

Gonorrhoea



Communicable Disease Control Branch

Etiology

Gonorrhoea is caused by *Neisseria gonorrhoeae* (*N. gonorrhoeae*), a gram-negative diplococcal bacterium.

Case Definition

Confirmed Case: Isolation of *N. gonorrhoeae* from any site by culture OR detection of *N. gonorrhoeae* by nucleic acid amplification test (NAAT). Males having intracellular diplococci present on stain of urethral exudates are also considered laboratory-confirmed cases.

Clinical Case: Urethral or cervical/vaginal discharge without laboratory confirmation, in a person with a history of sexual contact with a laboratory-confirmed case in the preceding six to eight weeks.

Cases include both genital and extra-genital infections. Perinatally-acquired cases are cases occurring in neonates (up to four weeks of age), leading to the diagnosis of gonococcal conjunctivitis, scalp abscess, vaginitis, bacteremia, arthritis, meningitis or endocarditis.

Note: Surveillance reports include only laboratory confirmed cases.

Reporting Requirements¹

- All positive laboratory tests are reportable by laboratory to the Communicable Disease Control Branch, Manitoba Health and Healthy Living for surveillance and Public Health follow-up.
- All clinical and laboratory-confirmed cases are reportable by the attending health care professional to the Communicable Disease Control Branch, Manitoba Health and Healthy Living (1-3) for surveillance and Public Health follow-up.
- Operators of Manitoba clinical laboratories are required to submit clinical isolate sub-cultures of

N. gonorrhoeae to Cadham Provincial Laboratory (CPL) within seven days of report for surveillance purposes.

Epidemiology

Reservoir: The source of the organism is exudate and secretions from infected mucosal surfaces in humans (4). As the majority of infected females and some infected males do not show any symptoms, they act as a “silent” reservoir for the spread of this infection (5).

Incubation Period: Usually two to seven days (4, 6).

Transmission: Transmission occurs through direct sexual contact with exudates from mucous membranes of infected people via oral, genital or rectal routes. Perinatal transmission may also occur (4, 7). Gonococcal infection in prepubertal children beyond the newborn period and in nonsexually active adolescents is considered an indicator of sexual abuse (4, 8). Transmission occurs rarely through household exposure in prepubertal children (4). HIV transmission is enhanced in individuals with concomitant gonococcal infections (6).

Period of Communicability: Communicability may extend for months if untreated, especially in asymptomatic persons. Effective treatment ends communicability within hours (8).

Host Susceptibility and Resistance: Humans are considered universally susceptible. Gonococcal strains are antigenically heterogeneous and re-infection is common. Women using intrauterine devices (IUDs) have higher risk of gonococcal salpingitis during the first three months after

¹ Please see the Manitoba Health and Healthy Living document “*The Public Health Act – Reporting Requirements and Powers*” for information on reporting requirements when a patient refuses treatment for a reportable communicable disease or fails to comply with an order from the Medical Officer of Health.

insertion (8). Young sexually active females are at higher risk for gonococcal pelvic inflammatory disease owing to biological factors (cervical ectopy) that may facilitate ascending infection, as well as behavioural factors (7).

Occurrence:

General: The disease affects both men and women, especially sexually active adolescents and young adults. Prevalence is highest in communities of lower socioeconomic status (8). The highest incidence of gonorrhoea and its complications occurs in developing countries (7).

Canada: After more than two decades of declining rates, the rate of gonorrhoea in Canada began to rise in the late 1990s. In 2004, there were 29 per 100,000 population reported infections (9). Regional outbreaks are in part driving the national increase. Rates of gonorrhoea are highest in the north followed by Manitoba and Saskatchewan. While the rise from 1997 to 2004 has been evident in both sexes, it has been greater among males (106%) than females (76%) (9). Gonorrhoea infection is concentrated in males aged 20 to 29 years (9). Preliminary data for 2006 indicates that the rate of gonorrhoea is 33 per 100,000 population (6).

Manitoba: In 2004, the rate of reported gonorrhoea cases in Manitoba was over three times the national average (9, 10). In 2006, 1,578 cases (134 per 100,000) were reported to Manitoba Health and Healthy Living, up from 1,168 (100 per 100,000) in 2005 and 1,091 (93 per 100,000) in 2004 (10). Regional rates vary significantly in Manitoba with the Burntwood Regional Health Authority having the highest rate of gonorrhoea infection; however, 55 to 57 per cent of cases occurred in Winnipeg, for the years 2003 to 2006 inclusive (10). The 15 to 24-year-old age group has the highest rate of infection (54 per cent of reported cases) in the province (10).

Antibiotic Resistance: Gonococcal resistance to common antimicrobials may be plasmid or chromosomally mediated. Gonococcal resistance to

penicillin, erythromycin, tetracycline and sulfonamides (11) has long been established and none of these antibiotics are recommended treatments (9). *Neisseria gonorrhoeae* strains may exhibit multiple drug resistance (12).

In Canada, *N. gonorrhoeae* resistance to ciprofloxacin has been increasing (5). Regional variation in ciprofloxacin resistance ranges from zero to approximately 60 per cent, with Quebec, Ontario, Alberta and British Columbia falling above the three per cent threshold for fluoroquinolone resistance in 2005 (5). Once regional resistance to an antibiotic reaches three to five per cent, empiric therapy using that antimicrobial regimen is no longer recommended. Gonococcal infections caused by resistant strains can only be confirmed through laboratory testing using culture and antimicrobial susceptibility testing of the organism.

In Manitoba, 200 of the gonococcal isolates submitted to CPL in 2006 underwent antimicrobial susceptibility testing. Over 90 per cent of isolates tested demonstrated some degree of resistance to penicillin. All 200 isolates were susceptible to azithromycin, cefixime and ceftriaxone; however, two per cent of isolates demonstrated ciprofloxacin resistance (13). This data should be interpreted cautiously due to the relatively small number of isolates tested.

Clinical Presentation/Natural History

N. gonorrhoeae infects mucosal surfaces and causes urethritis in men and endocervicitis in women, pharyngeal and rectal gonorrhoea in both men and women and ophthalmic infections in neonates, children and adults. Premenstrual girls may present with vaginal infection. Clinical presentations and symptoms overlap with other sexually transmitted infections (STIs), such as *Chlamydia*. It is difficult to diagnose gonorrhoea on clinical grounds alone. Co-infection with *Chlamydia trachomatis* is reported in 20 to 40 per cent of men and women with gonorrhoea.

Uncomplicated Infection in Adults: Urethral discharge and dysuria (usually without urinary

frequency) are the major symptoms of genital infection in men (7). Urethral itch may also occur (6). A small percentage of gonococcal infections in males are asymptomatic (8). Infection in women is often asymptomatic but symptoms may include lower abdominal pain, abnormal vaginal discharge, deep dyspareunia, vaginal bleeding after intercourse (8) and dysuria (often without urgency or frequency) (7). Pharyngeal and anorectal infections are common in females and men who have sex with men (MSM) and are usually asymptomatic. Anorectal infections may cause pruritis, tenesmus and discharge (8). More than half of gonorrhea infections in MSM may be at nonurethral sites. These infections are not identified if only urethral screening is performed. In addition, co-infection with *Chlamydia trachomatis* (CT) is common and more than 70 per cent of Chlamydial infections would be missed and not treated if MSM were tested only for gonorrhea (14-17). Gonococcal conjunctivitis in adults is usually seen in persons with genital gonorrhea and most cases likely result from autoinoculation (7).

Complications: Local extension from the genital tract can result in epididymitis and chronic prostatitis in men and Bartholinitis, perihepatitis, pelvic inflammatory disease (PID), ectopic pregnancy and infertility in women (4, 6). Even asymptomatic infection in females can progress to PID (4). Eye infections in adults may progress to corneal involvement, perforation and blindness if not treated promptly.

Disseminated Gonococcal Infections (DGI): Hematogenous spread can involve skin and joints (arthritis-dermatitis syndrome) and occurs in up to three per cent of untreated individuals with gonorrhea (4). DGI is more common in women than men. It is believed that asymptomatic mucosal infection is a predisposing factor to DGI and women more commonly have asymptomatic infection than men. Other risk factors for DGI include recent menstruation, pregnancy or immediate postpartum, complement deficiency and systemic lupus erythematosus. The classic presentation of DGI includes the triad of tenosynovitis, dermatitis, and polyarthralgias. The

other clinical form that may be seen is purulent arthritis with skin lesions that are typically pustular or vesicular. However, the separation between these two forms does not always exist. Endocarditis, osteomyelitis or meningitis may also rarely occur. Arthritis is the most common manifestation of DGI especially in young sexually active adults (18).

Pregnancy: Gonorrhea in pregnancy is associated with premature rupture of membranes, pre-term delivery and postpartum endometritis. Gonorrhea can be transmitted from the mother's genital tract to the neonate at delivery and occasionally during prolonged rupture of membranes before birth.

Neonatal Infection: The usual manifestation of neonatal infection is gonococcal ophthalmia neonatorum (neonatal conjunctivitis). Conjunctivitis typically begins in the first three to five days of life and presents with abrupt onset of profuse purulent conjunctival discharge, either uni- or bilateral. Rapid progression within 24 hours leading to corneal ulceration, perforation and blindness may occur if not diagnosed and treated promptly. Other gonococcal infections in neonates include vaginitis, scalp abscesses (if scalp electrodes were used for fetal monitoring), disseminated disease with bacteremia, arthritis and meningitis. The mucous membranes of the vagina, urethra, pharynx and rectum may also be colonized and therefore all sites should be screened in neonates.

Interrelationship between Gonorrhea and HIV: Non-ulcerative sexually transmitted infections (STIs) such as gonorrhea and *Chlamydia* increase the likelihood of HIV transmission up to five times. This may occur because other STIs facilitate HIV shedding in the genital tract and may also recruit HIV susceptible inflammatory cells to the site. These events may disrupt normal mucosal barriers (19, 20).

Diagnosis (21, 22, 23)

Diagnosis is based on a combination of history, physical examination and laboratory investigation. Laboratory confirmation should be sought when there is urethral discharge in a male with a history of sexual contact with an at-risk contact or when

there is vaginal discharge in a female with a history of sexual contact with an at-risk contact. Cadham Provincial Laboratory (CPL) will assay for both gonorrhea and *Chlamydia* on all urine and swab specimens submitted for nucleic acid amplification testing (NAAT). (Note: At CPL, the term RNA-DNA amplification has also been used to indicate NAAT testing).

A smear may be submitted for staining. In males, intracellular gram-negative diplococci present on a smear of urethral exudate is considered to be a positive test for gonorrhea. Staining is unreliable in females due to the presence of other microbial species that may mimic *Neisseria*.

At the time of publication of this document, CPL is the sole laboratory provider of NAAT diagnostic and screening services in Manitoba for gonorrhea and *Chlamydia*, using Gen-Probe Aptima technology. Specimens collected for use on this system require the Gen-Probe Aptima specimen collection kits provided by CPL. CPL specimen collection requirements may change; these changes will be reflected in the online CPL *Guide to Services* and will also be communicated to practitioners by letter from CPL. Check with your local laboratory service provider for the diagnostic and screening methods available to you.

Adult Male/Female Urine: Urine is the preferred specimen for males and it is the only recommended specimen for females without a cervix (e.g., due to hysterectomy) or those refusing a complete genital examination. The patient should not have voided for at least one hour prior to specimen collection. The first 20 to 30 mL (not midstream) of urine should be collected in a sterile collection container. Transfer the urine (within 24 hours of collection) to the transport tube provided in the urine specimen collection kit.

Male Urethral and Female Endocervical Swab Specimens: The endocervical swab specimen is preferred for women as it is more sensitive than urine. The swab specimen collection kit is used for female endocervical and male urethral swab specimens. Males should **NOT** have urinated one hour prior to specimen collection. After collection

of the endocervical/urethral specimen, place the collection swab into the swab specimen transport tube.

NOTE 1: Culture of specimens obtained from adult genital sites is **recommended** in cases of mucopurulent cervicitis or urethritis, high-risk contacts, travelers, residents from areas of high fluoroquinolone resistance, cases of sexual abuse/assault and in cases where treatment has failed. Culture, whenever possible, is important for monitoring antimicrobial resistance (see “Antimicrobial Resistance” above) as nucleic acid amplification testing does not identify resistant organisms. See “Adult Male/Female Non-genital Specimens” (below) for how to obtain specimens for culture. Specimens taken from children under 12 years of age should also be cultured (see “Prepubertal Children” below).

NOTE 2: The Gen-Probe Aptima test has not been approved for conjunctival specimens. Laboratory results obtained for conjunctival specimens will be reported as “for investigational purposes only.”

Adult Male/Female Non-genital Specimens:

Culture is necessary for specimens obtained from all non-genital sites (i.e., throat, rectum, eye). See **NOTE 1** above for situations where culturing is recommended for specimens obtained from genital sites. Culture is useful when the specimen can be processed in the laboratory within 24 hours from specimen collection. When culture is indicated, use the swab in the Amies Charcoal Transport medium (or equivalent) tube to obtain the specimen. Alternatively, a swab inoculated to a modified Thayer Martin plate (or equivalent) can be sent if it can be delivered immediately to the laboratory. Culture of gonorrhea is compromised if the specimen is frozen, thawed or heated.

Prepubertal Children: Although non-culture techniques are considered diagnostic, culture is always strongly recommended for specimens from children. Specimens for culture from children should follow the same collection procedure as described above for adults although sites sampled may differ (i.e., vagina from girls). See “Adult

Male/Female Non-genital Specimens” (above) for how to obtain specimens for culture. The same urine specimen collection procedure should be used for both boys and girls, as described above for adults (see “Adult Male/Female Urine”). NAAT (swab collection kit) may be used for vaginal or urethral sites in children. The collection procedure for NAAT in prepubertal children is as described above for “Male Urethral and Female Endocervical Swab Specimens” except that swabs are taken from the vagina in prepubertal females.

NOTE 3: Children aged 12 or under, presenting with vaginal, urethral or rectal discharge (or older children with any suggestion of sexual abuse) require diagnostic testing from the pharynx and rectum as well as from the vagina (girls) or urethra (boys). See the Manitoba Health and Healthy Living protocol *Children with Sexually Transmitted Diseases*.

Newborn: Although the non-culture techniques are considered diagnostic, culture is always strongly recommended for all specimens from newborns for potential medicolegal purposes and/or testing for other organisms. Use the specimen collection procedure for culture as described above under “Adult Male/Female Non-genital Specimens” for both genital and non-genital sites in newborns.

Key Investigations

- Interview case for history of exposure, risk assessment, contacts, adequacy of treatment and promotion of safer sex practices.
- Interview contacts and provide epidemiological treatment, with risk assessment and promotion of safer sex practices.

Control

Management of Cases

The Public Health Agency of Canada no longer recommends fluoroquinolones for the treatment of *N. gonorrhoeae* in Canada due to resistance rates being greater than three to five per cent (6). Specific treatment regimens are detailed in Table 1. In Manitoba, in 2006, two per cent of gonorrhoea

strains undergoing antimicrobial susceptibility testing were found to be resistant to ciprofloxacin (13). This data should be interpreted cautiously due to the small number of organisms tested.

- All confirmed and suspected cases should be treated (6). Suspected cases include individuals where urethral/cervical mucopurulent discharge is observed (6).
- Patients who have gonococcal infection and are also infected with HIV should receive the same treatment regimens as those who are HIV negative (24).
- All patients treated for gonorrhoea should also be treated for *Chlamydia*, unless chlamydial infection has been ruled out, as dual infection is common (6, 24-26) (see the Manitoba Health and Healthy Living *Chlamydia* protocol and *STI Treatment Guidelines*).
- Immunization against hepatitis B is recommended for individuals with no history of hepatitis B virus infection or immunization (6).
- Serologic testing for syphilis, hepatitis B (to identify chronic carriers) and hepatitis C are recommended.
- Confidential HIV counselling and testing (with informed consent) are recommended (6, 8).
- Discuss the human papillomavirus (HPV) vaccine with women as per the recommendations outlined in the *National Advisory Committee on Immunization (NACI) Statement on Human Papillomavirus Vaccine (Canada Communicable Disease Report, Volume 33 ACS-2, 2007)* (27).
- Patients should be advised to abstain from unprotected sexual contact until seven days after single-dose therapy or until completion of a multi-dose regimen (3, 8).
- To avoid re-infection, patients should be advised to abstain from sexual contact with previous sexual partners until the partners have completed treatment (8).
- Interview cases as soon as possible, preferably within five working days. Repeaters (persons with more than one documented sexually

transmitted infection [STI] episode in the preceding 12 months), women with PID and other high-risk individuals (i.e., MSM, sex trade workers) are the highest priority.

- Routine test of cure is not recommended (6, 8, 24).
- Test of cure must be with culture. Sampling of all positive sites approximately four to five days after completion of therapy is recommended if one or more of the following are present (3, 6, 26):
 - patient remains symptomatic after treatment
 - patient was not treated with a recommended or alternative regimen
 - treatment failure has previously occurred
 - antimicrobial resistance to therapy is documented
 - compliance is uncertain
 - pharyngeal or rectal gonorrhea is diagnosed
 - infection occurs during pregnancy
 - patient is a child
 - PID or disseminated gonococcal infection was diagnosed
 - there is concern over accuracy of non-culture test result (i.e., false positive)
- NAAT is not recommended as a test of cure; however, if it is the only choice, testing should be done three weeks or more post-treatment to avoid false-positive results due to the presence of non-viable organisms (6).
- Retesting of individuals with gonorrhea after six months is recommended as re-infection is common (6, 7, 24).

The majority of infections identified after treatment with one of the recommended regimens result from re-infection rather than treatment failure, indicating a need for improved patient education and referral of sex partners (24).

Special Considerations for Pregnant Women:

- See Table 1 for treatment regimens.

- Always consult with an experienced colleague if you are unclear about a medication risk in pregnancy (6).
- Treatment for *C. trachomatis* is recommended when *N. gonorrhoeae* is diagnosed (6) unless infection with *C. trachomatis* has been ruled out (6, 8)(see Manitoba Health and Healthy Living *Chlamydia* protocol and *STI Treatment Guidelines*).
- All sexual partners of patients who have *N. gonorrhoeae* infection should be evaluated and treated for both *N. gonorrhoeae* and *C. trachomatis* infections (6).
- Patients and contacts should abstain from unprotected sexual contact until treatment of both partners is complete (i.e., after completion of a multi-dose treatment or seven days after single-dose therapy) (6).
- A test of cure is recommended for all pregnant women and their sexual partners (6).
- Women who have not presented for care during pregnancy should be tested for gonorrhea when they present at labor or delivery.
- Neonates born to infected mothers must be tested and treated for gonorrhea (6). See “Neonatal Infection” below.
- Neonates born to infected mothers should be tested for chlamydial infection (24).

Neonatal Infection:

- Hospitalize infants with clinical evidence of ophthalmia neonatorum (neonatal conjunctivitis), scalp abscess or disseminated infections (4).
- Culture eye discharge, blood or other sites of infection such as cerebrospinal fluid to confirm diagnosis and determine antimicrobial susceptibility (4, 6).
- Initiate antimicrobial therapy. Infants should receive ceftriaxone (4, 24). See Table 1 for dosages.
- Institute appropriate infection control precautions until 24 hours of effective therapy have been completed (6).

- Irrigate eyes of infants diagnosed with gonococcal ophthalmia with saline solutions immediately and at frequent intervals until the discharge is eliminated (4, 6).
- Consult with an infectious diseases specialist (6).

Children:

See Table 1 for treatment. Sexual abuse must be considered when genital, rectal or pharyngeal gonorrhea is diagnosed in any child beyond the neonatal period (4, 6). Consultation with a colleague experienced in such cases should be sought (6). Refer to the Manitoba Health and Healthy Living protocol *Children with Sexually Transmitted Diseases* for management and additional mandatory reporting requirements.

Disseminated Gonococcal Infections (DGI):

- Hospitalization is usually indicated, especially for those who cannot reliably comply with treatment, have uncertain diagnosis, or have purulent joint effusions or other complications. Hospitalized individuals should be managed with routine precautions (3).
- See Table 1 for treatment regimens. Consultation with a specialist is recommended (3).

NOTE: All treatment regimens for gonorrhea (6, 28) should be followed by treatment for chlamydial infection unless chlamydial infection has been ruled out (see Manitoba Health and Healthy Living *Chlamydia* protocol and *STI Treatment Guidelines*).

Table 1. Recommended Treatment Regimens for Gonorrhea

Drug	Dosages	Indications	Precautions
Cefixime	400 mg PO single dose	First line treatment for uncomplicated urethral, endocervical, pharyngeal and rectal gonorrhea in adults and children 9 years of age or older. May be used in pregnancy and lactation.	Contraindicated in patients with known cephalosporin allergy or history of immediate and/or anaphylactic reaction to penicillins. Preferred over ceftriaxone because of ease of administration.
	8 mg/kg PO in a single dose (maximum 400 mg)	Children under 9 years of age with uncomplicated urethral, vaginal, rectal and pharyngeal infection.	Contraindicated in patients with known cephalosporin allergy or history of immediate and/or anaphylactic reaction to penicillins. In children under 9 years of age, antimicrobial susceptibility must be determined and follow-up culture is recommended. Use ceftriaxone if follow-up is uncertain.
Ceftriaxone	125 mg IM in a single dose	Alternative treatment for uncomplicated urethral, endocervical, pharyngeal and rectal gonorrhea in adults and children 9 years of age or older. May be used in pregnancy and lactation.	Contraindication as for cefixime. Oral therapies are preferred.
	125 mg IM in a single dose	Alternative treatment for uncomplicated urethral, vaginal, pharyngeal and rectal gonorrhea in children under 9 years of age.	Contraindication as for cefixime. Oral therapies are preferred.

Communicable Disease Management Protocol

Drug	Dosages	Indications	Precautions
	2 g per day IM/IV	First line treatment for gonococcal ophthalmia and disseminated infection in adults and children 9 years of age or older.	Contraindication as for cefixime. Consultation with an infectious diseases specialist is recommended, especially for duration of treatment and step-down therapy. Hospitalization may be necessary.
	50 mg/kg/day IM or IV	Gonococcal ophthalmia and disseminated infection (arthritis, meningitis, endocarditis) in children under 9 years.	Contraindication as for cefixime. Hospitalization is necessary. Consultation with an infectious diseases specialist is recommended for advice regarding number of doses per day and duration of therapy.
	25-50 mg/kg IV/IM single dose (maximum 125 mg)	Ophthalmia neonatorum.	As for cefixime. Hospitalization is necessary. Consultation with an infectious diseases specialist is recommended.
Azithromycin	2 g PO in a single dose	Alternative treatment for uncomplicated urethral, endocervical, pharyngeal and rectal gonorrhoea in adults and children 9 years of age or older.	Contraindicated in pregnancy and lactation. Associated with a significant incidence of gastrointestinal adverse effects.
Ciprofloxacin	500 mg PO in a single dose	Alternative treatment for uncomplicated urethral, endocervical, pharyngeal and rectal gonorrhoea in adults and children 9 years of age and older.	Contraindicated in pregnancy and lactation. Should only be considered if antimicrobial susceptibility testing is available and fluoroquinolone susceptibility is demonstrated. If antimicrobial testing is not available, a test of cure is necessary. Quinolones should not be used in prepubertal patients. Experience in pubertal patients under 18 years of age is limited.

NOTE: See Appendix A for management of acute pelvic inflammatory disease.

Management of Contacts

- Patients should be referred to a physician, public health nurse or other health care professional for support with partner notification. Public Health will be notified of all cases in order to coordinate contact management and ensure that it is completed.
- Where the case is a male or female with symptomatic uncomplicated gonorrhoea, all sexual contacts exposed two months prior to the onset of symptoms in the case, up to and including the interview date, should be examined, tested and offered treatment. For example, if a case noted symptoms on June 1,
 - was tested on June 4, diagnosed on June 6 and interviewed on June 10, the interview period is April 1 to June 10 (3).
- Where the case is a male or female with asymptomatic gonorrhoea, complicated gonorrhoea or repeated infections (i.e., two or more infections in a 12-month period), the interview period should extend to three months prior to the diagnosis of the case (3).
- Parents of infected neonates (i.e., mother and her sexual partner) and individuals implicated in sexual abuse/assault cases, must be located, clinically evaluated and treated (6).

- Contacts should also be counseled and screened for HIV, syphilis, *Chlamydia*, hepatitis B and C (3).

NOTE: When resources are limited, priority for partner notification should be directed toward youth/young adults < 25 years of age.

Preventive Measures

- Educate the public and counsel individuals in an effort to promote safer sexual practices and the use of barrier contraceptives (7).
- Promptly test individuals with compatible clinical syndromes (7).
- Test individuals with newly acquired STIs for other common infections (7).
- Test all pregnant women at least once during pregnancy. Pregnant women at high risk of exposure to *N. gonorrhoeae* should be tested again late in the third trimester (3, 4).
- Undertake screening and case-finding for gonorrhea in the following circumstances (3). Frequency of testing will depend upon individual risk circumstances:
 - women prior to insertion of an intrauterine device;
 - women prior to therapeutic abortion or D&C;
 - sexually active adolescents and adults < 25 years of age;
 - individuals with more than one sex partner in the past year;
 - individuals with a new sex partner in the past year;
 - individuals whose sex partner has other sex partners;
 - sex partners of those with gonococcal infection;
 - sex workers and their sexual partners;
 - street-involved individuals;
 - individuals involved in substance use (i.e., injection drug use, glue sniffing);
 - individuals with a history of STI in the past year;
 - anyone with a history of unprotected sex with a person in one of the above categories.
- Instruct cases and contacts to abstain from unprotected sexual contact until treatment of both partners is complete (e.g., seven days after single-dose therapy) (6, 8).
- Implement ocular prophylaxis of infants immediately after birth to prevent ophthalmia neonatorum (4, 24).
- Treat infants born to mothers known to have gonococcal infection with single dose ceftriaxone (125 mg IV/IM) (4, 6). Premature and low-birth-weight infants should receive 25-50 mg/Kg, to a maximum of 125 mg (4).

Additional Resources for Health Care Professionals

Canadian Guidelines on Sexually Transmitted Infections, 2006 Edition. Available from Materials Distribution for Manitoba Health, telephone (204) 945-3000, fax (204) 772-7213.

STI Information Line, Winnipeg Regional Health Authority, 940-2200.

AIDS/STI information (Nine Circles Community Health Centre) Winnipeg, 945-2437, Outside Winnipeg, 1-800-782-2437.

Facts of LIFE Line (Sexuality Education Resource Centre), Winnipeg, 947-9222, Outside Winnipeg, 1-800-432-1957.

Appendix A: Management of Acute Pelvic Inflammatory Disease (PID)

- Acute pelvic inflammatory disease results from the ascending spread of microorganisms from the vagina and endocervix to the upper female genital tract including the endometrium, fallopian tubes and/or contiguous structures.
- This syndrome includes endometritis, salpingitis, tubo-ovarian abscess and pelvic peritonitis.
- Etiologic agents include *N. gonorrhoeae*, *C. trachomatis* and other organisms such as anaerobes, enteric gram negative rods, streptococci and some mycoplasma.
- Acute PID may be difficult to diagnose because of the wide variation in presenting symptoms and signs. Many women with PID have subtle or mild symptoms.
- Delays in diagnosis and initiation of effective treatment probably contribute to inflammatory sequelae (e.g., ectopic pregnancy) in the upper reproductive tract.
- Laparoscopy provides a more accurate diagnosis of salpingitis as well as a more complete bacteriologic diagnosis. However, laparoscopy will not detect endometritis or subtle inflammation of the fallopian tubes. Consequently, diagnosis of PID is usually based on clinical findings.
- The optimal treatment regimen and long-term outcomes following early treatment of women with asymptomatic or atypical PID are unknown.
- Empiric treatment for PID should be initiated in women at risk for STIs if the following minimum criteria are present and no other causes for the illness can be identified (4):
 - lower abdominal tenderness and
 - uterine/adnexal tenderness or
 - cervical motion tenderness
- Additional criteria that support a diagnosis of PID and enhance the specificity of the diagnosis, in addition to the minimum criteria, include (4, 7):

- oral temp >101°F (>38.3°C)
- presence of white blood cells (WBC) on saline microscopy of vaginal secretions
- leukocytosis
- elevated erythrocyte sedimentation rate
- elevated C reactive protein
- laboratory documentation of cervical infection with *N. gonorrhoeae* or *C. trachomatis*

NOTE: Most women with PID have either mucopurulent cervical discharge or evidence of WBC on microscopic evaluation of a saline preparation of vaginal fluid.

Treatment:

- PID treatment regimens must provide empiric broad spectrum coverage of all likely pathogens. Antimicrobial coverage should include *N. gonorrhoeae*, *C. trachomatis*, gram negative bacteria and streptococci. Anaerobic coverage should also be considered.
- Treatment should be initiated as soon as the presumptive diagnosis has been made because prevention of long-term sequelae has been directly linked with immediate administration of appropriate antibiotics.
- The selection of treatment regimens should consider availability, cost, patient acceptance and antimicrobial susceptibility.
- The recommended treatment consists of a combination of:
 - Ceftriaxone 250 mg IM in a single dose followed by
 - Doxycycline 100 mg orally twice a day for 14 days with or without
 - Metronidazole 500 mg orally twice a day for 14 days.

NOTE: Anaerobic coverage (metronidazole) should be considered, but whether elimination of anaerobes from the upper tract is necessary remains to be answered even though anaerobes are detected in the majority of PID cases (6).

An alternate regimen includes cefoxitin 2 gm IV every six hours and doxycycline 100 mg bid. Parenteral therapy may be discontinued 24 hours after a patient improves clinically, and oral therapy with doxycycline (100 mg bid) should continue for a total of 14 days.

Precautions: Ceftriaxone and cefoxitin should not be given to persons with a cephalosporin allergy or a history of immediate and/or anaphylactic reactions to penicillins. Doxycycline is contraindicated in pregnancy, lactation and children less than nine years of age. Patients should not drink alcohol during and for 24 hours after oral therapy with metronidazole because of a possible disulfiram (antabuse) reaction.

Some patients will require hospitalization. The decision of whether hospitalization is necessary initially should be based on the discretion of the health care provider. Patients should demonstrate substantial clinical improvement within three days after initiation of treatment. Patients who do not improve within this period usually require hospitalization for additional diagnostic tests and possibly surgical intervention.

Some specialists also recommend re-screening for *N. gonorrhoeae* and *C. trachomatis* four to six weeks after therapy is completed in women with documented infection.

Pregnant patients with suspected PID should be hospitalized for evaluation and treatment with parenteral therapy; consultation with an expert should be sought.

References

1. Public Health Agency of Canada. Case definitions for diseases under national surveillance. CDR. Volume 26S3 May 2000.
2. Manitoba Health and Healthy Living. Provincial sexually transmitted disease control strategy, 2001.
3. Manitoba Health and Healthy Living. Communicable Disease Management protocol: Gonorrhoea. November 2001.
4. American Academy of Pediatrics. Gonococcal Infections. In. Pickering LK ed. *Red book: 2006 Report of the Committee on Infectious Diseases. 27th ed.* Elk Grove Village, IL: American Academy of Pediatrics, 2006: 301-309.
5. Public Health Agency of Canada. Epi Update: Ciprofloxacin resistance to *Neisseria gonorrhoeae* in Canada, 2006.
6. Public Health Agency of Canada. *Canadian Guidelines on Sexually Transmitted Infections 2006 Edition with October 2007 Update.*
7. Handsfield H Hunter and Sparling P Frederick. *Neisseria gonorrhoeae.* In: Mandell GL, Bennell JE, Dolin R eds. *Principles and Practice of Infectious Diseases 6th ed.* Elsevier, Philadelphia, 2007.
8. Heymann David L. Gonococcal Infection. In: *Control of Communicable Diseases Manual 18th ed,* American Public Health Association, Washington, 2004; 232-237.
9. Public Health Agency of Canada. 2004 Canadian Sexually Transmitted Infections Surveillance Report. *Canada Communicable Disease Report 2007;* 33S1: 1-69.
10. Dyck Myrna. Epidemiologist, Manitoba Health and Healthy Living, personal communication, October 30, 2007.
11. Wang Susan A, Harvey Alesia B, Conner Susan M *et al.* Antimicrobial Resistance for *Neisseria gonorrhoeae* in the United States, 1988 to 2003: The Spread of Fluoroquinolone Resistance. *Annals of Internal Medicine* 2007; 147 (2): 81-88.
12. Knapp Joan S, Fox Kimberley K, Trees David L and Whittington William L. Fluoroquinolone Resistance in *Neisseria gonorrhoeae.* *Emerging Infectious Diseases* 1997; 3 (1): 1-9.
13. Van Caesele Paul and Giercke Sandra. Re: Monitoring of *Neisseria gonorrhoeae* cultures. Cadham Provincial Laboratory Communication, October 1, 2007.

14. Creighton S, Tenant-Flowers M, Taylor CB *et al.* Co-infection with gonorrhoea and *chlamydia*: how much is there and what does it mean? *Int J STD & AIDS*; 14:109-113, 2003.
15. Lyss SB, Kamb ML, Peterman TA *et al.* *C. trachomatis* among patients infected with and treated for *N. gonorrhoeae* in STD clinics in the United States. *Ann Intern Med* 2003; 139: 178-185.
16. Kent CK, Chaw JK, Wong W *et al.* Prevalence of rectal, urethral and pharyngeal chlamydia and gonorrhoea detected in 2 clinical settings among men who have sex with men: San Francisco, California, 2005. *Clin Infect Dis* 2005; 41(1): 67-74.
17. McMillan A, Manavi K, Young H. Concurrent gonococcal and chlamydial infections among men attending a sexually transmitted diseases clinic. *Int J STD & AIDS* 2005; 16(5): 357-61.
18. Cucurull E & Espinoza LR. Gonococcal Arthritis. Rheumatic Disease. *Clinics of North America* 1998; 24 (2): 305-322.
19. Laga M, Manoka A, Kivuvu M *et al.* Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: results from a cohort study. *AIDS* 1993; 7: 95-102.
20. Fleming DT & Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect* 1999; 75(1): 3-17.
21. Van Caesele Paul, Director, Cadham Provincial Laboratory, Manitoba Health and Healthy Living. New Specimen Collection Guidelines for Genital Chlamydia and Gonorrhoea. Letter to CPL users, June 7, 2007.
22. Giercke Sandra, Technical Specialist, Cadham Provincial Laboratory, Manitoba Health and Healthy Living, personal communication, November 2007.
23. Public Health Branch, Manitoba Health and Healthy Living. Cadham Provincial Laboratory Guide to Services 2005 Edition. Available at: www.gov.mb.ca/health/publichealth/cpl
24. US Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines, 2006. *MMWR Morb Mortal Wkly Rep* 2006; 55 No. RR-11.
25. Guidelines for the Management of Sexually Transmitted Infections. Geneva: World Health Organization; 2003; 33-36.
26. British Association for Sexual Health and HIV. National Guideline on the Diagnosis and Treatment of Gonorrhoea in Adults 2005.
27. Public Health Agency of Canada. National Advisory Committee on Immunization Statement on Human Papillomavirus Vaccine. *Canada Communicable Disease Report* 2007; 33 ACS-2.
28. Wong Tom. Director, Community Acquired Infections Division, Infectious Disease and Emergency Preparedness Branch, Public Health Agency of Canada, personal communication, December 7, 2007.