

Sexually Transmitted Infections (STI) in the CARPA Region

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This chapter provides an outline of the occurrence of STIs and their sequelae in the CARPA region, summarises important general principles of managing STIs and deals specifically with STIs in adult men. The general principles of managing STIs are the same in men and women. Specific infections and clinical syndromes in women are covered in the Nganampa Health Council/ Congress Alukura Women's Business Manual. Infections in children should always alert the practitioner to the possibility of child sexual abuse and be managed after consultation with a paediatrician and the appropriate child protection authorities.

Key references

KK Holmes et al. (eds) Sexually Transmitted Diseases. McGraw-Hill, 1999. The nearest thing to an STI 'bible'. Covers a very broad range of the discipline from clinical to public health considerations.

There are a variety of guidelines published dealing with the investigation and management of people with STIs.

International Union against Sexually Transmitted Infections: European STD guidelines¹

http://www.iusti.org/sti/European_Guidelines.pdf

World Health Organisation: Guidelines for the management of sexually transmitted infections²

http://www.who.int/HIV_AIDS/STIcasemanagement/STIManagemntguidelines/who_hiv_aids_2001.01/002.htm

Centers for Disease Control: Sexually Transmitted Diseases Guidelines 2002³

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5106a1.htm>

National Management Guidelines for Sexually Transmissible Infections. April 2002, Venereology Society of Victoria Inc. Melbourne⁴

UK National Guidelines: Clinical Effectiveness Group (Association for Genito-Urinary Medicine and the Medical Society for the Study of Venereal Diseases)

<http://www.mssvd.org.uk/CEG/ceguidelines.htm>

The occurrence of STIs in the CARPA STM region

Sexually transmissible infections (STIs) and their sequelae are extremely common in the CARPA STM region. There are important regional variations in the rates of infection. In general terms, rates are higher in remote communities compared to towns, although there are remote communities with low rates of infections and there are subgroups of people living in towns with very high rates. While rates of infection amongst non-Aboriginal people in the CARPA STM region are higher than the national average, rates amongst Aboriginal people are very much higher. See table 1 over. It has been hypothesised that this relates to lack of access to health care rather than substantial differences in sexual behaviour.⁵

In most populations, younger people (i.e. those under 25 years of age) are more affected by STIs. In the CARPA region, notifiable disease data reveals that, on average, about 60% of STIs occur in people under the age of 30 in this region, with significant rates also occurring in over 30-year-olds. Of note is that trichomonas infection in women in particular persists well into older age groups. See figure 1 over.(not shown here)

Prevalences of gonorrhoea, chlamydia and trichomonas

While incidence rates provide a picture of high rates of infection, prevalence information provides a different perspective and one that is more pertinent to the primary health care level. In many communities, a very high proportion of individuals are affected by these infections. As a result, in these populations, unprotected sex carries a high risk of contracting an infection.

Particularly in Central Australia there have been many screening initiatives over the years providing prevalence information. In Central Australian screening programs involving 26 remote communities between 1995 and 1997, 1693 men and 1458 women were tested for gonorrhoea and chlamydia. Participation rates ranged between about 50% and 80%. Rates of infection from these programs are shown in table 2. It was observed that 24-29% of 15-24 year olds were infected, as were about 10% of those aged 40-50 years.¹¹

Table 1: Rates per 100 000 population of Bacterial STIs in the CARPA region 20006-9

	Syphilis	Gonorrhoea	Chlamydia
Australia	10.1	29.7	74.5
NT non-Aboriginal	18.0	156.0	228.0
NT Aboriginal	547.0	1713.0	983.0
WA Goldfields non-Aboriginal	0.0	11.0	69.0
WA Goldfields Aboriginal	84.0	2761.0	2064.0
SA Northern zone	11.0	132.0	145.0

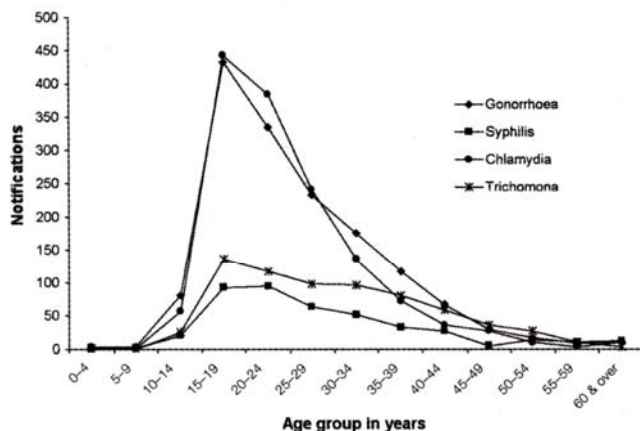


Figure 1: Age specific notifications for bacterial STIs in the Northern Territory, 2002¹⁰

Table 2: Prevalence of infection with gonorrhoea and chlamydia in remote central Australian communities 1995-97

	Men: n=1693 (95% CI)	Women: n=1458 (95% CI)
Any infection	20.4% (19-22)	16.0% (14.1-18)
Gonorrhoea	15.3% (14-17)	10.6% (9-12)
Chlamydia	9.7% (8-11)	8.6% (7-10)
Both	4.7% (4-6)	3.6% (3-5)

Nganampa Health Council in northern South Australia has conducted community screening and treatment as a key element of their STI/HIV program for many years. Initially prevalences of infection with either gonorrhoea or chlamydia of 19% were observed¹² but these have been drastically reduced with each year of the program.¹³⁻¹⁵

In the Top End there was extensive screening conducted in many remote communities during the work-up and evaluation of the tampon as a self-administered testing tool for women. During these trials it was found that 17% of women tested had gonorrhoea, 11% had chlamydia and 25% had trichomonas.¹⁶ The proportions of women in communities who were tested was generally of the order of 10-25%. Although most women were asymptomatic, they did self-present for testing so there may be some bias in these estimates of prevalence. However, they are consistent with prevalences observed in Central Australia, the Kimberley region¹⁷ and north Queensland during the Well-Person's Health Checks (pers. comm. Prof Robyn McDermott). Case-note audits in approximately 20 Top End remote communities revealed that between 42% and 75% of adults had had at least one episode of a bacterial STI during their life (unpublished data NT DHCS AIDS/STD programs).

Trichomonas displays a different epidemiological pattern to other STIs. The typical STI pattern is for the highest rates to be seen amongst the younger, more sexually active age groups: particularly 15-29 year olds. However, high rates of trichomonas infection amongst women persist into older age groups: see figure 1. Indeed, Bowden et al. found that the

prevalence of infection of trichomonas was higher amongst women over 30 years of age.¹⁶

Syphilis

Once a person has been infected with syphilis, they generally remain treponemal test (EIA, TPHA, FTA-Abs etc) seropositive for life, even after successful treatment. Treponemal test seropositivity provides a good indicator of the burden of syphilis infection and one which can be monitored over time to observe changes, especially in younger age groups. This data must be interpreted with some caution as syphilis treponemal tests may be positive as a result of either yaws or non-venereal endemic syphilis, both of which were common historically in the CARPA region. They mostly disappeared during the course of the 1950s, with the last known case of yaws occurring in a Top End community in 1968.¹⁸ The number of people who are seropositive from venereal syphilis will naturally increase with age as more people are infected. But, for people over the age of 40, or perhaps even 35, seropositivity could have occurred as a result of either yaws or non-venereal endemic syphilis.

In the Nganampa Health Council region some 60% of all people aged 30 years were recently found to be seropositive.¹⁹ A study of infertility and STIs revealed that 41% of all women in a large Top End community were seropositive for syphilis.²⁰ Recent audits of a random sample of 10% of case notes in approximately 20 remote Top End communities revealed that between 10% and 40% of people were seropositive for syphilis (unpublished data NT Dept Health and Community Services AIDS/STD programs).

Pelvic inflammatory disease (PID)

PID will occur in between 10% and 40% of women infected with gonorrhoea or chlamydia if they do not receive treatment.^{21,22} Experienced practitioners relate that this is a common condition. In one large Top End community study it was found that 26% of women have had PID at least once.²³ A study of women admitted to Royal Darwin Hospital with PID found that Aboriginal women were greatly over-represented.²⁴ Recent audits of a random sample of 10% of women's case notes in approximately 20 remote Top End communities revealed that between 20% and 30% of women appeared to have had at least one clinical episode of PID (unpublished data NT DHCS AIDS/STD programs).

Infertility

In two Top End communities 26% and 30% of women were found to be infertile.²³ Preliminary work done by the Tri-State STD/HIV project in four remote Central Australian communities suggests very similar rates of infertility (pers. comm. Tri-State STD/HIV Project). Recent audits of a random sample of 10% of women's case notes in approximately 20 remote Top End communities revealed that between 10% and 30% of women appeared to have had no children (unpublished data NT DHCS AIDS/STD programs), with very similar rates observed in women over the age of 24.

By extrapolating from other studies²⁵⁻²⁸ in populations with similar rates of STIs, it is reasonable to assume that at least 50%, and perhaps as much as 70%, of this infertility is due to STIs.

Important principles in the provision of STI clinical care

The syndromic management approach

Many STIs cause very similar symptoms and it is common for a person to have more than one infection. For example, in the Central Australian screening programs referred to above, 22% of infected persons had a dual infection with gonorrhoea and chlamydia. It is also common for people to have atypical manifestations of infection for a number of reasons. Studies from all over the world have demonstrated that even experienced venereologists cannot reliably distinguish between different infections on clinical grounds alone. This has been shown for urethritis in males, vaginal discharge in females and genital ulcer disease in both sexes.²⁹

An important principle of STI management is to treat symptomatic persons immediately, or as soon as possible, to limit the possibility of transmission to others. In many regions of the world diagnostic tests for STIs are not routinely available. For these reasons, the syndromic management approach was developed and promoted by the World Health Organisation.³⁰ This approach, particularly for male urethritis and genital ulcer disease, has been evaluated in many different settings throughout the world.^{29,31-35} These studies consistently demonstrate that syndromic management for genital ulcer disease and male urethritis is effective at both the individual and at a population level. The experience is that syndromic management of vaginal discharge is less effective. It is difficult to develop algorithms with good sensitivity and specificity that are applicable in a range of settings.

The syndromic management approach is especially important in the CARPA region where client mobility is high and follow-up systems are not always very effective. While diagnostic tests are readily available in the CARPA region, there are often significant delays in receiving results. All health services in the CARPA region have endorsed an adaptation of syndromic management for patients presenting with symptoms of STIs.

The essence of this approach is to offer all clients with symptoms of an STI a full screen for STIs and immediate syndromic treatment for all the common infections their symptoms may indicate. For example, a man presenting with a urethral discharge may have gonorrhoea and/or chlamydia and he should therefore be immediately treated for both of these.

Full screen for STIs and HIV

All clients presenting with symptoms of an STI should be offered a full screen for all the common infections in the region and an HIV test. It is common for a person with one STI to have another and also common for infections to cause no symptoms. The great majority of syphilis in the CARPA region is diagnosed via a blood test rather than people presenting with symptoms. If a person has an STI, they may have been exposed to HIV. There has been a medico-legal precedent set which found a doctor negligent for failing to offer an HIV test to a person who, by his presentation with another STI, was known to have been at risk of HIV.³⁶ If a patient declines any or all of the STI or HIV tests, this should be clearly documented.

All clients should be fully informed of the nature of any tests in order to be able to give their consent. Some health services have developed audiotape, videotape or written resources to assist practitioners in this process.

Tests should be offered for:

- gonorrhoea and chlamydia
- syphilis

- HIV

Depending on local prevalences and health service policies, testing for trichomonas infection may be indicated.

Hepatitis B testing with STIs

[Editor: It was difficult to come to an agreement over the inclusion of hepatitis B testing in the STI protocols. The decision has to be based on reckoning and common sense rather than based on evidence, which is lacking. A summary of the debate is provided here.]

The burden of disease

Infection with hepatitis B is common amongst Aboriginal people in the CARPA region. Studies from a variety of settings indicate markers of past hepatitis B infection in 30-72% of Aboriginal people and chronic Hepatitis B surface antigen carriage in 3-19%.³⁷⁻⁴³ Higher rates are observed in rural/remote areas than in urban centres. Chronic carriage of HBV surface antigen is associated with progression to cirrhosis and carcinoma of the liver. Hepatic carcinoma has been described as occurring ten times more frequently in Aboriginal people in the NT.⁴⁴ Amongst non-Aboriginal Australians most hepatitis B is transmitted sexually or via injecting drug use. In developing countries, most hepatitis B transmission results either from mother-to-child transmission or transmission between young children, rather than sexually between adults.⁴⁵ Aboriginal people in remote communities have similar rates of infection and living conditions to many developing nations. It is known that 60% of incident cases in NT Aboriginal people occur in children under 10 years of age.⁴⁶ It therefore seems plausible and likely that hepatitis B infection in remote community Aboriginal people is largely acquired in childhood. The experience of practitioners is that clinical cases of acute hepatitis B infection are extremely rare in adult Aboriginal people in the region. In addition, there is a much more substantial workload involved in the follow-up, investigation and management of a positive result for hepatitis B compared to other STIs. The benefits for the individual, and in terms of reducing further transmission, are much less clear compared to other STIs. For these reasons the CARPA manual puts caveats on the testing for hepatitis B as part of STI investigation as summarised in the discussion above.

[Editor: For more detail see the chapter on hepatitis. Some details are highlighted below.

A 1994 study in AJPH (18(3):286) quoted hepatoma as 10 times more likely in the NT Aboriginal population than non-Aboriginal and rates equivalent to those in China.

In the Northern Territory in 1991-95, chronic liver disease (all causes) and cirrhosis death rates were four times higher for Aboriginal males and 5.5 for Aboriginal females, compared to the non-Aboriginal population. There were a total of 62 deaths from chronic liver disease (all types) in the NT during this period.

There were 28 deaths from hepatocellular carcinoma diagnosed in the Northern Territory between 1991 and 1995. During the period 1987-97 primary liver cancer was the third most common cancer and the second highest cause of cancer death in Aboriginal males.

However, as a health priority, many issues are more significant than hepatitis B to this population. Furthermore, interventions for higher priority conditions may use fewer resources and be more appropriate. Preventing vascular disease (for example) will have a much greater impact on community mortality than efforts on hepatitis B, such as antiviral therapy or screening for HCC. This is not to say, however, that an individual should be refused 'best care' if it is deemed by the patient and clinician to be in that individual's interest when co-morbidities (and therefore life expectancy), plus other issues (e.g. preparedness to have a liver biopsy, or treatment in a larger city or interstate) are considered.

The case against including hepB testing:

It has been argued that most primary health care services using the CARPA manual will not have the capacity to undertake long-term follow-up and surveillance of those found to be chronic hepB carriers. We do not know, but strongly suspect, that of those found to be carriers very few would end up with a better health outcome because of having their hepB status known through screening of STI cases. Presumably a proportion of those with chronic active hepatitis will be identified through being symptomatic rather than screening.

Further, time and resources spent on investigating and following up on hepB might be better spent in other STI or other PHC activities. Caution in overloading clinic staff is an issue dear to the hearts of the editorial committee, and impacts on the acceptability of the manual as a whole.

There is a risk that clinic staff will not search case notes very well for a patient's immune status as clinic notes are often not well sorted and it can take some time to do well. This could lead to unnecessary re-testing.

The amount of hepB that is sexually transmitted in the Indigenous population in the NT is not known, but may be small. We know that the majority of hepB carriers are infected through non-sexual contact as children or through vertical transmission from their mothers. If there was a lot of STI transmission of hepB we should be seeing more acute hepB as susceptible adults are infected (no data available).

It may be that most of the adults who are not chronic carriers (possibly 85% of the adult population) are immune, from natural exposure as a child.

Contact tracing is often not well done in Indigenous health services for a multitude of reasons. Further burdening of the contact follow-up systems may 'overload' them further.

Through routine immunisation of Aboriginal children since 1988 and the catch-up program for children 6-16 years old in 1998, a large proportion of children up to 20 years old will be immune.

The main strategies to address the burden of disease from hepB are universal immunisation (underway), and screening of antenatal patients to allow treatment of the neonates that prevents the vertical transmission of infection (current practice). 'High risk' and contact screening with follow-up immunisation will probably add marginally to these main strategies.

The case for including hepB testing

Testing for hepB is a routine part of STI case management in the rest of Australia, (where infection rates are lower).

The NT health department guidelines from CDC recommend (and fund vaccine costs for) immunisation of people at high risk, including those with an STI.

A high proportion of Indigenous people in the NT are chronic carriers of hepB (thought to be 10-15%) and there are high rates of STIs. In theory, these factors combine to make a high risk of sexual transmission of hepB to susceptible individuals especially those presenting with suspected STI. These people should be offered hepB immunisation if not immune. However, we do not know what proportion of the adult population is susceptible to hepB infection. (An alternative would be to immunise without testing their immunity first, as was done in the school-age hepB immunisation catch-up program.)

The CARPA STM includes a protocol for surveillance of hepB carriers with view to treatment to decrease long-term sequelae of chronic hepB. There are now effective interventions available for those with chronic active hepatitis (CAH) from hepatitis B and treatment stops progression and (presumably) cirrhosis and hepatoma. This should be offered to people with CAH.

Which tests?

HepBsAg will identify current infection, except those in the early incubation period, which will be rare. HepBsAb will identify those immune through vaccination and most of those immune through natural infection. A few people (Western Pathology says very few) will be hepBcAb positive and hepBsAb negative after natural infection and are thought to be protected by the core Ab.

In terms of billing, Western Pathology charges the same for hepB serology with or without the cAb, i.e. they charge for two tests even if you ask for hepBsAg, sAb and cAb and that will be \$28.55.

This may vary for other labs, but it seems the additional cost of the HepBcAb is not high, though it will seldom change the decision to immunise.

The compromise

The main strategies for combating hepB are:

1. Universal immunisation, which is under way for all newborn children, and now covers most people up to 20 years old.
2. Screening pregnant women for carrier status with treatment of the newborn baby to block the vertical transmission. This is said to be 85-95% effective at five years, and should be coordinated by the paediatricians and CDC guidelines.
3. The third strategy, (probably the less important than the other two in our population of interest), is immunisation of higher risk people, such as those with STI and their contacts.

We have included a protocol on checking for HepB in those with symptomatic STI. As with any screening or testing it should not be done if there is not the capacity to follow through with appropriate follow-up. In the case of annual surveillance of all adults with chronic hepB, this could amount to a large workload (possibly 15% of the adult population).]

Using nucleic acid amplification (NAA) tests after treatment

Once an infection is treated and the organisms are dead it takes some time for the body to clear all remnants of them. NAA tests (such as pcr or lcr) will detect dead organisms or even parts of organisms. Therefore, if an NAA test is performed too soon after treatment, one cannot be sure if a positive result reflects treatment failure, re-infection or merely the continued presence of dead organisms.⁴⁷ This phenomena has also been

observed with other non-culture tests for chlamydia.^{48,49} It is not entirely clear from the literature how long one must wait after treatment before using an NAA test, but it is in the range of 1-4 weeks.⁵⁰⁻⁵³ Given the uncertainty, it will be more prudent to wait three to four weeks before re-testing using an NAA test.

Partner notification, or contact tracing

Partner notification, or 'contact tracing', has been considered a cornerstone of both the individual management of people with an STI and of STI control in the population. There is a great deal in the literature evaluating different methods of partner notification in terms of numbers of partners located, numbers with infection and numbers treated.⁵⁴⁻⁵⁸ Overall, it appears that the most effective method is that of the practitioner following up partners on the basis of names provided by the patient⁵⁵ or at least offering the patient this option. Whilst, theoretically, contact tracing is important in limiting the spread of infection within a population, no studies have demonstrated that this is so.⁵⁹

There is a great deal of variation in the emphasis placed upon contact tracing by different health departments and health services. Practitioners should seek the advice of local authorities in determining the level of time and effort put into this activity. It should be recalled, however, that there is a clear duty of care to the sexual partners of people with an STI – at least to the principal partner – and every effort must be made to identify, locate and offer treatment to them. If this is not done, the original client is at high risk of being re-infected and wider transmission of infection will continue.

Sexual partners should be offered:

- a physical assessment (history and examination)
- a full STI screen (as above)
- the same, immediate treatment as the original client received

Do not wait for test results to come back.

For example:

If the original client had gonorrhoea, treat the partners for gonorrhoea.

If the original client had urethritis (i.e. either gonorrhoea or chlamydia), treat the partner(s) for both gonorrhoea and chlamydia.

Follow-up of sexual partners of STI patients can be a very 'high yield' activity in terms of detecting infection. Clinical audits in the Top End of the NT found that when sexual partners were tested, an STI was detected in between 20% and 50% of cases (unpublished data NT DHCS AIDS/STD programs). The importance of offering a full STI screen is to also identify other possible infections. For example, in a study of contact tracing in north Queensland, it was found that nearly half the women and a third of the men named as contacts had an infection which the index case did not.⁶⁰ Very similar findings were made during the Top End clinical audits (unpublished data NT DHCS AIDS/STD programs).

Partner notification is not easy. Clients are often reluctant to name names, may be unable to identify partners in a way health staff can use for follow-up, or may have difficulty with remembering Gregorian calendar time frames. In some places local, paper-based systems to facilitate contact tracing have been established.⁶¹ These systems help ensure that when sexual partners are identified that they receive treatment. Contact your local CDC/Sexual Health Unit for help with resources in how to do contact tracing and local systems. The local CDC/Sexual Health Unit can also assist in

locating and arranging treatment for people who are not in the community where the initial diagnosis was made.

Education and promotion of safer sex behaviour

When a person has an STI, it is a prime opportunity to offer them some education that may prevent them becoming infected again in the future. This should be done with all STI clients. There are many resources available to assist with this and all clinics should have a basic resource set to assist with this. Contact your local CDC/Sexual Health Unit for help with resources.

Notification of infections

Notification of STIs is important because it is the only way to detect a change in their occurrence so that health services can develop their programs appropriately.

By law, STIs must be notified to the health department in all states of Australia. This legal requirement means that the patient's consent is not needed in order to make the notification. Some states require full name details, others require only a combination of initials and date of birth. There is some variation in the STIs that are notifiable in different states as well as in their case definition. Gonorrhoea, chlamydia, syphilis, donovanosis and HIV are notifiable in all three states of the CARPA region (NT, SA and WA). Trichomonas is notifiable only in the NT. Herpes and viral genital warts are not notifiable in any state.

The diagnosis of syphilis is not based on a single laboratory test result. It requires interpretation in relation to clinical signs, past serology results and past treatment. Syphilis must therefore be notified by the practitioner and the appropriate form sent in to the health department. In some areas there are regional syphilis registers which assume the responsibility of formal notification of infections

Gonorrhoea, chlamydia and trichomonas are diagnosed on the basis of a single laboratory report. The regulations in each state vary. In the NT, they are notified automatically by the pathology company and, in practice, there is no need for practitioners to also do so. In SA and WA there is dual practitioner/laboratory notification. Practitioners should be aware of the particular requirements in those states.

Donovanosis may be notified by the laboratory, but the standard test for donovanosis – microscopy of a biopsy or smear – has poor sensitivity (i.e. a high false-positive rate).^{62,63} Therefore, in the NT, donovanosis may also be notified on clinical grounds by the practitioner.⁶⁴ A polymerase chain reaction (PCR) test for donovanosis is under development and available in WA.

Detecting infection in asymptomatic persons

A very large proportion of sexually transmitted infections cause either no symptoms or very mild symptoms. This is particularly true of chlamydia, gonorrhoea and trichomonas in women, but also occurs in a substantial proportion of men with these infections.⁶⁵⁻⁶⁷ Genital ulcers may occur inside the vagina in women and be clinically inapparent.^{68,69} People with mild symptoms may not realise that an STI is the cause or – because of shame, a lack of access to health care services or an appropriate practitioner – may not present to a clinic for care. In some settings, it has been estimated

that as few as 5% of all persons in a population with an STI present to a clinic and receive appropriate treatment.⁷⁰

This is entirely consistent with experience in the CARPA region. In the screening programs referred to above, high prevalences of infection were detected: even of gonorrhoea in men.¹¹ No data is available as to whether these people had symptoms. However, the key point is that, for whatever reason, they had not presented to the clinic for care at the time they were offered the test. Data from Top End clinical audits in over 20 remote communities reveals that only 10% to 20% of all STIs detected in remote communities are found in persons presenting with STI symptoms. Approximately 60% of all infections are detected by testing of apparently asymptomatic persons as part of well-persons, antenatal or opportunistic testing or as part of a formal screening program (unpublished data NT DHCS AIDS/STD programs). The remainder are found via contact tracing or follow up of other infections.

There have been many efforts to describe criteria in order to identify people at a greater risk of an STI. Many studies have come up with criteria appropriate to their situation, but very few of them are applicable in a wide variety of settings. Young age, usually less than 25 years, is common to most places. In the CARPA region, approximately 60% of all STIs occur in people under the age of 30 years.^{7,10} However, particularly in Central Australia, there is good data to show that, while STIs are more common in younger people, high rates continue to occur even up to age 50. There is a common perception that alcohol use, especially heavy drinking or binge drinking, is associated with an increased risk of STIs, although there is no specific data to prove this. In Central Australia, Miller et al. found that female petrol sniffers were at increased risk of gonorrhoea or chlamydia, as were people with a past history of an STI.⁷¹ Several prospective studies overseas have found that people having one STI are at a substantially increased risk of another within a relatively short period of time.⁷¹⁻⁷⁷

Primary care practitioners in the CARPA region need to be aware of this situation. Health services will have their own policies for STI testing in asymptomatic persons. However, it is clear that if health service strategy is to only offer STI tests to those persons presenting with symptoms, then it will have very little impact on a substantial public health problem. It is highly recommended that practitioners have a low threshold for offering testing. Fortunately, in most instances the important STIs in the CARPA region can be treated with single doses of antibiotics.

When an infection is detected in an asymptomatic person, there is an imperative to find the person for treatment as soon as possible. The individual (especially a woman) is at risk of sequelae and infection can continue to spread. A person with an STI identified in this way should be offered a full STI screen if they did not already have one at the time of the initial test. Significant treatment delays between diagnosis and treatment have been documented in remote communities. In the case-note audits in over 25 Top End communities, the average delay between diagnosis and treatment of an STI in an (apparently) asymptomatic person was 19 days. Nganampa Health Council found that the delay in treatment of syphilis was initially 42 days but that this was able to be reduced to 14 days via a series of health service system improvements.⁷⁸

Recommended treatment regimens

Urethritis in males

Urethritis in males can be caused by a variety of organisms: Chlamydia trachomatis, Neisseria gonorrhoeae, Trichomonas vaginalis, Herpes Simplex Virus, probably Mycoplasma hominis and possibly Ureaplasma urealyticum. In the CARPA region the only organisms regularly tested for are C. trachomatis and N. gonorrhoeae, with occasional testing for T. vaginalis. There is virtually no testing for other organisms as causes for male urethritis. There is no routinely available data as to the proportion of cases of urethritis which are caused by any particular organism or no known organism. The impression of practitioners and sexual health units is that both C. trachomatis and N. gonorrhoeae are common causes of urethritis, and there is evidence that infection with both is also common.^{11,12,79}

The CARPA manual therefore recommends immediate single-dose treatment for both gonorrhoea and chlamydia in men with symptoms of urethritis, regardless of whether signs of urethritis are also present. This is in line with the syndromic approach and the known pattern of infection in the CARPA region. Treating on the basis of symptoms alone will lead to some over-treatment. However, a number of studies of syndromic management of urethritis have found that this approach also leads to the fewest number of infections being missed.^{29,35,80} It is considered a certain amount of over-treatment is acceptable in the interest of reducing further spread of infection as much as possible.

The recommended drugs, when the infection is contracted locally, are 1 g of Azithromycin, 3 g of Amoxicillin and 1 g of Probenicid. In both Central Australia and the Top End penicillin resistance, be it chromosomally mediated or due to penicillinase production, occurs in less than 5% of cultured isolates.⁸¹ Therefore, penicillin continues to be suitable for first-line treatment of gonococcal infection. The CARPA protocol recommends that gonococcal infection, which is likely to have been contracted outside the CARPA region, should be treated with a single injection of 250 mg of intramuscular ceftriaxone because of the increased risk of penicillin resistant infection. These recommendations are consistent with all major texts and guideline references mentioned at the beginning of this section.

If a man re-presents with the same symptoms within one week the protocol indicates there are a number of possibilities which may not be easy to elucidate. The protocol recommends that investigations be repeated with a special effort to obtain a culture specimen for N. gonorrhoeae because of the possibility of a resistant organism. It is recommended that such cases be discussed with the local sexual health unit to determine the most appropriate therapy and follow-up. Given the high prevalence of trichomonal infection in Aboriginal women in the CARPA region^{16,82,83}, treatment for this infection should be considered early.

Genital ulcer

The STIs to consider in the differential diagnosis of genital ulcers in the CARPA regions are syphilis, donovanosis and herpes. Other STI causes of genital ulcers, such as chancroid or lymphogranuloma venereum, are extremely rare in Australia.^{84,85}

Other non-STI causes of an ulcer are of course possible; in particular an infected bite, a burn or other trauma. The guideline intentionally plays down the possibility of the ulcer not being due to an STI. This is to reduce the chance of an infection being left untreated. The flow chart is adapted from a WHO document³⁰ and is designed to reduce unnecessary

treatment of herpes with antibacterials whilst improving syndromic management of syphilis and donovanosis.

In keeping with the syndromic management approach, it is recommended that genital ulcers that are not typical of herpes simplex virus are immediately treated for both syphilis and donovanosis. A single dose of 4 ml of Benzathine penicillin is adequate treatment for primary syphilis.⁶⁹ Azithromycin as a once-a-week dose has been found to be a very effective treatment for donovanosis in both formal trials^{86,87} and from clinical experience in the CARPA region. Longstanding clinical practice has been to continue other antibiotic therapy until lesions have fully healed to reduce the likelihood of recurrences.⁶⁸ Given its long tissue half-life and some limited clinical experience, it is possible that limited courses of azithromycin may be effective. Several of the major guidelines recommend azithromycin for the treatment of donovanosis, but they vary in their durations.¹⁻⁴ No clinical trials have determined what the optimum duration of therapy should be. Therefore, the CARPA protocol recommends that patients be closely followed and therapy continued until lesions are seen to be fully healed with an (arbitrary) minimum of four weeks of treatment.

Three antiviral drugs are commonly used to treat herpes; aciclovir, valaciclovir and famciclovir. The comparative studies which have been performed have not shown any differences in effectiveness. They do not 'cure' the infection, but do reduce the pain and make the lesions heal more quickly by a few days. They should only be used within five days of the start of the primary episode or if new lesions are forming. After this they are of no use. Herpes often recurs, and treating recurrent episodes with these drugs has no influence on whether a person will get recurrences. The main factors determining choice of drug are cost and convenience.

The guideline recommends Famciclovir but there will be local cost variations which might lead to a different choice.

As with any area of broken skin the ulcer should be kept clean; the guideline recommends saline for this. If the ulcer hurts, the man should be given appropriate analgesia. Lignocaine (aka lidocaine) ointment is effective at relieving the pain of herpetic ulcers.

	Famciclovir	Valaciclovir	Aciclovir
Cost	Most expensive	Mid-price	Cheapest
Dose for primary episode	125 mg bd for 5 days	500 mg bd for 5-10 days	200 mg 5 per day for 5 days
Other issues	Most evidence of safety in pregnancy. Not licensed for use in primary herpes		

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