors declare no conflict of interest.

Ethics approval statement

This study has been approved by the ACT Health Human Research Ethics Committee Low Risk Subcommittee (Protocol 2020/ETH03191).

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Appendix A: Participant survey

1. **How has the COVID-19 pandemic impacted your clinical practice in relation to testing and treating STIs?** *Select all that apply.*

- ☐ No impact on STI testing
- ☐ More presentations
- ☐ Fewer presentations
- ☐ Increased use of telehealth to assess patients for STIs and order investigations
- ☐ Other: _____
- ☐ Increase in testing
- ☐ Decrease in testing
- ☐ Increased use of telehealth to provide counselling for STIs

2. **Does the practice you spend most of your time working in collect pathology specimens for STI testing on-site?** *Select best answer.*

- ☐ Yes, urine, swabs, and blood
- ☐ Yes, urine and swabs only
- ☐ No, but there is a pathology clinic onsite
- ☐ No, I refer to external pathology services

3 **Some of the information around asymptomatic STI testing can be unclear. When conducting routine asymptomatic STI testing in the following scenarios, would you offer to include syphilis and HIV serology?**

a) Women who are <u>not</u> pregnant

- ☐ Yes, always
- ☐ Yes, if the patient requests it
- ☐ Yes, only if I consider the patient to be at risk
- ☐ No

Reason for answer: _____

b) Men reporting heterosexual exposure

- ☐ Yes, always
- ☐ Yes, if the patient requests it
- ☐ Yes, only if I consider the patient to be at risk
- ☐ No

Reason for answer: _____

If relevant, list the risk factors you would consider: _____

4. **Do any patients to whom you offer syphilis and HIV testing decline to be tested?**

- ☐ Yes
- ☐ No

If yes, why? _____

5. **Many GPs report challenges taking a sexual health history. These are some of the experiences that are reported. How do these statements reflect your current experiences?**

Strongly disagree *Neutral* *Strongly Agree*
1 *3* *5*
Circle the score that best applies

I only ask about sexual practices or sexual orientation when the patient brings it up or they report symptoms of an STI	1	2	3	4	5
I feel comfortable and confident taking a sexual history	1	2	3	4	5
I think a full sexual history is not necessary to order STI tests	1	2	3	4	5
I find it hard to find enough time to fit it into the consult	1	2	3	4	5
I experience cultural or linguistic barriers	1	2	3	4	5
I am afraid of offending the patient	1	2	3	4	5

Other: _____

Case 1: Lucy is 25-year-old law student at ANU who presents to you in general practice to discuss moving to a long acting contraceptive, as she stopped taking the OCP a few months ago. You discuss contraceptive options, and as you have some time left in the consultation you consider offering Lucy an STI screen.

6. **In this scenario of an opportunistic STI screen, what questions do you ask Lucy to determine what STI tests are appropriate?** _____

7. **Lucy tells you she last had an STI test 2 years ago, and in the last 6 months she has had unprotected vaginal and oral sex with 2 different male partners. She has been well and has not had any symptoms.**
Based on your current clinical practices, what pathology tests do you request?
Include the site/ specimen requested for each test (as you would request it on a pathology form)

_____

_____

8. **Her pathology results come back positive for gonococcal infection, negative for chlamydia.**
Where would you go to get information about treatment and management? *Select all that apply.*

- ☐ Unsure
- ☐ Personal clinical experience
- ☐ Advice from colleagues
- ☐ The Therapeutic Guidelines (eTG)
- ☐ Contacting the Canberra Sexual Health Clinic on 5124 2184
- ☐ The online ASHA Australian STI Management Guidelines for use in Primary Care (www.sti.guidelines.org.au)
- ☐ ACT Health Communicable Diseases Surveillance Unit
- ☐ Other: _____

9.	**Based on your current clinical practice, would you follow up the positive gonococcal PCR with a culture before beginning treatment?**	☐ Yes ☐ Unsure ☐ No
	Reason for your answer:	_____
10.	**In this instance, a follow up culture is indicated to ensure the pathogen is not resistant to antimicrobial therapy. However, we know that GPs sometimes experience obstacles obtaining a culture or may not be aware that they are indicated. Do any of these apply to you?** *Select all that apply.*	☐ I didn't know a culture was indicated ☐ I think that waiting for a culture delays treatment ☐ In my personal clinical practice, results of a culture would not change my management ☐ I think that following up with a culture is inconvenient for patients ☐ The cost is prohibitive for my patients ☐ I would be concerned the patient might be lost to follow up ☐ I think that following up with a culture is the responsibility of the ACT Health CDC or Canberra Sexual Health Centre ☐ There are no obstacles for me to follow up with a culture ☐ Other: _____
Case 2: Ahmed is a 32-year-old accountant who presents for STI testing as he is experiencing urethral discharge. Ahmed has had unprotected sex with both male and female partners in the last 6 months. His pathology results come back positive for uncomplicated pharyngeal and urethral gonococcal infection, susceptible to ceftriaxone and azithromycin.		
11.	**How would you manage Ahmed's treatment?**	☐ Refer to the Canberra Sexual Health Centre ☐ Treat on site ☐ Other: _____
	Reason for your answer:	_____
12.	**Whose responsibility is it to discuss contact tracing with Ahmed?**	☐ Unsure ☐ You (the diagnosing doctor) ☐ ACT Health CDC ☐ Canberra Sexual Health Centre
13.	**What treatment is most appropriate?**	*If required, you can look this up in your usual information source.* ☐ Unsure ☐ Ceftriaxone 500mg IMI, stat in 2mL 1% lignocaine PLUS Azithromycin **1g** PO, stat ☐ Ceftriaxone 500mg IMI, stat in 2mL 1% lignocaine PLUS Azithromycin **2g** PO, stat
14.	**How would you like ACT Health CDC to contact you to collect further information about Ahmed?**	☐ Phone call (current process) ☐ Link to a secure online survey ☐ Fax ☐ Other: _____
15.	**After completing treatment, how would you follow up Ahmed?** *If required, you can look this up in your usual information source.*	_____ _____
16.	**How could the ACT Health CDC better support you in testing and treating notifiable STIs?**	_____ _____
17.	**If you would be happy to receive a phone call from us to discuss your experiences testing and treating notifiable STIs in the ACT further, please include your details below.** Name: _____Preferred contact number: _____Convenient day/time: _____	

Appendix B: Correlation of National STI Guidelines and Therapeutic Guidelines at the time of data collection with conformity of care standards used in data analysis

National STI Guidelines standard used in conformity of care analysis (Figure 1)	2020 National STI Guidelines recommendation[5]	Therapeutic Guidelines (eTG) recommendation[18, 19]
Gold standard investigation used for diagnosis of gonorrhoea in women reporting vaginal sex	Endocervical swab if discharge/ dysuria Self-collected vaginal swab if not examined First pass urine ONLY if endocervical swab/ self-collected vaginal swab cannot be taken	Gonococcal infection is generally identified by nucleic acid amplification testing (NAAT) (e.g polymerase chain reaction [PCR]).
Gold standard investigation used for diagnosis of gonorrhoea in women reporting oral sex	Pharyngeal swab if patient has oral sex	Gonococcal infection is generally identified by nucleic acid amplification testing (NAAT) (e.g. polymerase chain reaction [PCR]).
Both gold standard investigations for pharyngeal and genital gonorrhoea used	Endocervical swab if discharge/ dysuria Self-collected vaginal swab if not examined First pass urine ONLY if endocervical swab/ self-collected vaginal swab cannot be taken Pharyngeal swab if patient has oral sex	Gonococcal infection is generally identified by nucleic acid amplification testing (NAAT) (e.g polymerase chain reaction [PCR]).
Gold standard investigation considered for diagnosis of syphilis and HIV in individuals not from a high-risk population group (always and/or when patient considered at risk)	Consider the following tests [for Hepatitis B, HIV, syphilis] for individuals who are not from a high-risk population group. To determine risk, take a sexual history. Blood – HBsAg, Anti-HBs, Anti-HBc, HIV Ag/ Ab, Syphilis serology	For patients with a suspected STI, consider testing for *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, HIV and syphilis, and for patients who are not fully vaccinated, consider testing for hepatitis A and B.
Gold standard investigation used for following up a positive gonococcal PCR to assess antimicrobial sensitivities	ALWAYS test for culture before treating gonorrhoea to determine anti-microbial sensitivity and contribute to anti-microbial resistance surveillance. If possible, culture samples should be obtained from genital and non-genital sites to determine antibiotic susceptibility before treating someone with a positive NAAT.	Take a sample for culture and susceptibility testing before starting antibiotic therapy because antimicrobial resistance is emerging, and most nucleic acid amplification tests do not detect resistance.
Appropriate antibiotic therapy recommended for uncomplicated pharyngeal and urogenital infection	Ceftriaxone 500mg IMI, stat in 2mL 1% lignocaine PLUS Azithromycin 2g PO, stat*.	Ceftriaxone 500 mg in 2 mL of 1% lidocaine intramuscularly, or 500 mg intravenously, as a single dose PLUS azithromycin 2 g orally with food, as a single dose.
Identification of the need for the diagnosing doctor or nurse practitioner to discuss contact tracing with the patient	Contact tracing for gonorrhoea is a high priority and should be performed in all patients with confirmed infection.	Undertake contact tracing for patients with *N. gonorrhoeae* infection… Addressing contact tracing is the responsibility of the diagnosing clinician.
Patient follow-up following treatment for gonorrhoea including test of cure and/or retest	For pharyngeal, anal or cervical infection, TOC by Nucleic Acid Amplification Test (NAAT) should be performed 2 weeks after treatment is completed. Retest patients 3 months after exposure.	Perform a test of cure at least 2 weeks after treatment completion if using nucleic acid amplification testing (NAAT). If using culture, test of cure may be performed 1 week after treatment completion.