Gonococcal Infections

CHAPTER CONTENT

In September of 2022, the Office of the Chief Public Health Officer (OCPHO) released the NWT Sexual Health and Sexually Transmitted Blood-Borne Infection (STBBI) Program Standards for the NWT. STI/STBBI programing in the NWT should follow these standards which can be found here:

- NWT Sexual Health and Sexually Transmitted Blood Borne Infection (STBBI) Program Standards

1. CASE DEFINITION

Confirmed Case

Genital and Extra-Genital Infections

Laboratory evidence of infection in genitourinary specimens* or from pharynx, rectum, joint, conjunctiva, blood, or other extra-genital sites:

- Isolation of Neisseria gonorrhoeae by culture **OR**
- Molecular detection of *N. gonorrhoeae* (e.g., Nucleic Acid Amplification Testing [NAAT]).

Perinatally Acquired Infections

Laboratory evidence of infection leading to the diagnosis of gonococcal conjunctivitis, scalp abscesses, vaginitis, bacteremia, arthritis, meningitis, or endocarditis in an infant in the first four weeks of life:

- Isolation of *N. gonorrhoeae* by culture **OR**
- Molecular detection of *N. gonorrhoeae* (e.g., NAAT).

Probable Case

Clinically compatible signs and symptoms in a person with an epidemiologic link to a laboratory-confirmed case.

*Refer to Alberta Public Health Laboratory (ProvLab) Guide to Services for current specimen collection and submission information.

NOTE: Each case classification is mutually exclusive. Individuals with more than one site of infection concurrently may fall under more than one case classification but will be counted as one case with multiple sites of infection identified to avoid duplicate counting of cases.

2. DIAGNOSIS

The diagnosis is established by the identification of *N. gonorrhoea* at an infected site. Nucleic acid amplification testing (NAAT) is preferred because it is the most sensitive method and can be done at time of presentation.

- Culture allows for testing of antimicrobial sensitivity.
  - Consideration should be given to performing **both** culture and NAAT, especially in symptomatic patients.
  - Cultures obtained less than 48 hours after exposure may give false negative results.
  - **Culture must be done** as part of antimicrobial surveillance in the following circumstances*:
    - Non-genital sites (e.g., eye, pharynx, rectum)
    - Suspected treatment failure – symptomatic, positive lab or infection present more than 3 weeks after treatment
    - Sexual contact with individual(s) from a country with a high prevalence of gonorrhea drug resistance
    - Anyone who reports sexual assault/abuse, including children and those under the age of majority in the NWT
    - In the presence of symptoms compatible with cervicitis, urethritis, PID, epididymo-orchitis, proctitis or pharyngitis.
    - Symptomatic men who have sex with men (MSM)
    - NWT designated sentinel sites participating in Enhanced Surveillance of Antimicrobial Gonorrhea (ESAG.)
- For more information, refer to the Alberta Provincial Laboratory: Guide to Services

***NOTE:** NAAT testing may be the only choice due to NWT transport and viability constraints in some regions.

Treatment

NWT approved best practice standards and clinical guidance for the treatment of all STI/STBBI infections can be found at the Government of Canada website: Sexually transmitted and blood-borne infections: Guides for health professionals

Indications for treatment are:

- Symptoms of STI (empiric treatment)
- Positive diagnostic test result,
- Diagnosis of a syndrome compatible with a gonorrheal infection, without waiting for test result, and/or

- Partner with a positive gonorrhea test result or diagnosis of a syndrome compatible with a gonorrhea infection in a partner without waiting for test results.
- Refer to the Government of Canada Sexually Transmitted and Blood-Borne Infections: Guides for Health Professionals Gonorrhea Guide: Key information and resources.

Pediatric Cases

- When a case is diagnosed in an infant, the mother and her sexual partner(s) should be examined and tested.
- It is recommended that all children less than 14 years of age who have a suspect or confirmed diagnosis of gonococcal infection or any other STI/STBBI be referred to a pediatrician. See further legal reporting requirements below in reporting section.

3. REPORTING

All HCPs must follow the NWT *Public Health Act*. Measures for contact tracing and legislative requirements are laid out within the *Reportable Disease Control Regulations* and reporting timelines are found in the *Disease Surveillance Regulations*.

Note: the only acceptable methods of reporting to the OCPHO are outlined below. Information provided outside of these methods will not be considered reported unless otherwise stated by a CPHO delegate.

Health Care Professionals

For **Part 2** written report within 24 hours

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) by fax (867)873-0442 or SFT to CDCU@gov.nt.ca within **24 hours** after diagnosis is made or opinion is formed, ***AND***
- Complete and fax (867) 873-0442 the NWT STI Case Investigation Report Form to the OCPHO within **24 hours.**

Laboratories

- Report all positive results to the OCPHO by fax (867) 873-0442 within **24 hours.**

Additional Reporting Requirements

- The clinician should determine whether there are reasonable and probable grounds to believe that they are in contact with a "child who needs protection" as per *Section 7(3)* of the *NWT Child and Family Services Act* and shall report to a Child Protection Worker, or peace officer/authorized person if a Child Protection Worker is not available, pursuant to *Section 8* of the *NWT CFSA Act*.

To Law Enforcement Agency

- Consent is a key factor in determining whether any form of sexual activity is a criminal offence. Children under 12 do not have the legal capacity to consent to any form of sexual activity.

- The government of Canada recognizes that the age of consent for sexual activity is 16. The law also identifies close in age exceptions for minors between 12 and 15 years. Please refer to the government of Canada website: Age of Consent to Sexual Activity.
- Reporting is the responsibility of the healthcare provider and can be done by contacting local RCMP Detachment.
- For additional information see:
  - Age of Consent to Sexual Activity at: https://www.justice.gc.ca/eng/rp-pr/other-autre/clp/faq.html
  - Criminal Code of Canada at: The Criminal Code of Canada (justice.gc.ca)
  - *Northwest Territories Child and Family Services Act*.

4. OVERVIEW

Causative Agent

Neisseria gonorrhoea (N. gonorrhoea) is an aerobic, gram-negative bacteria with 14 subtypes.

Clinical Presentation

Genital Infections

- In **men**, urethral infection is commonly symptomatic for urethral discharge and/or dysuria. The discharge is often mucopurulent or purulent. Rarely, epididymal tenderness/swelling or balanitis may be present.
- **Women** are often asymptomatic (up to 50%). Commonly, no abnormal findings are present on examination; however, if symptoms are present, they may include mucopurulent endocervical discharge and cervical friability.

Extra-Genital Infections

Extra-genital Infections include infection in the pharynx, rectum, joints, conjunctiva, blood, and other sites.

- Pharyngeal and anorectal infections are common and are often asymptomatic.
- Anorectal infections may cause pruritus, tenesmus, and discharge.
- Conjunctivitis may occur, and, if not treated adequately, could cause blindness.

Perinatally Acquired Infections

Infections occurring in newborns because of passage through an infected birth canal.

- The most common presentation of infection is ophthalmia neonatorum.
- Other presentations such as vaginitis, rhinitis, anorectal infection, funisitis, urethritis, scalp abscesses or other disseminated diseases (bacteremia, arthritis, meningitis, or endocarditis) may also occur.

Major Complications

Bacteremia or gonococcemia is rare, occurring in 0.5–1% of gonorrheal infections. Disseminated gonococcal infection (DGI), results from bacteremic spread of *N. gonorrhoeae*, which can lead to a variety of clinical signs and symptoms, such as meningitis, arthritis, tenosynovitis, skin lesions, and endocarditis. Death is uncommon.

Transmission

- *N. gonorrhoeae* is transmitted by direct inoculation of infected secretions from one mucous membrane to another, usually through sexual activity or through the birth process (vertical transmission).
- *N. gonorrhoeae* is communicable for as long as a person harbors the organism.

Host Susceptibility

- All persons are susceptible to this disease if exposed and re-infection is common. Co-infection with *chlamydia trachomatis* is common. Epidemiologic studies provide strong evidence that gonorrheal infections facilitate HIV transmission.

Incubation Period

The incubation period is typically two to seven days, with a range of 1–14 days.

Clinical Guidance

- Clinical guidance for the management of gonococcal infections can be found on the Government of Canada website: Sexually transmitted and blood-borne infections: Guides for health professionals
- For patient-specific clinical management consult your local healthcare professional, pediatrician, or infectious disease specialist.
- Treatment guidance for gonococcal infections in the NWT can be found in the approved references:
  - Sexually transmitted and blood-borne infections: Guides for health professionals: Gonorrhea Guide key information and resources
  - NWT Sexually Transmitted Infections Case Investigations Form
- Previous treatment recommendations for uncomplicated gonococcal infections included antimicrobials to treat both chlamydia and gonorrhea, however in the context of changing patterns of *N. gonorrhoeae* resistance to azithromycin and cefixime and considering therapeutic efficacy and the importance of antimicrobial stewardship, it is now recommended to treat all uncomplicated gonococcal infections with **ceftriaxone monotherapy.**
- **Preferred treatment for uncomplicated gonococcal infections in adults and adolescents 10 years or older (including pregnant people): Ceftriaxone 500mg IM as a single dose**
  Note: Uncomplicated gonococcal infections include urethral, endocervical, rectal and pharyngeal infections.

- Refer to the PHAC **Gonorrhea guide: Treatment and follow-up** for alternative treatment options.
- See Management of Cases section for further information.

5. PUBLIC HEALTH MEASURES

Gonorrhea is the second most commonly reported sexually transmitted infection (STI) in Canada, with a gradual and steady increase in reported cases of gonorrhea since 2012. When not treated, gonococcal infections can lead to serious complications beyond the impact of the infection itself. It is important to note that as asymptomatic gonorrhea infections may be undiagnosed and underreported, reported case counts and rates of gonorrhea may underestimate the true prevalence of gonorrhea in Canada. For further information on STI and STBBI surveillance data in Canada go to: Sexually transmitted and blood-borne infections surveillance government of Canada webpage at https://www.canada.ca/en/public-health/services/surveillance/sexually-transmitted-blood-borne-infections.html#a3

Key Investigation

The diagnosis and treatment of gonorrhea is performed by community health care providers.

Management of Cases

- See: Sexually transmitted and blood-borne infections: Guides for health professionals: Gonorrhea guide: Key information and resources
- All cases suspect or confirmed should be offered routine STI/STBBI screening: HIV, syphilis, Hepatitis B and C, chlamydia and gonorrhea, including swabs from the throat and rectum for gonorrhea and chlamydia (can be done as self-sampling by patient).
- All suspect or confirmed cases of gonorrhea must have the NWT STI Case Investigation Report Form filled out in entirety as per the reporting regulations above (see Reporting Section) and sent to OCPHO via SFT @ cdcu@gov.nt.ca or via fax to medical confidential fax at 1-867-873-0442.
- Ensure initial contact information is captured on NWT STI Contact Tracing Form. This form is also an attachment to the NWT STI Case Investigation Report Form (See Management of Contacts section)

Follow up:

- A test of cure (TOC) is recommended for **all positive sites in all cases**. This is particularly important when regimens other than ceftriaxone 500 mg IM are used.
- Refer to table 2 of National Advisory Committee on STBBIs (NAC-STBBI) Statement – Interim guidance for the treatment of uncomplicated gonococcal infections for more information on the timing for TOC:

Recommendation on the choice of test and timing

NAC-STBBI recommends a TOC for all positive NG sites in all cases. This is particularly important when regimens other than ceftriaxone 500mg IM are used. Ideally, TOC samples should be taken for both culture and NAAT.

- A NAAT should be performed **three to four weeks after** the completion of treatment because residual nucleic acids from dead bacteria may be responsible for positive results less than three weeks after treatment.
- When a TOC is performed **within three weeks** after completion of treatment, a culture should be performed; samples should be taken **at least three days** after completion of treatment.
- When treatment failure is suspected **more than three weeks after** treatment, both NAAT culture should be performed (for example, when symptoms persist or recur after treatment).

- Repeat screening of people with a gonococcal infection is recommended six months post treatment, because of the risk of reinfection

Persistent and Recurrent Infection

Possible causes of persistent signs and symptoms after treatment:

- Failure to take the medication correctly (including vomiting within one hour of taking medication) or to finish the course of therapy
- Re-exposure
- Infection with other pathogen(s)
- Non-infective etiology
- Treatment failure or drug resistance

Treatment Failure

Treatment failure is defined as **absence of reported sexual contact during the post-treatment period AND one of the following**:

- Presence of Gram-negative intracellular diplococci on microscopy in specimens taken at least 72 hours after completion of treatment
- Positive N. gonorrhoeae on culture taken at least 72 hours after completion of treatment
- Positive N. gonorrhoeae NAAT taken at least 3-4 weeks post treatment

Recommended management of NG treatment failures

- Notify OCPHO of treatment failures via STI Case Investigation Form Section 2 (reason for visit/test).
- Consult an infectious disease specialist and local public health authorities to determine the appropriate antimicrobial agent according to susceptibility test results.
- **TOC should be performed following treatment. If less than 3 weeks after completion of treatment**, perform a TOC using culture. **In all situations where a samples for culture is taken**, perform a TOC using both culture and NAAT.
- Refer to the test of cure section in the Gonorrhea Guide for more information on the timing of TOC.

- All cases should be instructed about infection transmission.
- People diagnosed with gonorrhea and their partners should abstain from any sexual activity without barrier protection until treatment of the person and all current partners is complete (after completion of a multiple-dose treatment or for seven days after single-dose therapy) and symptoms have resolved.
- All cases should be provided with individualized STI prevention education, targeted at developing knowledge, skills, attitudes, and behaviors to reduce the risk, and prevent recurrences of STI.
- All patients with a notifiable STI qualify for publicly funded medications.
- Sexual abuse/assault should be managed in conjunction with local sexual assault services and other appropriate community support services.

Management of Contacts

Partner Notification

- Case finding and partner notification are critical to the prevention and control of gonococcal infections.
- Notify, clinically assess, test, and provide empiric treatment to all sexual partners of the index case within 60 days prior to symptom onset or date of specimen collection (if the index case is asymptomatic).
- Empiric treatment is indicated regardless of clinical findings and without waiting for test results).
- People diagnosed with gonorrhea and their partners should abstain from any sexual activity without barrier protection until treatment of the person and all current partners is complete (after completion of a multiple-dose treatment or for seven days after single-dose therapy) and symptoms have resolved.
- Extend the length of time for partner notification in the following circumstances:
  - To include additional time up to the date of treatment
  - If the index case states, there were no partners during the recommended trace-back period (notify last partner)
  - If all partners traced, test negative (notify the partner prior to the trace-back period)
- **It is mandated under the Reportable Disease Control Regulations that every attempt is made to identify, locate, examine, and treat partners/contacts of all cases.**
- All contacts should be:
  - Screened for HIV and other STI/STBBIs,
  - Instructed about infection transmission, and
  - Provided with individualized STI prevention education, targeted at developing knowledge, skills, attitudes, and behaviors to reduce the risk, and prevent recurrences of STI.
- Health care providers are required to provide partner names and locating information on the STI Contact Tracing Form and forward to the OCPHO as per reporting section above.

Note: The Communicable Disease Control Unit (CDCU) in the OCPHO will follow-up on any incoming and outgoing referrals of cases and contact(s) from **out of territory/country**, known as interjurisdictional notifications (IJN). Any contact identified by a practitioner that is currently located outside of the local public health unit but within the NWT, must send contact information to the appropriate community health center or public health unit for follow up. Any contact outside of the territory will be followed-up by the CDCU if indicated on reporting form. For ease of follow-up ensure all identifying information known is included.

Prevention and Control Measures

Gonorrhea prevention and control measures are part of broader STBBI prevention in NWT.

Sexual health and STBBI prevention are an integral part of everyone's health care. Health professionals should discuss sexual health and STBBI with everyone as part of routine care rather than making assumptions about sexual activity or behaviours. All individuals can benefit from preventive counselling and care, including those who are not yet or not currently sexually active. For more information on the prevention of STI/STBBI's go to the government of Canada's website: STBBI prevention guide at https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/stbbi-prevention-guide.html

Primary and secondary STBBI prevention measures at the individual-level have population-level benefits and are key to reducing the incidence (newly acquired infections) and prevalence (current infections) of STBBI. Primary prevention aims to prevent infection by providing person-centered counselling and education about how to reduce risk. Secondary prevention aims to minimize the impact and spread of infection through early detection, treatment, counselling and partner notification.

Methods of STI/STBBI prevention and control measures include:

- **Education**
  - Assessing and discussing risks for STBBI. STBBI prevention guide: Assessment and counselling includes an overview of practices for the assessment and counselling of sexually STBBIs by healthcare professionals practicing in public health or primary care settings
  - Educating people about the signs and symptoms of STBBI and the asymptomatic nature of many infections
  - Helping individuals recognize and minimize their risk for STBBI. See the STI Teaching Tool found here: https://www.hss.gov.nt.ca/professionals/sites/professionals/files/resources/nwt-patient-teaching-tool-sexually-transmitted-blood-borne-infections.pdf
  - Discussing use of barrier protection
    - External condoms (covering the penis), internal condoms (inserted in the vagina or anus) and dental dams (used during oral sex) create a protective barrier and prevent the exchange of bodily fluids between sexual partners when used correctly.
    - Consistent and correct use of latex and synthetic polymer condoms and dental dams can decrease the risk of acquiring and transmitting the majority of STBBI, including HIV, HBV, HCV, chlamydia and gonorrhea. They do not provide complete protection against syphilis, HPV, *Herpes simplex* virus type 1 or type 2 (HSV-1 or HSV-2), or mpox because lesions and (for HSV-1 and HSV-2) asymptomatic shedding can occur in areas not covered by these barrier methods.

- **Vaccination:**
  - Offer vaccination for hepatitis A virus (HAV), hepatitis B virus (HBV), HPV, and mpox to people at risk of these infections as per the Canadian Immunization Guide. Refer to for more information.
  - Refer to NWT vaccination schedules for more information:
    - nwt-immunization-schedule-health-care-professionals.pdf
    - immunization-schedule-general-public.pdf
- **Screening**
  - Offering STBBI screening in sexually active individuals at regular intervals and as part of routine prenatal screening (see further information below).
  - Offer HPV screening as NWT Cervical Cancer Screening Guidelines (April 2025)
- **Testing and Treatment**
  - Testing, as appropriate, and providing treatment, follow up and counselling to individuals and their partner(s) to prevent further spread.

It is also important to avoid making assumptions about sexual or substance use behaviours based on a person's culture or population group. Being a member of a population disproportionately affected by STBBI does not necessarily increase risk.

Personal or behavioral factors that can increase risk for STBBI include:

- Sex with person(s) with an STBBI
- Multiple partners (concurrently or over time)
- Anonymous or casual sex partners
- Sex without the use of barrier protection
- Personal history of STBBI
- Substance use (drugs, alcohol or both)
- Use of medications for erectile dysfunction
- History of intimate partner or sexual violence
- Social environments (e.g. bath houses, circuit parties, post-secondary institutions)

STBBIs like hepatitis B, hepatitis C, and HIV can be transmitted through the sharing or reuse of substance use equipment, especially needles and syringes. This is because these viruses can be present in blood and can be passed from one person to another through contaminated equipment.

It is critical that health professionals adopt a harm reduction approach so that people who use drugs are supported in a respectful and meaningful way while reducing the negative consequences associated with substance use. Health professionals can facilitate safer substance use practices by supporting people with access to new equipment, testing, education and supportive environments such as supervised consumption services.

STBBI do not affect all people in the same way. People facing social and medical challenges may be more vulnerable to some STBBI. Syndemics are linked to health equity and the social determinants of health (SDoH). As SDoH can influence health practices, examining the SDoH can lead to more holistic and coordinated approaches to STBBI prevention and care. It is also important to acknowledge the uniqueness, strength and resilience of people regardless of potentially challenging circumstances.

The SDoH that can impact vulnerability and resilience to STBBI include:

- Education
- Income and employment
- Stable and appropriate housing
- Food security
- Early childhood development
- Disability
- Gender and gender norms
- Culture, ethnicity and racialization
- Social and support networks
- Access to health and social services

Epidemiological evidence has revealed that certain populations are disproportionately affected by STBBI, such as:

- Indigenous Peoples
- Gay, bisexual and other men who have sex with men (gbMSM)
- Transgender people
- Youth and young adults
- People who use drugs
- People who are or have been incarcerated
- People from countries where rates of infection with HIV, hepatitis B virus (HBV) or hepatitis C virus (HCV) are elevated
- People engaged in the sale or the purchase of sex

Screening

Please refer to the national screening recommendations for *chlamydia trachomatis* and n. *gonorrhea*.

- NWT has the second highest national rates of both chlamydia and gonorrhea infections in Canada, therefore consider all of NWT to be a high prevalence community
- Options to increase screening uptake should be explored. They can include:
    - Opportunistic screening (offering screening when an individual accesses health services and has not undergone recent STBBI testing or as part of other health services such as HIV or addiction care)
    - Increasing accessibility and normalizing testing through strategies such as outreach testing and opt-out screening
    - Facilitating sample collection through strategies such as non-invasive collection specimens, including self-sampling
- Consider local epidemiology, travel history and individual patient risk factors when determining which groups/communities to target.

6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

For more information about Gonorrhea:

- DHSS: NWT Sexual Health and Sexually Transmitted Blood Borne Infection (STBBI) Program Standards
- DHSS: Routine Follow-up of STI Cases and Contact: https://www.hss.gov.nt.ca/professionals/sites/professionals/files/resources/routine-follow-up-sti-cases-contacts.pdf

- DHSS: STI Teaching Tool: https://www.hss.gov.nt.ca/professionals/sites/professionals/files/resources/nwt-patient-teaching-tool-sexually-transmitted-blood-borne-infections.pdf
- Government of Canada: Canada/ Gonorrhea guide: Key information and resources
- Government of Canada: Health Canada/Gonorrhea
- Government of Canada: National Advisory Committee on Sexually Transmitted and Blood-Borne Infections (NAC-STBBI) Statement- Interim guidance for the treatment of uncomplicated gonococcal infections
- Government of Canada: STBBI action plan 2024-2030
- Government of Canada: STBBI prevention guide: Assessment and counselling at https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/stbbi-prevention-guide/assessment-counselling.html
- Government of Canada: Sexually transmitted and blood-borne infections surveillance
- Government of Canada: Trauma and violence-informed approaches to policy and practice
- National Advisory Committee on STBBI (NAC-STBBI): STBBI Guidance and Other Resources
- Pan-Canadian Sexually Transmitted and Blood-borne Infections Framework for Action
- STI Information for the Public: Government of Canada: Diseases and Conditions
- The Government of Canada: Management and treatment of gonococcal infections Canadian Guidelines on Sexually Transmitted Infections
- The Government of Canada: STBBI: Guides for health professionals: Summary of Recommendations for Chlamydia trachomatis (CT), Neisseria gonorrhoeae (NG), and Syphilis
- Centers for Disease Control and Prevention: CDC/Gonorrhea
- World Health Organization: WHO/Gonorrhea

7. EPIDEMIOLOGY

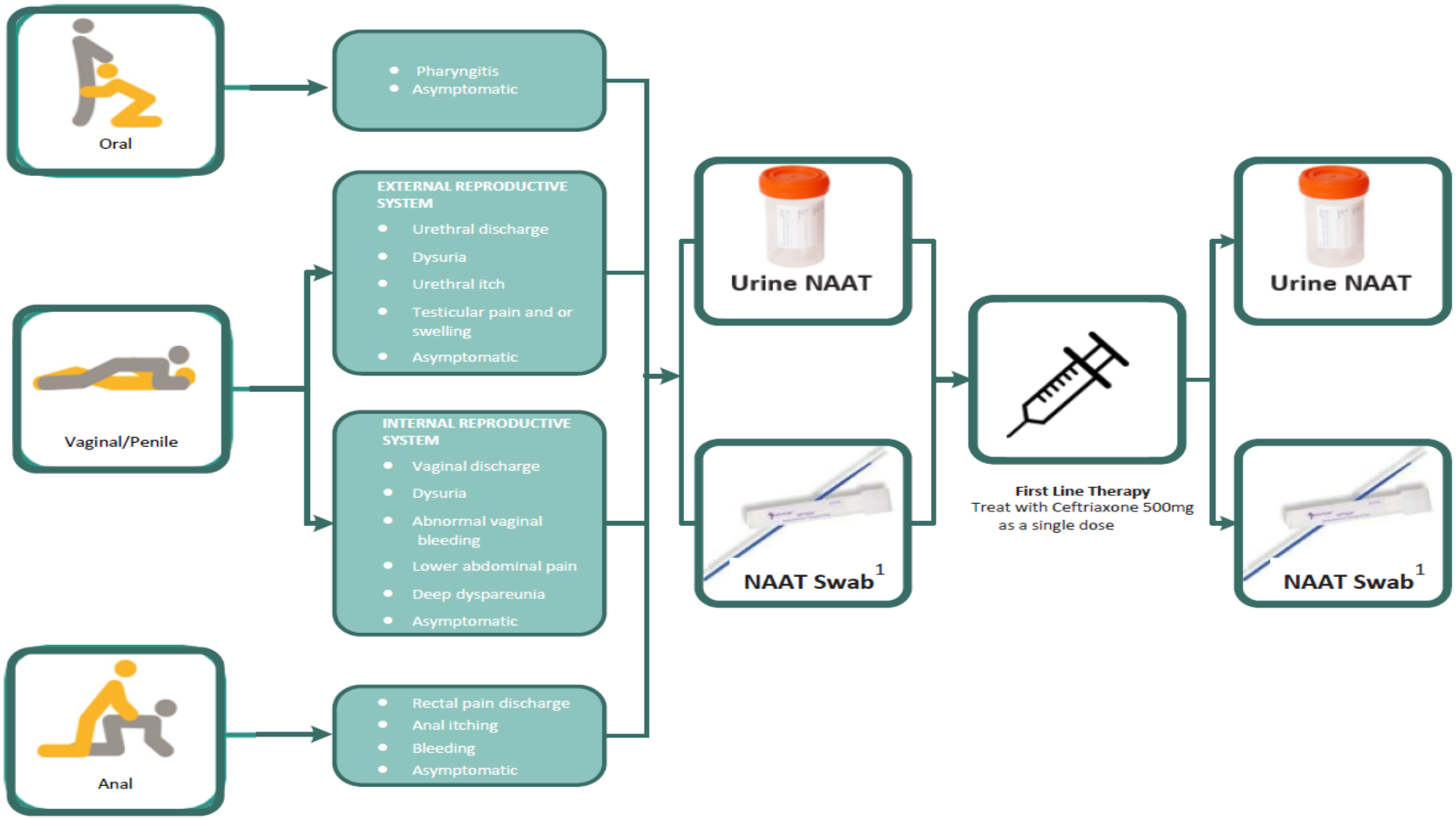
- For more information on the epidemiology of Gonorrhea in the Northwest Territories (NWT) see: Epidemiological Summary of Communicable Diseases HSS Professionals

8. REFERENCES

1. Government of the Northwest Territories: Legislation of the Northwest Territories. *Public Health Act* and *Child and Family Services Act*: Legislation of the Northwest Territories:: Justice (gov.nt.ca)
2. Government of Canada: Canada/ Gonorrhea guide: Key information and resources
3. Government of Canada: Health Canada/Gonorrhea
4. Government of Canada: STBBI Action Plan 2024-2030
5. Government of Canada: Sexually transmitted and blood-borne infections surveillance
6. Government of Canada: Trauma and violence-informed approaches to policy and practice
7. National Advisory Committee on Sexually Transmitted and Blood-Borne Infections (NAC-STBBI): STBBI Guidance and Other Resources
8. Pan-Canadian Sexually Transmitted and Blood-borne Infections Framework for Action
9. STI Information for the Public: Government of Canada: Diseases and Conditions

Appendix A: Point of Care Gonorrhea Desk Reference

ASSESS RISKS	ASSESS SYMPTOMS (if present)	TEST	TREATMENT	TEST OF CURE
			• Positive test/Tx failure • Contact of case or re-exposure • Sexual assault • Symptomatic	



[1]Nucleic acid amplification testing (NAAT). Collect in the UNISEX blue-shaft, white label transport tube. Only one sample is required for chlamydia/gonorrhea. Used for endocervical, urethral, eyes, rectal, throat.