

## 2.1 CHLAMYDIA

### ORGANISM

Genital chlamydia infection is caused by some of the subtypes of *Chlamydia trachomatis*. Other subtypes cause trachoma and lymphogranuloma venereum (LGV). Like all chlamydial species, the organism has to grow within cells, and so it is found within the endothelium and epithelium of the endocervix, rectum, peritoneal cavity, fallopian tubes, oropharynx and conjunctiva. Genital chlamydia is a common STI in Australia, particularly in adolescents and young adults.

### CLINICAL PRESENTATION

**Asymptomatic infection is common. Chlamydia is asymptomatic in at least 60 per cent of women and 25 per cent of men.**

**Genital chlamydia infection may be manifested by:**

- ◆ urethral discharge (typically clear, white or grey) in men
- ◆ testicular or scrotal pain and tenderness due to epididymo-orchitis
- ◆ vaginal discharge or abnormal bleeding due to cervicitis
- ◆ abdominal pain and fever due to pelvic inflammatory disease (PID), or infection of the fallopian tubes or uterus
- ◆ infertility or ectopic pregnancy due to previous PID, which may or may not have been symptomatic. Patients may have persisting chlamydia infection.
- ◆ dysuria (pain on passing urine)
- ◆ and less commonly as:
  - peri-hepatitis (abdominal pain, fever, tender liver)
  - conjunctivitis in adults or newborns
  - proctitis (anal irritation and discharge)
  - pneumonia of newborns
  - reactive arthritis (Reiter's syndrome).



## Chlamydia

The incubation period for symptomatic urethritis in men is about seven to 14 days, but may be longer.

Screening should be carried out on asymptomatic partners of infected individuals, and should be considered for sexually active adolescent girls and young women at the time of gynaecological examination, even in the absence of symptoms. The highest risk is in those who do not consistently use barrier contraceptives, or who have a new partner or multiple partners.

### INVESTIGATIONS

**Chlamydia infection is diagnosed by detecting *Chlamydia trachomatis* in appropriate specimens. Serology is not helpful in the diagnosis of sexually transmitted chlamydial infection.**

- ◆ The preferred tests are nucleic acid tests (NAT), (a generic term which includes PCR or LCR). Culture is now used only in special circumstances.
- ◆ In women, endocervical swabs are the preferred specimen. Where examination is not possible, a self-obtained low vaginal swab and a urine specimen should be taken.
- ◆ Diagnosis and treatment of infected patients prevents ongoing/further transmission to sex partners and, for infected pregnant women, may prevent transmission of chlamydia to infants during birth.

### Specimen collection and handling

**Men:** Collect first void urine for NAT. If the patient is unable to pass urine, a urethral swab should be collected instead for NAT.

2.1



**Women:** Take an endocervical swab or cytobrush PLUS a first void urine for NAT. The handling of the swab or cytobrush depends on the test used. Follow the instructions provided by the laboratory.

- ◆ Specimens should reach the laboratory as quickly as possible.
- ◆ All specimens must be clearly labelled with the patient's name, date of birth or medical record number, and the site, date and time of collection.
- ◆ Keep as close as possible to 4 °C during storage and transport. Avoid extremes of temperature. DO NOT place samples in the freezer section of the refrigerator and avoid direct contact with freezer blocks during transport.

*See Section 1.3, page 27 for further information on methods of testing.*

## TREATMENT

Directly observed single dose therapy is preferred.

### Treating uncomplicated chlamydia

#### **Adults**

- ◆ Azithromycin 1 g orally, as a single dose (preferred treatment)  
OR
- ◆ doxycycline 100 mg orally, 12-hourly for 10 days.

#### **Children 0-8 years**

- ◆ Erythromycin 5 mg/kg per day orally, in four doses for 10-14 days  
OR
- ◆ azithromycin 20 mg/kg (to a maximum of 1 g) orally, as a single dose (restricted PBS availability).



## Chlamydia

### **Children >8 years**

- ◆ Azithromycin 20 mg/kg (to a maximum of 1 g) orally, as a single dose  
OR
- ◆ doxycycline 100 mg orally, 12-hourly for 10 days.

### **Pregnant women**

- ◆ Azithromycin 1 g orally, as a single dose (category B1) (preferred option)  
OR
- ◆ erythromycin ethyl succinate 800 mg orally, 12-hourly for 10 days (category A)  
OR
- ◆ erythromycin base 250 mg orally, 6-hourly for 14 days (category A)  
OR
- ◆ amoxicillin 500 mg orally, 8-hourly for 10 days (category A).

### **Special Considerations**

Tetracycline antibiotics, including doxycycline, should never be used in:

- ◆ women who are pregnant or possibly pregnant, or breast feeding
- ◆ children under nine years old.

Erythromycin estolate is contraindicated in pregnancy due to increased risk of hepatotoxicity.

### **Treating chlamydia in cases of gonorrhoea**

**Many patients with gonorrhoea will also have chlamydia, although the converse is less likely.**

**Presumptive treatment of chlamydia in patients being treated for gonorrhoea may be appropriate, especially in highly endemic areas.**

*See section 2.2 on gonorrhoea, page 82.*



### Treating chlamydia in cases of PID

See section 3.11 on PID, page 166.

### Treating chlamydia in cases of epididymitis

See section 3.5 on epididymo-orchitis, page 149.

### Treating chlamydia in cases of LGV

See section 3.8 on LGV, page 159.

## EDUCATION, COUNSELLING AND PREVENTION

**Counselling is important in managing STIs/HIV and should be considered at every contact with the patient.**

**As a minimum, consider counselling at the first presentation, and subsequently during treatment and follow-up.**

- ◆ Counselling is an opportunity to educate and support the patient in prevention strategies. This should be done in a confidential setting.
- ◆ The key points are:
  - communicating the confidentiality of the diagnosis
  - communicating the reasons for testing and contact tracing
  - formulating expectations from treatment
  - promoting awareness of risk behaviours.
- ◆ Counselling should also include discussion of the implications of STI testing (i.e. that testing does not prevent transmission). Emotional reactions can accompany a positive STI/HIV diagnosis with delayed reactions sometimes occurring several days after the consultation.

See also *General considerations in STI/HIV COUNSELLING*, page 16.



### MANAGEMENT OF PARTNERS

**It is the responsibility of all health care providers, including doctors, to begin tracing sex partners so that they can be assessed and treated.**

**This involves counselling to ensure that the patient understands the implications of infection transmission.**

**Managing sex partners may require referral to another practitioner.**

- ◆ Contact tracing in cases of chlamydia infection is important. Untreated chlamydia can lead to PID, infertility, neonatal pneumonia, pre-term delivery and neonatal conjunctivitis.
- ◆ The duration of potential infectivity may be months to years.
- ◆ All sex partners of the index case from the preceding three months should be tested. In circumstances where testing is not possible, consider treatment for both chlamydia and gonorrhoea. If the history of the index case suggests they are likely to have been infectious for longer than three months, then reasonable efforts should be made to screen earlier contacts.
- ◆ Transmission of chlamydia by oral sex is low.

*For more information about contact tracing, see section 1.6, page 57.*

### FOLLOW-UP

**To ensure continuity of care, record follow-up instructions in the patient's medical record.**

**Review all patients with chlamydia about one week after completing treatment. This is an opportunity for further education and counselling.**



As NAT can remain positive for three to four weeks after treatment, repeat sampling for test of cure should be undertaken one month after treatment in the following circumstances:

- ◆ where regimens other than azithromycin are used
- ◆ in children
- ◆ in pregnant women
- ◆ where there is doubt about compliance with treatment and advice
- ◆ where there is a high risk of re-infection
- ◆ where symptoms persist
- ◆ where there appear to be complicated infections such as PID or epididymitis.

If possible, review patients three months after exposure as this provides an opportunity to repeat blood tests for syphilis, HIV and HBV. Patients should be retested for chlamydia.

### **PUBLIC HEALTH ISSUES**

Contact tracing is important to prevent further transmission and reinfection. Always test for other STIs.

If a child is diagnosed with genital chlamydia, issues of sexual abuse and/or sexual assault should be considered and mandatory notification of infection forwarded to your PHU. For further information, see page 10.



## 2.2 GONORRHOEA

### ORGANISM

Gonorrhoea is caused by *Neisseria gonorrhoeae*, a Gram-negative intracellular diplococcus (GNID).

### CLINICAL PRESENTATION

**Gonorrhoea is asymptomatic in 80 per cent of women and 10 to 15 per cent of men.**

**Gonorrhoea is a sexually transmitted infection characterised by one or more of the following:**

- ◆ a urethral or cervical discharge
- ◆ anorectal infection
- ◆ pharyngeal infection
- ◆ pelvic inflammatory disease (PID)
- ◆ prostatitis and epididymitis
- ◆ conjunctivitis
- ◆ skin lesions
- ◆ arthritis
- ◆ rarely meningitis or endocarditis.

### INVESTIGATIONS

**A definitive diagnosis of gonorrhoea is established by detecting *Neisseria gonorrhoeae* in a clinical specimen by culture or by nucleic acid testing (NAT). Cultures are the preferred way of diagnosing gonorrhoea so that antibiotic sensitivities can be obtained.**

**A presumptive diagnosis of gonorrhoea is achieved by:**

- ◆ demonstrating at least two GNID in a smear made from a male urethral swab. Absence of neutrophils or gonococci on Gram stain does not exclude gonorrhoea.
- ◆ demonstrating GNID in a smear from a normally sterile site from a patient with a disease that clinically indicates gonococcal infection.



**Men:** *If there is a discharge*, take a urethral pus swab for smear and culture. Collect first void urine for NAT. If the patient is unable to pass urine, a urethral swab should be collected instead for NAT.

- ◆ Detecting GNID in a urethral smear is a reliable indicator of gonorrhoea, but the absence of diplococci does not exclude the diagnosis. For these reasons, always collect samples for culture or NAT.
- ◆ For **men who have anally receptive sex with men**, but are asymptomatic, take a blind anal swab. However, if the patient presents with anal symptoms, take a swab for microscopy and culture under direct vision of the rectal mucosa via a proctoscope.

**Women:** *If pus is present or the cervix is inflamed*, take an endocervical swab for smear and culture, and an endocervical swab or cytobrush for NAT.

*If there is no discharge*, take an endocervical swab or cytobrush for NAT only. If a woman declines a vaginal examination and an endocervical swab cannot be taken, sampling from the genital tract by a self-obtained low vaginal swab should be taken in addition to a first void urine for NAT. Sampling of both the genital tract and urine increases the detection of gonorrhoea.

- ◆ Endocervical swabs are essential for culture and high vaginal swabs are not adequate. If the patient has had a hysterectomy, a urethral swab or urine for NAT must be collected.
- ◆ Anal swabs for culture are recommended for women who have had anal sex.



### Specimen collection and handling

- ◆ It is important to collect suitable specimens before treatment because the diagnosis of gonorrhoea relies heavily on detecting the organism by culture or NAT.
- ◆ Serology is not useful for gonorrhoea testing.
- ◆ When delays of greater than 24 hours occur in getting the specimen to a laboratory (e.g. in rural and remote areas), NAT is the preferred test. However, where there is pus, a culture should still be sent.

### Special considerations

- ◆ Allow slides to air-dry before sealing and labelling.
- ◆ Clearly label all specimens with the patient's name, date of birth or medical record number, and the site, date and time of collection.
- ◆ Specimens should reach the laboratory as quickly as possible and preferably within 24 hours of collection. (This is particularly important for specimens for culture). A longer delay may result in some infected individuals being missed.
- ◆ If swabs for culture are unlikely to be processed in the laboratory within 24 hours of collection, they should still be sent, although the yield will be diminished.
- ◆ **Never put specimens for gonorrhoea culture in the refrigerator.** Keep them in an insulated container between 10 °C and 25 °C.

## TREATMENT

The treatment of gonorrhoea in WA must be guided by the current antibiotic sensitivity profile. Empirical treatment of gonorrhoea should now be given based on the following geographically based guidelines:



- ◆ Infection contracted in the Perth Metropolitan area, or interstate/overseas
- ◆ Infection contracted outside the metropolitan area but within WA.

### Treating uncomplicated gonorrhoea contracted in the Perth Metropolitan area or interstate/overseas

#### **Adults**

- ◆ Ceftriaxone\* 250 mg intramuscularly, as a single dose (preferred treatment)

#### **Children**

- ◆ Ceftriaxone 50 mg/kg (maximum 250 mg) intramuscularly, as a single dose.

### Treating uncomplicated gonorrhoea contracted outside the metropolitan area but within WA

Directly observed single dose therapy is preferred.

#### **Adults**

- ◆ Amoxicillin 3 g orally, as a single dose  
PLUS
- ◆ probenecid 1 g orally, as a single dose.

#### **Children weighing < 45 kg**

- ◆ Amoxicillin 50 mg/kg orally, as a single dose  
PLUS
- ◆ probenecid 25 mg/kg orally, as a single dose.

Care should be taken to follow-up these patients as empirical treatment will sometimes fail due to the rise in penicillin-resistance.

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\* Ceftriaxone should always be given with lignocaine dilutant as per the manufacturers' recommendations.

## Gonorrhoea

Uncomplicated gonorrhoea excludes:

- ◆ PID
- ◆ epididymitis
- ◆ ophthalmic lesions
- ◆ prostatitis
- ◆ arthritis
- ◆ disseminated infections.

### Chlamydia co-infection

**Because of the high risk of co-infection, treat all symptomatic patients who are suspected to have gonorrhoea, for chlamydia as well (see page 77).**

- ◆ The co-infection rate for heterosexually acquired gonorrhoea and chlamydia is about 40 per cent.

### Treating gonorrhoea in other clinical situations

#### *Allergy to penicillin*

- ◆ Ceftriaxone\* 250 mg intramuscularly, as a single dose (NB should not be used when the allergy to penicillin is recorded as severe)  
OR
- ◆ spectinomycin 2 g intramuscularly, as a single dose  
OR
- ◆ ciprofloxacin 500 mg orally, as a single dose (see special considerations below).

#### *Special considerations*

- ◆ Azithromycin 2 g can be used but is not recommended due to high gastro-intestinal high intolerance.

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\* There is a 10 per cent chance of cross-sensitivity between penicillin and cephalosporins. Avoid cephalosporins in patients who have had a severe reaction to penicillin previously.



- ◆ Ciprofloxacin should no longer be used for empirical treatment due to increasing resistance profiles. It should only be used when swabs have been taken for culture and sensitivities and ciprofloxacin is demonstrated to be appropriate.
- ◆ Ciprofloxacin should not be used in children or pregnant women.

### *Pharyngeal and anorectal gonorrhoea*

#### **Adults**

- ◆ Ceftriaxone 250 mg intramuscularly, as a single dose  
OR
- ◆ spectinomycin 2 g intramuscularly, as a single dose  
OR
- ◆ ciprofloxacin 500 mg orally, as a single dose (see special considerations above).

#### **Children**

- ◆ Ceftriaxone 50 mg/kg (maximum 250 mg) intramuscularly, as a single dose.

#### **Special considerations**

- ◆ Amoxicillin should not be used in either adults or children for gonococcal pharyngeal infections because of the difficulty in achieving an adequate concentration of antibiotic in tissues and cells.
- ◆ Spectinomycin is not recommended for children.

### *Prophylactic treatment of neonates*

- ◆ Ceftriaxone 50 mg/kg (maximum 250 mg) intramuscularly, as a single dose.



### *Gonococcal conjunctivitis*

This disease may not be sexually transmitted and sporadic cases do occur in settings of high endemicity and poor hygiene. It should be treated as follows:

#### **Adults**

- ◆ Ceftriaxone 250 mg intramuscularly, as a single dose  
OR
- ◆ procaine penicillin\* 1.5 g intramuscularly, as a single dose (see special consideration below)  
PLUS
- ◆ frequent irrigation of the eyes with saline to remove purulent discharge.

#### **Children**

- ◆ Ceftriaxone 50 mg/kg (maximum 250 mg) intramuscularly, as a single dose, daily for three days  
OR
- ◆ procaine penicillin\* 50 mg/kg (maximum 1.5 g) intramuscularly, as a single dose, daily for three days (see special consideration below)  
PLUS
- ◆ frequent irrigation of the eyes with saline to remove purulent discharge.

#### **Special considerations**

- ◆ In remote Aboriginal communities, gonococcal conjunctivitis is a public health emergency and all suspected cases should be notified as soon as possible to the local PHU.
- ◆ Procaine penicillin is suitable only in cases where the infection was contracted outside the metropolitan area but within WA.

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\* See page 123 with regard to procaine reaction.



- ◆ It is important that the index case and all contacts are treated within the same 24-hour period to prevent reinfection.
- ◆ If the index case's infection was contracted outside the metropolitan area but within WA, contacts may be treated with either procaine penicillin (single dose) or amoxicillin (child: 75 mg/kg up to 3 g) orally PLUS probenecid (child >2 years; 25 mg/kg up to 1 g) orally (single dose).
- ◆ Contact the local PHU as soon as possible.

### ***Neonatal***

- ◆ Ceftriaxone 50 mg/kg (maximum 125 mg) intravenously or intramuscularly, daily for seven days  
PLUS
- ◆ frequent irrigation of the eyes with saline to remove purulent discharge.

### ***Special considerations***

- ◆ Mothers of neonates with gonococcal eye disease should be tested for other STIs and treated for genital gonococcal infection.
- ◆ Also test the neonate for chlamydia.
- ◆ Specialist advice should be obtained when treating people with serious penicillin allergy. These patients are at risk of anaphylaxis, collapse, breathing difficulties or urticaria if exposed to penicillin or cephalosporin.
- ◆ Contact the local PHU as soon as possible.

### **Treating gonorrhoea complicated by associated infections**

- ◆ PID
- ◆ epididymitis
- ◆ ophthalmic lesions
- ◆ prostatitis
- ◆ arthritis
- ◆ disseminated infections.



## Gonorrhoea

These conditions require multiple dose therapy and individualised care. Some aspects of preferred treatment are described below but in most cases, medical advice, and sometimes specialist advice, should be sought.

PID presents with a range of mild to severe infection. The condition may closely mimic such abdominal emergencies as acute appendicitis or ectopic pregnancy. Such circumstances warrant hospitalisation, as do PID in pregnancy, inability to tolerate oral therapy, or suspected pelvic abscess (see page 166).

Epididymitis, prostatitis, arthritis and disseminated infections may all require hospitalisation and usually prolonged antibiotic therapy. Single dose therapy is NOT adequate.

### EDUCATION, COUNSELLING AND PREVENTION

Counselling is important in managing STIs/HIV and should be considered at every contact with the patient.

As a minimum, consider counselling at the first presentation and subsequently during treatment and follow-up.

- ◆ Counselling is an opportunity to educate and support the patient in prevention strategies. This should be done in a confidential setting.
- ◆ The key points are:
  - communicating the confidentiality of the diagnosis
  - communicating the reasons for testing and contact tracing
  - formulating expectations from treatment
  - promoting awareness of risk behaviours.
- ◆ Counselling should also include discussion of the implications of STI testing (i.e. that testing does not



prevent transmission). Emotional reactions can accompany a positive STI/HIV diagnosis with delayed reactions sometimes occurring several days after the consultation.

*See also General considerations in STI/HIV COUNSELLING, page 16.*

## MANAGEMENT OF PARTNERS

**All partners of patients with gonorrhoea need to be traced, investigated and treated.**

**It is the responsibility of all health care providers, including doctors, to begin tracing sexual partners so that they can be assessed and treated.**

**This involves counselling to ensure that the patient understands the implications of infection transmission.**

**Managing sexual partners may require referral to another practitioner.**

**Sexual partners of the index case within the preceding two to three months should be assessed, and considered for treatment of gonorrhoea and chlamydia.**

**Contact tracing for gonorrhoea is a high priority. Untreated infections can lead to PID, epididymitis, disseminated infection, or neonatal conjunctivitis.**

### ***Special considerations***

- ◆ Period to trace will depend on the sexual history: three months if the infection is in the anus or cervix, and up to two months if the infection is in the pharynx or the male urethra.
- ◆ Gonorrhoea is easily transmitted by oral sex.



### FOLLOW-UP

**Review all patients with gonorrhoea about one week after treatment for follow-up and consideration of retesting and to ensure that contact tracing has been completed.**

**To ensure continuity of care, record follow-up instructions in the patient's medical record.**

Clinical evaluation of the patient's condition should occur one week after completing treatment. This is an opportunity for further education and counselling (and offering to supply condoms).

Test of cure by swab for culture should be done for all cases at one week after treatment is completed.\*

### ***Special considerations***

If possible, review patients three months after exposure, as this provides an opportunity to repeat blood tests for syphilis, HIV and HBV. Consider retesting for gonorrhoea, those at high-risk of re-infection.

### PUBLIC HEALTH ISSUES

**Penicillinase-producing gonorrhoea is a public health emergency and contact tracing must be undertaken as a high priority to ensure that penicillin-resistant gonorrhoea is eliminated as soon as possible from a community.**

Contact tracing is important to prevent further transmission and reinfection. Always test for other STIs.

If a child is diagnosed with gonorrhoea, issues of sexual abuse and/or sexual assault should be considered and mandatory notification of the infection forwarded to your PHU. For further information, see page 10.

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\* If only NAT is available, test of cure should be done at four weeks because NAT may remain positive for three weeks after treatment has finished.



## 2.3 DONOVANOSIS (GRANULOMA INGUINALE)

### ORGANISM

Donovanosis (Granuloma inguinale) is a mildly contagious, chronic, progressively destructive infection caused by *Klebsiella granulomatis* (formerly *Calymmatobacterium granulomatis*), a Gram-negative, intracellular bacillus. It occurs in tropical countries including Papua New Guinea and, although uncommon in Australia, it appears mainly in Aboriginal people in northern and central parts of WA.

### CLINICAL PRESENTATION

The lesions develop over one to four weeks or longer. They begin as a single or multiple subcutaneous nodules, usually on the genitalia. These nodules enlarge and erode through the skin to produce beefy red granulations or ulcers that are typically painless, and have thick, rolled edges. Occasionally the organism may spread to extra-genital sites through auto-inoculation or systemic spread.

### INVESTIGATIONS

#### ***Special considerations***

- ◆ Make sure it is clear to laboratories that the specimens are for examination for donovanosis.
- ◆ The anorectal region should be checked for donovanosis lesions in all patients.
- ◆ Donovanosis can be mistaken for malignancy, warts or condylomata lata of secondary syphilis. Previous infections result in scarring and eroded epithelial surfaces.
- ◆ Pelvic examination in women may not initially be possible because of extensive vulval disease, and may have to be postponed.



### Specimen collection and handling

It is essential that a serological test for syphilis be done whenever the diagnosis of donovanosis is suspected.

Recently, a NAT\* (PCR)-based method has been developed for the detection of the organisms in lesions. This is a simple and acceptable test, which appears to have high sensitivity and specificity, and is in the final stages of validation. It is recommended that another test be done to confirm the diagnosis of donovanosis. Other tests are an impression smear (press slide), crush smear or punch biopsy.

The diagnosis of donovanosis relies on detecting the organism through NAT or finding characteristic intracytoplasmic Donovan bodies in the infected tissue.

Notification of donovanosis can be either “confirmed” with laboratory and clinical findings or “probable” with clinical and epidemiological evidence (see case definitions in Appendix E, page 212).

#### ◆ NAT

- Using a dry swab firmly swab at or beneath the leading edge of the ulcer
- Following collection, handle swabs according to the instructions from your testing laboratory
- It is recommended that the pathology request is for "Genital Ulcer Disease (GUD) NAT", which will test for donovanosis, syphilis and herpes.

Alternative confirmatory tests include:

#### ◆ An impression smear ('scrape & slide')

- gently clean the lesion of blood, slough or debris with a gauze swab and saline
- gently squeeze the lesion to bring the exudate to the surface

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\* The term "NAT" has been used throughout the Guidelines as a generic term, which includes "PCR" and "LCR".



- press a clean slide firmly down onto the lesion OR swab the ulcer vigorously and make a smear for internal lesions
  - allow to air-dry
  - clearly label the specimen “For Donovan bodies”.
- ◆ **A crush smear** can be done if granulation tissue can be easily removed. The removed tissue can be placed in saline and sent to the laboratory under cool conditions. This is preferred if the operator is not experienced in making impression smears.
  - ◆ **A punch biopsy** may be taken if the smear is negative. An experienced operator should perform this procedure. It is preferable that a separate sample in saline is sent for NAT but if that is unavailable, a portion of the formalin-fixed specimen can be used. Biopsies should be taken whenever there is a reasonable suspicion that the lesion may be malignant either at primary presentation or on review. Failure to respond to adequate treatment and/or a negative NAT should prompt early review and biopsying of the lesion.

## TREATMENT

Treatment is usually commenced on clinical diagnosis after specimens are collected.

Treatment should be directly observed (DOT). Weekly treatment should be provided initially for four weeks.

Review the ulcer each week if possible. If there is no response to treatment at four weeks, consider a biopsy to investigate other causes, i.e. malignancy.

### Standard

- ◆ Azithromycin 1 g orally (DOT), weekly for four weeks or until healing occurs (whichever is longer) (preferred treatment because of much greater compliance)



## Donovanosis

OR

- ◆ azithromycin 500 mg orally (DOT) daily for seven days only.

If allergic to macrolides give either:

- ◆ doxycycline 200 mg orally, daily (or 100mg 12-hourly) for 4 weeks or until healing occurs (whichever is longer)
- OR

- ◆ ceftriaxone 1 g intramuscularly or intravenously, daily for 14 days. Check for recurrences which may occur with this treatment.

### Pregnancy

- ◆ Azithromycin 1 g orally, each week for four weeks or until healing occurs (whichever is longer) (preferred treatment) (category B1)
- OR

- ◆ ceftriaxone 1 g intramuscularly or intravenously, daily for 14 days (category B1).

The appropriate response to treatment should be resolution of lesions with progressive healing after seven days.

### Neonate

A baby born to a mother with active donovanosis lesions should receive prophylactic treatment. Expert advice is mandatory in this situation.

### ***Special Considerations***

Tetracycline antibiotics, including doxycycline, should never be used in:

- ◆ women who are pregnant or possibly pregnant, or breast feeding
- ◆ children under nine years old.



## EDUCATION, COUNSELLING AND PREVENTION

Counselling is important in managing STIs/HIV and should be considered at every contact with the patient.

As a minimum, consider counselling at the first presentation and subsequently during treatment and follow-up.

- ◆ Counselling is an opportunity to educate and support the patient in prevention strategies. This should be done in a confidential setting.
- ◆ The key points are:
  - communicating the confidentiality of the diagnosis
  - communicating the reasons for testing and contact tracing
  - formulating expectations from treatment
  - promoting awareness of risk behaviours.
- ◆ Counselling should also include discussion of the implications of STI testing (i.e. that testing does not prevent transmission). Emotional reactions can accompany a positive STI/HIV diagnosis with delayed reactions sometimes occurring several days after the consultation.

*See also General considerations in STI/HIV COUNSELLING, page 16.*



## MANAGEMENT OF PARTNERS

**It is the responsibility of all health care providers, including doctors, to begin tracing sex partners so that they can be assessed and treated.**

**This involves counselling to ensure that the patient understands the implications of transmission of the infection.**

**Managing sex partners may require referral to another practitioner.**

Donovanosis is not highly contagious, but reasonable efforts should be made to examine sex partners.

*For more information about contact tracing, see section 1.6, page 57.*

## FOLLOW-UP

Review the ulcer each week if possible. It is essential that the lesion be re-examined at four weeks after commencement of treatment.

- ◆ **If there is no response to treatment at four weeks, consider a biopsy to investigate other causes, i.e. malignancy.**
- ◆ If the lesion has healed, no further treatment is required.
- ◆ If the lesion has improved but not yet healed a further two weeks of treatment should be given (weeks five and six). However, if the lesion has not healed by week six, a biopsy should be considered.

Follow-up at three and six months after the lesion has healed is recommended to ensure that relapse does not occur.

**If the patient has had a poor response, consider another diagnosis (e.g. carcinoma or immunosuppression).**

**To ensure continuity of care, record follow-up instructions in the patient's medical record.**



As part of follow-up of patients with donovanosis, it is essential to:

- ◆ assess healing of ulcers and compliance with therapy
- ◆ consider hospital admission if response to therapy as an outpatient is inadequate.

### ***Special considerations***

This also provides an opportunity to repeat blood tests for syphilis, HIV and HBV.

## **PUBLIC HEALTH ISSUES**

Contact tracing is important to prevent further transmission and reinfection.

Screen and treat for coexisting STIs (particularly ulcerative diseases such as herpes and syphilis) and especially HIV. A person with an ulcerative condition has a tenfold risk of acquiring HIV.

For further information on genital ulceration, see page 49.

If a child is diagnosed with donovanosis, issues of sexual abuse and/or sexual assault should be considered. For further information, see page 10.



## 2.4 HUMAN IMMUNODEFICIENCY INFECTION (HIV) & ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

### ORGANISM

HIV infection is caused by Human Immunodeficiency Virus type 1 and 2.

### CLINICAL PRESENTATION

HIV disease is characterised by depletion and/or dysfunction of the cells of the immune system. HIV infection targets macrophages (which ingest and process infectious agents) and CD4+ T lymphocytes. These cells are central to all functions of the immune system, so that when they are affected by the disease process there is a very extensive immune deficiency.

Up to 80 per cent of people who are infected by HIV will experience a glandular fever-like illness within six weeks of infection. This occurs at the time of HIV antibody appearance, and is called a seroconversion illness or primary HIV infection syndrome. Subsequently, there is a period of months to years during which the person is well, even though there is a progressive depletion of CD4+ T lymphocytes. Eventually, immune function becomes so poor that infections and/or cancers develop. This stage is known as acquired immunodeficiency syndrome (AIDS).

The most common cancers are Kaposi's sarcoma and lymphoma. A wide range of infections, mostly viral and fungal, are common in AIDS, including *Pneumocystis carinii* pneumonia, cytomegalovirus infections and severe infections with *Candida* and *Mycobacteria* sp.



HIV infection may also affect immune system cells in the nervous system and cause neurological diseases. The most common neurological disease is a chronic encephalitis, which may result in a sub-cortical dementia associated with other neurological abnormalities (AIDS-dementia complex).

HIV infection is a progressive condition, which will result in AIDS and death in the majority of infected people if the infection is not treated with antiretroviral therapy. Combination antiretroviral therapy is very effective in arresting or slowing the progression of HIV infection.

HIV infection should be considered in patients with risk factors, and/or a consistent clinical illness.

### Primary HIV infection syndrome

**Primary HIV infection syndrome (seroconversion illness) presents a rare opportunity to identify HIV infection, which otherwise may remain hidden for years. Primary HIV infection syndrome usually occurs within six weeks of infection and may include the following:**

- ◆ Fever
- ◆ Malaise
- ◆ Anorexia
- ◆ Myalgia
- ◆ Headache
- ◆ Sore throat
- ◆ Lymphadenopathy
- ◆ Generalised maculoerythematous rash.
- ◆ Night sweats
- ◆ Severe lethargy
- ◆ Nausea
- ◆ Arthralgia
- ◆ Photophobia
- ◆ Diarrhoea
- ◆ Thrombocytopenia
- ◆ Mouth ulceration

Neurological manifestations including meningoencephalitis and peripheral neuritis may also be observed.



The acute illness may be accompanied by neutropenia, lymphadenopathy, thrombocytopenia, and mildly elevated erythrocyte sedimentation rate (ESR) or serum transaminase levels.

The role of antiretroviral therapy, in the treatment of primary HIV infection is currently unclear but its use should be considered. This should be discussed with a specialist in HIV medicine as a matter of urgency (see list of contacts on page viii).

Sequelae to the acute illness include:

- ◆ chronic lethargy
- ◆ depression
- ◆ irritability.

Non-specific viraemic manifestations include:

- ◆ mucosal ulceration
- ◆ desquamation of skin
- ◆ exacerbation of seborrhoea
- ◆ recurrence of herpes simplex.

## INVESTIGATIONS

### Laboratory investigations

Laboratory investigations of HIV infection include tests for three different purposes:

- ◆ tests for evidence of HIV infection
- ◆ tests for immune deficiency
- ◆ tests for opportunistic infections and malignancies arising from HIV infection.

Only tests for HIV infection and immune deficiency are considered here.

#### ***HIV tests***

HIV diagnosis in Australia is based on detecting antibodies to HIV in a blood sample. Initial testing is undertaken



using an enzyme immunoassay (EIA). Positive results are confirmed by a Western Blot assay. Current tests detect antibodies to both HIV-1 and HIV-2.

**Window period:** The test detects antibody to the virus rather than the virus itself, so there is a period after infection, before antibody has developed, when the test will not detect antibody. This antibody-negative period of four to 12 weeks is called the *window period*. Although HIV testing will be negative, the person is highly infectious.

- ◆ A negative EIA for HIV antibody excludes HIV infection provided that the last potential exposure was at least 12 weeks before the test. If not, the test must be repeated at an appropriate time.
- ◆ Some reactive EIA results are not due to HIV infection. Therefore, all reactive results must have a Western Blot.
- ◆ If the Western Blot is positive, then HIV infection is highly likely but the tests must be repeated on a second blood specimen from the patient to confirm the diagnosis of HIV infection.
- ◆ Tests for detection of HIV proteins (p24 antigen) or HIV RNA are available but are only used in special circumstances. This should be discussed with a specialist in HIV medicine or infectious diseases (see list of contacts on page viii).

### ***Tests of immune function***

Most service providers should consult a specialist before ordering tests of immune function (see list of contacts on page viii).

HIV infection causes a decline in the number of CD4+ T lymphocytes. These are essential cells in the body's immune system. As they decline, the opportunistic infections and malignancies that are characteristic of HIV infection become more frequent. Before the development



of signs and symptoms, tests of immune function may be within normal limits but abnormalities are often present.

The CD4+ T cell count is the main laboratory test indicator of the degree of immune deficiency produced by HIV infection:

- ◆ **Normal:** Over 500 CD4+ T cells/ $\mu$ L of blood.
- ◆ **Early immune deficiency:** 350-500 CD4+ T cells/ $\mu$ L of blood. Clinical signs and symptoms are few.
- ◆ **Intermediate immune deficiency:** 200-350 CD4+ T cells/ $\mu$ L of blood. Increasing signs and symptoms, especially infections of skin and mucosa.
- ◆ **Advanced immune deficiency:** <200 CD4+ T cells/ $\mu$ L of blood. Frequent clinical manifestations of immune deficiency.

### Assessing HIV risk factors

**Assess risk factors for HIV, and consider testing in patients with a glandular fever-like illness, or in those patients with unusual or persistent infections for which there is no adequate alternative explanation.**

**If the initial HIV antibody test is negative, repeat it during the convalescence of the illness, and again at least three months after exposure.**

- ◆ In its early stages, and if the practitioner has not had the benefit of extensive experience with the condition, HIV infection is difficult to diagnose. Early diagnosis of HIV infection is essential to allow counselling, to offer treatment that will slow the progress of the disease, and to reduce the spread of infection.
- ◆ Patients are infectious throughout their illness, although the most infectious periods are before seroconversion or later, when AIDS develops.



## Is HIV testing appropriate?

### Lifestyle clues

- ◆ Unprotected sex
- ◆ Male-to-male sex
- ◆ Sharing of injecting drug use equipment
- ◆ Use of unsterile tattooing and body piercing equipment
- ◆ Unprotected sex with a person who has migrated from or recently travelled to a country with a high prevalence of HIV
- ◆ Overseas travel to or work in a country with a high prevalence of HIV
- ◆ Engaging in paid sex
- ◆ History of STI

Presence of any

**Lifestyle clue,**

**Epidemiological clue**

or

**Clinical clue**

indicates that

**HIV testing**

should be offered

### Epidemiological clue

- ◆ All antenates in regions with high STI rates

### Clinical clues

- ◆ Presence of another STI
- ◆ Seroconversion illness (fever, myalgia, rash)
- ◆ Atypical or severe prolonged infections without other apparent cause (e.g. oral candidiasis, oral hairy leukoplakia, severe persistent genital herpes)

**2.4**

## Investigating other STIs

**All patients with HIV infection should have investigations to exclude other STIs including *Herpes simplex virus (HSV)*.**

- ◆ The presence of HIV indicates a risk of other infection.
- ◆ The presence of STIs increases the risk of HIV transmission and acquisition.



## TREATMENT

**The treatment for HIV/AIDS is often complex and varied, and specialist advice should be sought.**

- ◆ In the absence of antiretroviral therapy, HIV infection usually progresses from no apparent illness to AIDS and death over a median of ten years. However, the pace of disease progression is variable. Almost all people who are infected with HIV will eventually have symptoms related to the infection.
- ◆ Early identification of HIV infection can lead to treatment that may slow the decline of immune system function. Early diagnosis also helps to prevent transmission of HIV to other people.
- ◆ The use of antiretroviral therapy is a complex and rapidly changing field of medicine, which should be supervised by a specialist in HIV medicine.
- ◆ People with HIV have special needs, and need access to a support network that will assist in maintaining good health and delaying the onset of symptoms.
- ◆ People with HIV/AIDS need access to out-of-hours care and special services.
- ◆ Planning HIV care requires the identification of patients who need:
  - immediate medical care
  - antiretroviral therapy
  - preventive therapy for opportunistic infections and symptomatic genital herpes.
- ◆ Hepatitis A and B vaccination should be considered in those who are seronegative for these infections. In addition, consider pneumococcal vaccine and influenza vaccine (refer to the NHMRC Immunisation Handbook\*).

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\* National Health and Medical Research Council 2003, *The Australian Immunisation Handbook*, 8th edn, AGPS, Canberra, available at <[www.immunise.health.gov.au/handbook.htm](http://www.immunise.health.gov.au/handbook.htm)> [accessed 09.06.06].



## EDUCATION, COUNSELLING AND PREVENTION

Counselling is important in managing HIV and should be considered at every contact with the patient.

As a minimum, consider counselling at the first presentation and subsequently during treatment and follow-up.

- ◆ Counselling is an opportunity to educate and support the patient in prevention strategies. This should be done in a confidential setting.
- ◆ The key points are:
  - building mutual trust and respect
  - communicating the confidentiality of the diagnosis
  - communicating the reasons for testing and contact tracing
  - formulating expectations from treatment
  - promoting awareness of risk behaviours.
- ◆ Counselling should also include discussion of the implications of STI/HIV testing (i.e. that testing does not prevent transmission). Emotional reactions can accompany a positive STI/HIV diagnosis, with delayed reactions sometimes occurring several days after the consultation.

**The purpose of pre-test discussion is to obtain informed consent and should address:**

- ◆ confidentiality
- ◆ the reason for the tests
- ◆ identifying risk activities
- ◆ understanding of the requirement for statutory notification and contact tracing
- ◆ awareness of the disease process
- ◆ awareness of modes of transmission and prevention
- ◆ the patient's past coping strategies/community or family or friend support systems.

### Post-test counselling

Discuss the results of the test with the patient **in person**.

A negative diagnosis provides an opportunity to reinforce pre-test discussions and re-emphasise prevention.

Counselling after a positive diagnosis should address:

- ◆ patient lifestyle and support systems, including those in whom the patient might confide
- ◆ potential for a crisis (e.g. suicide).

If the test is positive, avoid overloading the patient with excessive information and arrange for further counselling at a later time.

At follow-up:

- ◆ stress confidentiality
- ◆ confirm the patient's understanding of the infection
- ◆ if the patient is ready to deal with more information, provide further details of the infection and how to prevent its transmission
- ◆ continue to educate concerning risk behaviour
- ◆ provide continued support
- ◆ provide information about other sources of information and support, such as the WA AIDS Council (see page viii for contact details).

People with HIV should be counselled by a person able to discuss the medical, psychological and social implications of HIV infection. Appropriate social support and psychological resources should be available, either on site or through referral, to assist the patient in coping with emotional distress.

Emotional distress is a normal response when first being informed of a positive HIV test result. Patients face several major adaptive challenges:

- ◆ accepting the possibility of a shortened life span



- ◆ coping with the reactions of others to a stigmatising illness
- ◆ developing strategies for maintaining physical and emotional health
- ◆ initiating changes in behaviours to prevent HIV transmission.

Counselling for these patients should embrace:

- ◆ implications for management
- ◆ contact tracing (managing sexual partners)
- ◆ legal requirements of notification
- ◆ patients' rights and responsibilities
- ◆ family and community support resources
- ◆ the need for continued counselling.

## MANAGEMENT OF PARTNERS

**Every possible effort for thorough contact tracing should be undertaken in all cases of HIV/AIDS.**

**Contacts include not only sex partners but also anyone who has shared needles or other injecting equipment with the index case.**

Contact tracing for HIV/AIDS enables early diagnosis and treatment of possible HIV infection and associated illness, and offers the opportunity to encourage risk-reducing behaviours. Contact tracing is a means of concentrating risk-reduction efforts on people at high risk of contracting or transmitting HIV infection.

- ◆ Because HIV is a fatal infection, managing sexual partners carries with it special needs for sensitivity and care.
- ◆ Particularly with HIV/AIDS, those responsible for contact tracing should have a clear understanding of local community sensitivities.



- ◆ People with HIV infection should be advised of the risk they pose to uninfected sexual partners, and of the need to practice safe sex and to inform their partners of their infection.
- ◆ Contacts of HIV-infected patients should be traced, and offered testing and counselling.
- ◆ A person who has HIV infection or is at risk of HIV infection must not make any blood, semen or organ/ tissue donations.

### ***Special considerations***

Several publications have been produced by the Australian, State and Territory governments, other agencies and community groups, to assist health care practitioners and patients in preventive education and in managing HIV infection. These are available from the Department of Health and various other agencies (see pages viii and 201).

- ◆ Determining how far back to trace contacts can be difficult.
  - The incubation period for primary HIV infection is one to 12 weeks, but the seroconversion illness may pass unnoticed or be inaccurately recalled.
  - Trace back at least 12 weeks before a confirmed primary HIV illness. If an infected contact cannot be found, then a source for the infection has not been located. Therefore, extend the trace-back period.
  - If the date of primary infection cannot be confirmed, the trace-back period may be years, depending on the patient's history of risk behaviour and clinical presentation.
  - As HIV-2 infection is not endemic in Australia, expert support for contact tracing should be sought if there is a possibility of a patient with HIV-2 having been infected locally.



- A patient who presents with AIDS will usually have been infected for several years (median – eight to 10 years).
- ◆ Oral sex has been reported as a means of transmitting HIV infection but overall it remains an uncommon method of transmission.
- ◆ If the index case has donated or received blood products, contact the relevant Blood Transfusion Service.

*For more information about contact tracing, see section 1.6, page 57.*

## **FOLLOW-UP**

### **Advise patients of the need for indefinite follow-up.**

HIV infection requires facilities and resources that usually are beyond those available from the primary care provider.

### ***Special considerations***

- ◆ Specialist advice should always be sought for treatment and follow-up of HIV-infected patients.
- ◆ Review patients three months after exposure to repeat blood tests for syphilis, HBV and hepatitis C virus (HCV).



### **PUBLIC HEALTH ISSUES**

Contact tracing is important to prevent further transmission and reinfection. Always test for other STIs.

If a child is diagnosed with HIV, the virus may have been transmitted vertically during pregnancy or delivery. If the mother is HIV-negative, issues of sexual abuse and/or sexual assault should be considered. For further information, see page 10.

The Department of Health has Operational Circulars in place that address management of occupational exposure to HIV. These are *Standard and Additional Infection Control Precautions* (OP 2039/06) and *Management of Occupational Exposure to Blood and Body Fluids in the Health Care Setting* (OP 1803/04). These are available at [www.health.wa.gov/circulars](http://www.health.wa.gov/circulars).

### **Non-occupational post-exposure prophylaxis**

In 2005, the Department of Health's *Protocol for non-occupational post-exposure prophylaxis (NPEP) to prevent HIV in Western Australia* was updated (OP 1946/05). It is available at [www.health.wa.gov/circulars](http://www.health.wa.gov/circulars).



## 2.5 SYPHILIS

### ORGANISM

**Syphilis is a systemic disease caused by *Treponema pallidum*.**

Incubation period:

- ◆ Nine to 90 days from exposure to primary syphilis
- ◆ Thirty to 150 days from exposure to secondary stage
- ◆ Usually five to 35 years from exposure to tertiary stage.

The usual mode of transmission is sexual intercourse.

*T. pallidum* may occasionally be spread by blood contamination, for example by needlestick injuries or the sharing of injecting equipment, and also by direct contact with open lesions.

### CLINICAL PRESENTATION

**Test for syphilis in all patients presenting with a non-recurrent genital ulcer. The ulcer (chancre) is characteristically a single indurated painless ulcer which can occur in the genital region or elsewhere on the body.**

**Particularly in endemic communities, consider syphilis if a patient presents with characteristic hair loss, rashes on their hands and feet, and painless enlarged lymph nodes.**

- ◆ In Australia, syphilis usually presents either as a primary lesion or through the chance finding of positive serology.
- ◆ Congenital syphilis is rare if there is general screening of pregnant patients.
- ◆ Tertiary syphilis is rarely seen.



### **Special considerations**

- ◆ Careful physical examination of the relevant areas, and awareness of its likely presence in endemic communities is crucial to establishing an accurate diagnosis of syphilis.
- ◆ Untreated, early clinical syphilis usually resolves spontaneously, leading to latent disease, which may proceed to late, destructive lesions.

### **Staging of syphilis**

The appropriate course of treatment can only be decided after the clinical stage of the disease has been determined.

This requires examination and serological testing. The stages are:

**Primary syphilis:** the signs are an ulcer (chancre) at the site of infection that is typically solitary, indurated and painless.

**Secondary syphilis:** manifestations are a rash that is typically bilaterally symmetrical and non-itchy; ulcers of the mouth, nasal cavity or vulva; enlarged lymph nodes and condylomata lata. Hair loss involves scalp and eyebrows.

**Latent syphilis:** presence of *T. pallidum* in the body without symptoms or signs. Latent syphilis can be either early (within 12 months of primary infection) or late (more than 12 months since primary infection).

**Tertiary syphilis:** progression of syphilis to involve heart, nervous system, eye, ear or the development of gummata (granulomatous lesions). The first lesions of tertiary syphilis are usually seen five to 20 years after primary infection, but asymptomatic neurosyphilis may occur within five years.

2.5



## Presentation of latent syphilis

**Positive serology in a patient without symptoms or signs of disease is the most common presentation of syphilis in Australia today.**

- ◆ The duration of latency influences potential infectivity of the patient and the treatment required.
- ◆ The problem, with a finding of positive syphilis serology without clinical symptoms or signs, is to distinguish adequately treated syphilis from untreated disease.
- ◆ The duration of latency must be determined by:
  - identifying the occurrence of primary or secondary lesions, if possible
  - asking about previous syphilis serology at the time of blood donations, previous STI diagnosis or pregnancy
  - checking the records of Community Health, PHUs, ACCHS, PathWest, or other medical practitioners.

## Presentation of tertiary syphilis

**Tertiary syphilis should be excluded in any patient with the following conditions:**

- |                                     |                               |
|-------------------------------------|-------------------------------|
| ◆ aortic incompetence               | ◆ nerve deafness              |
| ◆ dementia                          | ◆ pupillary abnormalities     |
| ◆ personality change                | ◆ retinal disease or uveitis. |
| ◆ multifocal neurological disorders |                               |

If tertiary syphilis is suspected, referral to a specialist should occur. Contact details of specialists with appropriate experience are provided on page viii.

**Rationale:** Treating tertiary syphilis is intended to prevent late complications. Although clinical experience supports the use of penicillin for this purpose, evidence to guide a specific choice of regimen is limited. Specialist referral will assist in identifying and managing the consequences of tertiary syphilis. Cases of suspected tertiary syphilis need to be discussed with specialists because managing patients with tertiary syphilis can be very complex. Such complexities are beyond the scope of this manual.

### ***Special considerations***

- ◆ Practitioners should maintain an awareness of the possibility of tertiary syphilis.
- ◆ Tertiary manifestations of syphilis may be “benign”, with development of gummata in almost any organ, or more serious, with cardiovascular or central nervous system involvement. Benign gummatous disease is rare. Cardiovascular disease and neurosyphilis occasionally occur from five to 35 years after exposure.

### **Exclude other STIs**

**Investigate all patients presenting with possible syphilis for other STIs, including chlamydia, gonorrhoea, HIV, HBV, hepatitis A (HAV) (if symptomatic or if there is any history of male-to-male and/or oral-anal sex and vaccination is contemplated), and HCV (if there is a history of injecting drug use), as coinfection is likely.**

**In patients with primary syphilis and at risk for HIV, retesting for HIV should occur after three months.**

**The presence of herpes, donovanosis and genital warts may be detected during clinical examination.**

### **INVESTIGATIONS**

**All practitioners should be familiar with the types of syphilis serology tests and their interpretation.**

**Diseases caused by other treponemal organisms, including yaws, will cause the same serological reactions as syphilis. In a patient seen for the first time with a clinical presentation that suggests primary syphilis do a NAT (PCR) swab of the ulcer. In addition, syphilis serology should be requested.**

**Patients being treated for primary and secondary syphilis should have a rapid plasma reagin test (RPR)**



repeated on the day treatment is commenced to provide an accurate baseline for monitoring treatment.

In a patient seen for the first time without any signs or symptoms of syphilis, request syphilis serology.

### Choice of tests

Two types of tests are used for syphilis serology: non-treponemal tests and treponemal tests.

#### ***Non-treponemal tests***

- ◆ RPR (monitors disease activity)
- ◆ The Venereal Diseases Research Laboratory test (VDRL).

These tests do not measure antibodies to *T. pallidum* (the organism that causes syphilis). Instead, they measure antibodies to another protein called cardiolipin which is part of the cell wall of *T. pallidum*. These non-treponemal tests are more likely to give false positive results than the treponemal tests.

- ◆ Both tests are quantified (they indicate how much antibody is present), so they can be used to monitor progress of infection or treatment. However, titres on the RPR and VDRL may be different, and cannot be directly compared.
- ◆ VDRL is the only test fully validated for screening cerebrospinal fluid (CSF), although NAT may be useful in the future.

#### ***Treponemal tests***

- ◆ EIA
- ◆ *Treponema pallidum* haemagglutination test (TPHA)/  
*Treponema pallidum* particle agglutination test (TPPA)
- ◆ fluorescent treponemal antibody absorption test (FTA-Abs).



## Syphilis

These tests detect specific treponemal antibodies (commonly immunoglobulin G [IgG]) and, once positive, remain so whether the patient has been treated or not. Hence treponemal tests are not an indication of successful treatment.

### Interpreting tests for syphilis

Proper interpretation of tests for syphilis usually requires a detailed history of the patient's illness, when they may have been infected, their treatment, and their previous test results. The history may come from the patient or from previous treating practitioners.

The first test performed by the laboratory will be a TPHA or TPPA or EIA:

- ◆ **If the result is negative**, it is extremely unlikely that the patient has syphilis. However, in the first two weeks after infection, all tests may be negative, so:
  - repeat syphilis serology in two to four weeks where primary syphilis or re-infection is possible, as other tests may become positive or the antibody titres may rise.
- ◆ **If the result is positive**, and the patient is not known to have been infected previously with syphilis, an RPR and a FTA-Abs IgG will be carried out. If the patient is known to have been infected previously, it is unnecessary to perform a FTA-Abs IgG.

If none of these follow-up tests is positive, the patient may have:

- ◆ a false positive TPHA, TPPA or EIA
- ◆ very early primary syphilis
- ◆ distant past syphilis that may have been treated or untreated.

If any of these follow-up tests is positive, this confirms the presence of genuine syphilis antibodies (meaning that



the patient is infected or has been infected in the past). A positive RPR may be found in syphilis at any stage, whether or not the patient has been adequately treated.

- ◆ **The most common situation** is that the clinical situation and serology are consistent with latent or tertiary syphilis, whether treated or untreated.

If it is not certain that the patient has been adequately treated in the past, a full course of treatment is indicated.

### ***Special considerations***

- ◆ Clinical and CSF examination will determine the need for treatment of neurosyphilis.
- ◆ CSF for cell count, protein estimation and serology should be collected by lumbar puncture from seropositive patients:
  - with neurological signs
  - with treatment failures
  - who are HIV-infected
  - who are unable to be treated with any form of penicillin
  - with suspected congenital syphilis.
- ◆ Interpretation of CSF serology and cell counts should be discussed with a specialist.

### **Causes of false positive results in non-treponemal tests**

- ◆ **An acute false positive reaction** occurs during or after various acute febrile illnesses (e.g. hepatitis, infectious mononucleosis, measles, malaria), pregnancy, immunisation and in one per cent of clinically normal individuals. The reaction disappears within six months. It is usually low titre.



## Syphilis

- ◆ **A chronic false positive reaction** persists for more than six months. Such a reaction occurs in injecting drug users, autoimmune disease (e.g. systemic lupus erythematosus, immunoglobulin disorders), chronic infections (e.g. leprosy), and malignancy.

### Causes of false positive results in treponemal tests

- ◆ **FTA-Abs IgG:** Pregnancy, old age, some viral infections (e.g. infectious mononucleosis), autoimmune diseases, cancer, injecting drug use, and alcoholic cirrhosis of the liver. False positives are also found in two per cent of the healthy population.
- ◆ **TPHA/TPPA:** Pregnancy, some viral infections (e.g. infectious mononucleosis), autoimmune diseases, cancer, injecting drug use and skin diseases.
- ◆ **EIA:** Causes are less clear, but probably the same as for FTA-Abs IgG.

### Causes of false negative syphilis serology

- ◆ Antibody is not present. This is most likely in recently acquired infections, in which case the test should be repeated at least one month later. Recent antibiotic therapy may also delay the appearance of antibody.
- ◆ The patient is immunosuppressed.
- ◆ A negative RPR occurs in 25 per cent of patients with late syphilis. Therefore, TPHA, TPPA or EIA are the preferred screening tests.
- ◆ If tests are negative in a patient suspected to have syphilis on clinical grounds, a specialist with appropriate experience should be consulted (see list of contacts on page viii).

2.5



## TREATMENT

**Penicillin remains the drug of choice in treating syphilis.**

**If there is any doubt about the clinical stage of the patient's infection, treat as for late latent syphilis.**

**Rationale:** The effectiveness of penicillin for treating syphilis has been well established and treponemes have not developed penicillin-resistance. There is little evidence showing the effectiveness of non-penicillin regimens, and they must be regarded as inferior to penicillin.

### Treatment regimens

***Primary, secondary and early latent syphilis (up to 12 months)***

- ◆ Benzathine penicillin 1.8 g intramuscularly, as a single dose  
OR
- ◆ procaine penicillin 1 g for patients less than 60 kg bodyweight and 1.5 g for patients over 60 kg bodyweight, intramuscularly, daily for 10 consecutive days.

*If allergic to penicillin*

- ◆ doxycycline 100 mg orally, 12-hourly for 14 days.

***Late latent syphilis (more than 12 months)***

- ◆ Benzathine penicillin 1.8 g intramuscularly, once weekly for three doses. If treatment is missed for more than two weeks, must restart  
OR
- ◆ procaine penicillin 1 g for patients less than 60 kg bodyweight and 1.5 g for patients over 60 kg bodyweight, intramuscularly, daily for 15 days.

*If allergic to penicillin*

- ◆ Doxycycline 100 mg orally, 12-hourly for 28 days.



### ***Tertiary syphilis***

Tertiary syphilis includes cardiovascular syphilis and neurosyphilis. Specialist advice should be sought (see list of contacts on page viii).

Give steroid therapy 48 hours pre-treatment.

- ◆ Benzyl penicillin 1.8 g (3 million units) intravenously, four-hourly for 10 days  
OR
- ◆ if outpatient treatment is unavoidable, procaine penicillin 1.5 g intramuscularly, daily for 20 consecutive days  
PLUS
- ◆ probenecid 0.5 g orally, six-hourly for 20 days.

### ***Special considerations***

- ◆ Doxycycline should not be used in women who are pregnant or possibly pregnant, or breastfeeding, or in children under nine years of age.
- ◆ An appropriately experienced specialist should be consulted for patients allergic to penicillin (some of whom are also allergic to ceftriaxone).
- ◆ Neither benzathine penicillin nor aqueous procaine penicillin, at the doses recommended, achieve treponemicidal levels in CSF, and should not be used in treating neurosyphilis.
- ◆ **Jarisch-Herxheimer reaction** is a common reaction to treatment in patients with primary and secondary syphilis. It occurs six to 12 hours after commencing treatment, and is an unpleasant reaction of varying severity with fever, headache, malaise, rigors and joint pains, and lasts for several hours. Symptoms are controlled with analgesics and rest. Patients should be alerted to the possibility of this reaction and reassured accordingly.



- ◆ **Procaine reaction** is a rare reaction to procaine penicillin. It is characterised by a sensation of impending doom with hallucinations. The reaction is self-limiting and lasts about 30 minutes. The patient needs to be reassured and given general supportive measures.
- ◆ Patients being treated for primary and secondary syphilis should have RPR repeated on the day treatment is commenced to provide an accurate baseline for monitoring treatment.

## EDUCATION, COUNSELLING AND PREVENTION

Counselling is important in managing STIs/HIV and should be considered at every contact with the patient.

As a minimum, consider counselling at the first presentation and subsequently during treatment and follow-up.

- ◆ Counselling is an opportunity to educate and support the patient in prevention strategies. This should be done in a confidential setting.
- ◆ The key points are:
  - communicating the confidentiality of the diagnosis
  - communicating the reasons for testing and contact tracing
  - formulating expectations from treatment
  - promoting awareness of risk behaviours.
- ◆ Counselling should also include discussion of the implications of STI testing (i.e. that testing does not prevent transmission). Emotional reactions can accompany a positive STI/HIV diagnosis with delayed reactions sometimes occurring several days after the consultation.

*See also General considerations in STI/HIV COUNSELLING, page 16.*

### MANAGEMENT OF PARTNERS

**It is the responsibility of all health care providers, including doctors, to begin tracing sex partners so that they can be assessed and treated.**

**This involves counselling to ensure that the patient understands the implications of infection transmission.**

**Managing sex partners may require referral to another practitioner.**

**Sex partners of the index case with primary syphilis in the preceding three months should be assessed and treated for syphilis. For patients with secondary and early latent syphilis, sex partners from the preceding two years should be assessed and treated.**

#### ***Special considerations***

- ◆ Period to trace will depend on the sexual history and clinical stage of the infection. No longer than three months is necessary for primary syphilis.
- ◆ The duration of potential infectivity is up to two years. It is important to stress that people with tertiary or late latent syphilis are NOT infectious except rarely vertically in the case of females. Important sequelae include neurosyphilis and cardiovascular disease. In the case of congenital syphilis, the duration of infectivity is up to eight years.
- ◆ Syphilis can be transmitted by oral sex.
- ◆ Persons who were sexually exposed to a patient with primary, secondary, or early latent syphilis should be treated presumptively if serological test results are not available immediately and the opportunity for follow-up is uncertain.

*For more information about contact tracing, see section 1.6, page 57.*



## FOLLOW-UP

**Review all patients initially three months after completing treatment, then at six months and (if necessary) at 12 months.**

**The review should consist of:**

- ◆ clinical assessment
- ◆ repeat serology.

## Tests for follow-up and management of syphilis

For the primary health care provider, diagnosis and clinical management of syphilis depends largely on the interpretation of the RPR test in comparison with previous RPR results, together with the clinical findings.

Assessing the patient's response to treatment also depends on tracking the RPR results, which are expressed as "titres". Successful treatment is where the titres fall four-fold.

Therefore, it is essential that RPR is checked at the commencement of treatment in order that changes in titre can be accurately assessed.

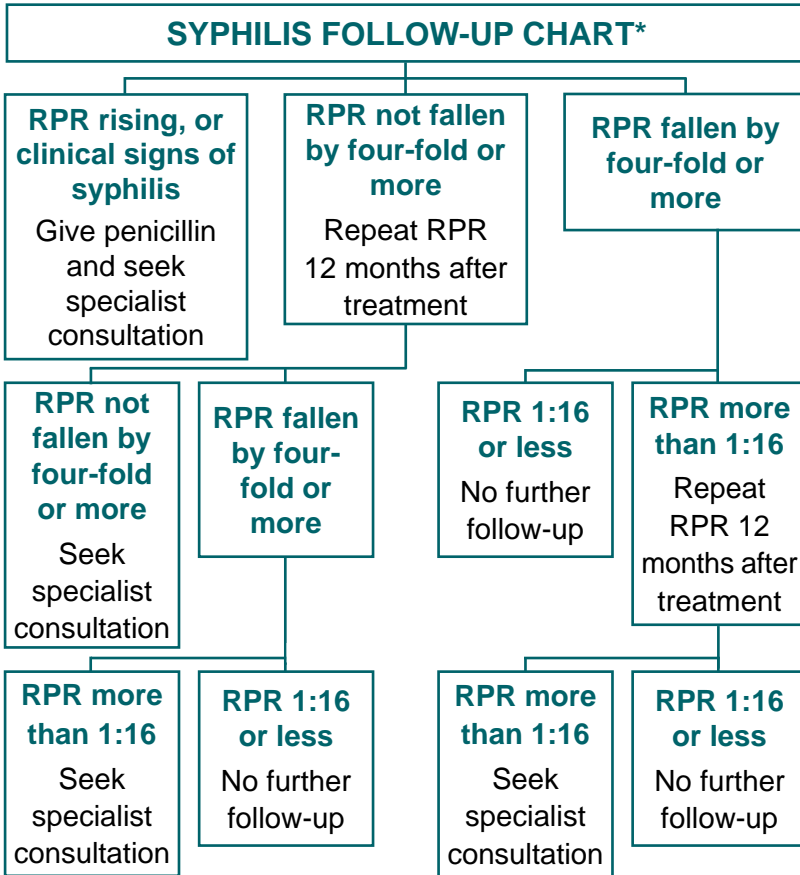
The diagnosis of re-infection is based on seroconversion from non-reactive to reactive RPR serology, or on the basis of at least a four-fold (e.g. four to 16) titre rise in RPR.

Re-treatment and lumbar puncture are indicated if:

- ◆ clinical signs persist or reappear after treatment
- ◆ the RPR titre rises at least four-fold after it has fallen
- ◆ (in early syphilis) the RPR titre does not fall at least four-fold within 12 months.



# Syphilis



After re-treatment, follow-up again at six and 12 months.

## **Special consideration**

- ◆ If possible, review all patients who present for STI testing three months later, as this provides an opportunity to repeat blood tests for syphilis, HIV and HBV.

\* Adapted from the Central Australian Rural Practitioners Association 2003, *Standard Treatment Manual*, 4th edn, CARPA, Alice Springs.



## SYPHILIS IN HIV INFECTION

**Diagnosis and investigation of patients who are immunosuppressed should be discussed with a specialist with appropriate experience (see list of contacts on page viii).**

- ◆ HIV-positive patients who are immunosuppressed may not form antibodies, so serological tests for disease may give false negative results. Their management, including the best form of investigation, requires specialist expertise.
- ◆ Published case reports and expert opinion suggest that HIV-infected patients with early syphilis are at increased risk of neurological complications, and have higher rates of treatment failure with currently recommended regimens. These risks are probably small but should be considered.
- ◆ Unusual serological responses have been observed among HIV-infected persons who also have syphilis. Nevertheless, both treponemal and non-treponemal serological tests for syphilis are accurate for most patients with syphilis and HIV co-infection.
- ◆ No treatment regimens have been demonstrated to be more effective in preventing development of neurosyphilis in patients with HIV infection than those recommended for patients without HIV infection.
- ◆ Careful follow-up after therapy is essential.

### **SYPHILIS DURING PREGNANCY**

**All women should have syphilis serology carried out in the first trimester of pregnancy or at the first antenatal visit.**

**Women at risk of acquiring syphilis should have a further test in the third trimester (preferably at 34 to 36 weeks). If this is not done, they should be tested at delivery.**

**The serological status of mothers should be documented at least once during confinement.**

**Cord blood testing offers no advantage over the testing of maternal blood in determining syphilis infection.**

- ◆ Screening and treatment of all pregnant women prevents the following complications of syphilis:
  - miscarriage, stillbirth
  - premature labour
  - congenital syphilis in the infant.
- ◆ Seropositive pregnant women should be considered infected unless treatment history is clearly documented in a medical record.
- ◆ Women who are treated for syphilis during the second half of pregnancy are at risk of premature labour and/or fetal distress if their treatment precipitates the Jarisch-Herxheimer reaction (see page 122). Advise these women to seek medical attention after treatment if they notice any change in fetal movements or if they have contractions.

2.5



## Treating syphilis during pregnancy

**Pregnant women with syphilis should be rapidly assessed and treated with penicillin (category A) according to the diagnosed stage of syphilis (see page 121).**

- ◆ If the mother and sexual partner(s) are treated adequately with penicillin during pregnancy, the risk of the infant acquiring congenital syphilis is low.
- ◆ Women who are allergic to penicillin should be managed in consultation with a specialist with appropriate experience.
- ◆ Treatment of syphilis in pregnancy can be considered adequate if:
  - it is completed by at least 30 days before delivery; and
  - there is a documented four-fold drop in RPR titre.
- ◆ If adequate treatment has not been documented, the patient should be treated for late latent syphilis.

## Follow-up after syphilis in pregnancy

**Mothers who have been treated for syphilis during pregnancy should be followed up as described on page 125.**

- ◆ In subsequent pregnancies, unless there is indication of reinfection and provided the patient has remained HIV negative, no further treatment is indicated.
- ◆ RPR titre should be monitored at 16, 24, 30 and 36 weeks and at confinement in subsequent pregnancies.
- ◆ Re-treatment is indicated if:
  - clinical signs persist or reappear after treatment
  - the RPR titre rises by at least four-fold after it has fallen
  - (in early syphilis) the RPR titre does not fall at least four-fold within six months.



### CONGENITAL SYPHILIS

**Congenital syphilis is syphilis acquired by an infant from the mother during pregnancy. It is diagnosed by demonstrating *T. pallidum* in clinical specimens of material taken from nasal discharges, skin lesions, or in placental, umbilical cord or autopsy material of a neonate.**

**Concurrent HIV infection should be excluded.**

Usually, clinical manifestations of congenital syphilis are not present at birth. In most cases, they appear within three months.

**Early congenital syphilis:** A child under two years of age who was infected *in utero*. Clinical signs are similar to secondary syphilis and may include:

- ◆ hepatosplenomegaly
- ◆ skin rash
- ◆ condylomata lata
- ◆ rhinitis (snuffly babies)
- ◆ bone involvement (osteochondritis)
- ◆ pseudoparalysis (due to epiphysitis)
- ◆ meningitis
- ◆ anaemia
- ◆ failure to thrive.

**Late congenital syphilis:** A child over two years of age who was infected *in utero*. The child presents with signs such as:

- ◆ one or more of Hutchinson's triad (interstitial keratitis, defective incisors and nerve deafness)
- ◆ gummata
- ◆ neurosyphilis
- ◆ frontal bossing and anterior bowing of the shins.

Cardiovascular lesions do not occur in congenital syphilis.



## Treating congenital syphilis

### **Abnormal CSF**

- ◆ Benzyl penicillin 50 mg/kg intramuscularly, 12-hourly for 10 days.

### **Normal CSF**

- ◆ Benzathine penicillin 50 mg/kg intramuscularly, as a single dose.

### **Special conditions**

- ◆ The infant should be treated if test results cannot exclude infection.
- ◆ Infants delivered to mothers with syphilis treated within 30 days of delivery should also receive treatment.
- ◆ Babies should be considered at risk if:
  - treatment of the mother during pregnancy was not adequate (i.e. the mother's RPR titre fails to fall four-fold after appropriate treatment for early syphilis in pregnancy)
  - maternal treatment was unknown
  - maternal treatment was with a drug other than penicillin
  - the mother's serology at delivery shows previously undiagnosed syphilis
  - examining the baby reveals signs of congenital syphilis
  - the mother has not had all the recommended antenatal and delivery blood tests.
- ◆ In some cases, infants who appear normal after complete assessment, and for whom follow-up can be assured, can be followed closely without treatment. The baby requires no investigation or treatment if:
  - all maternal syphilis tests (RPR, TPHA, TPPA, FTA-Abs, IgM) are negative
  - the RPR tests conducted during pregnancy and the last one before pregnancy are all at a titre of 1:4 or less, and all within one titre of each other



## Syphilis

- the mother has documented adequate treatment in the past and there is no evidence of new infection.
- ◆ If no antenatal syphilis serology was performed, and the mother is from a region with a high prevalence of syphilis, the baby should be considered for investigation and treatment while awaiting syphilis serology results.
- ◆ Infants with clinically evident congenital syphilis should have an ophthalmological examination.
- ◆ Passively transferred treponemal antibodies may be present for as long as one year. If they are present for more than a year, the infant should be re-evaluated and treated for congenital syphilis.

### Follow-up of congenital syphilis

**All neonates who have or are suspected of having congenital syphilis should be followed-up.**

- ◆ *If the child has abnormal CSF and confirmed congenital syphilis:* syphilis serology at three, six, 12 and 24 months and lumbar puncture every six months until normal.
- ◆ *If the child has normal CSF and confirmed congenital syphilis:* syphilis serology at three, six, 12 and 24 months.
- ◆ *If the child has normal CSF and no clinical signs or serological evidence of congenital syphilis:* follow-up mother only.

### PUBLIC HEALTH ISSUES

Contact tracing is important to prevent further transmission or reinfection. Always test for other STIs.

If a child is diagnosed with acquired syphilis, issues of sexual abuse and/or sexual assault should be considered. For further information, see page 10.



## 2.6 CHANCROID

### ORGANISM

*Haemophilus ducreyi* is the organism responsible for chancroid. It is an imported infection and is not endemic in Australia.

### CLINICAL PRESENTATION

Chancroid ulcers are usually tender and multiple, and may be associated with fluctuant inguinal lymphadenitis.

Unusual or large ulcers should be discussed urgently with a specialist because, occasionally, very rapid, extensive and destructive ulceration may occur.

### INVESTIGATIONS

- ◆ Ask the patient about overseas sexual exposure.
- ◆ Diagnosis is by culture of *H. ducreyi* on specialised media. It is important to ring the laboratory to discuss specimen collection before taking the specimen.
- ◆ In some cases, a Gram-stained smear may show typical organisms, but this test has low sensitivity compared to culture.
- ◆ Serological tests are not routinely available.
- ◆ NAT if available.



## Chancroid

### TREATMENT

Directly observed single dose therapy is preferred.

- ◆ Azithromycin 1 g orally, as a single dose  
OR
- ◆ ciprofloxacin 500 mg orally, 12-hourly for three days  
OR
- ◆ ceftriaxone 250 mg intramuscularly, as a single dose.

### MANAGEMENT OF PARTNERS

Partners need to be investigated and treated.

### FOLLOW-UP

Review the patient until the ulcers have healed.

### PUBLIC HEALTH ISSUES

Check for other STIs, and perform contact tracing to prevent further transmission and reinfection.



## 2.7 VIRAL HEPATITIS

Sexual transmission occurs with hepatitis A (HAV), hepatitis B (HBV) and rarely hepatitis C (HCV). Hepatitis D (delta hepatitis) only occurs in those who are carriers for HBV. Infection will often be asymptomatic, but all types of viral hepatitis have similar symptoms when they occur (fever, headache, malaise, nausea, anorexia, jaundice with dark urine and pale stools).

It is not possible to distinguish the type of hepatitis on the basis of clinical symptoms. The management of these infections is beyond the scope of this manual, however, there are certain public health considerations that impact on STI management.

### HEPATITIS A

There is no chronic carrier status associated with HAV. Sexual transmission is linked to oral-anal contact, and is seen most often in men who have sex with men. The use of dental dams will help prevent transmission. HAV is also associated with injecting drug use. A vaccine is available to prevent transmission. The current recommendation is for a single dose of 1440 units (IU) intramuscularly in the deltoid muscle, with a booster six to 12 months later. Given the cost of hepatitis A vaccine, it is worth establishing that a person is non-immune prior to vaccinating.

The NHMRC's Immunisation Handbook\* recommends that the following groups are among those who should receive hepatitis A vaccine:

- ◆ men who have sex with men
- ◆ people who inject drugs
- ◆ patients with chronic liver disease.

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\* National Health and Medical Research Council 2003, *The Australian Immunisation Handbook*, 8th edn, AGPS, Canberra, available at <[www.immunise.health.gov.au/handbook.htm](http://www.immunise.health.gov.au/handbook.htm)> [accessed 09.06.06].



### Post-exposure prophylaxis

Within two weeks of sexual exposure, use normal human immunoglobulin 2 mls (children – 0.06 ml/kg) intramuscularly, as a single dose, for adults and consider vaccination. If vaccination is to be given, it can be given at the same time but at a different injection site.

### Public health issues

- ◆ Notify the DoH of any cases of HAV.
- ◆ All household and sexual contacts should be given gamma globulin prophylaxis.
- ◆ Contact tracing is important to prevent further transmission of HAV.
- ◆ Offer vaccination for longer-term protection of at risk contacts.

## HEPATITIS B

In some cases of HBV infection, the virus will not be eliminated and the person will become a chronic carrier.

Carriers may transmit infection vertically (from carrier mother to baby), or through sexual or percutaneous exposure.

Treatment of chronic hepatitis B significantly reduces progressive liver damage and loss of liver function.

Heterosexual transmission is now a common route of transmission. Those at high-risk include:

- ◆ people who inject drugs
- ◆ men who have sex with men
- ◆ heterosexuals with multiple partners, including sex workers
- ◆ partners and household contacts of hepatitis B carriers.

The NHMRC's Immunisation Handbook recommends that the following groups are among those who should receive hepatitis B vaccine:



- ◆ partners and household contacts of hepatitis B carriers.
- ◆ men who have sex with men
- ◆ people who inject drugs
- ◆ individuals with chronic liver disease and/or hepatitis C
- ◆ inmates and staff of long-term correctional facilities.

Standard regimes for vaccination include:

- ◆ 0, 1 and 6 months
- ◆ 0, 1, 2 and 12 months.
- ◆ 0, 7, 21 days and 12 months for rapid vaccination of those at highest risk.

Vaccination should be administered into the deltoid muscle.

If doses are missed the course does not need to be restarted, but all doses should be completed.

Seroconversion should be documented in these high-risk groups to ensure immunity. If seroconversion does not occur, further doses of vaccine can be given at two-month intervals, up to a maximum of three more. Carrier status should be excluded in those who do not seroconvert.

### Post-exposure prophylaxis

Percutaneous contacts should be given hepatitis B immunoglobulin (HBIG) 400 IU intramuscularly, as a single dose within 72 hours of exposure.

Individuals sexually exposed should be given HBIG within two weeks of sexual contact. Adults should be given HBIG 400 IU intramuscularly, as a single dose, and vaccination commenced. Hepatitis B vaccination and immunoglobulin can be given at the same time, but at different sites.

### Public health issues

- ◆ Notify the DoH of any cases of HBV.
- ◆ Sexual, injecting drug use and household contacts should be given specific HBIG prophylaxis followed by vaccination.
- ◆ Percutaneous contacts should have HBIG within 72 hours.



## Viral Hepatitis

- ◆ Other contacts should receive HBIG within two weeks.
- ◆ Contact tracing is important to prevent further transmission of HBV.
- ◆ Vaccinate for hepatitis A if chronic carrier.

### HEPATITIS C

HCV is not often sexually transmitted, but patients should be advised about the potential risk. Transmission is more likely to occur at the time of menstruation or where trauma has occurred during sex.

Essentially, HCV is a blood-borne virus, and the risk for blood-to-blood transmission should always be sought during a sexual health interview so that appropriate protective behaviours can be discussed.

HCV is now treatable using pegylated interferon and ribavirin. Treatment is effective in achieving sustained viral response (i.e. absence of HCV ribonucleic acid [RNA] in the serum for six months after cessation of treatment) rates of up to 85 per cent of patients, depending on the HCV genotype.

Hepatitis A and hepatitis B vaccination is recommended if the patient is not immune, to avoid exacerbation of hepatitis and progression of underlying liver disease.

### Public health issues

- ◆ No specific prophylaxis or vaccine is available for HCV.
- ◆ Notify the DoH of any cases.
- ◆ Contact tracing is not carried out for all HCV cases. However, it should be done for recent percutaneous or sexual exposure.
- ◆ Consider testing for other STIs and blood-borne viruses (HAV and HBV).
- ◆ Provide information about other sources of information and support, such as the Hepatitis Council of WA (see page viii for contact details).

