

Detection of ceftriaxone non-susceptible *Neisseria gonorrhoeae* in Ontario

May 3, 2023

Case information

In March 2023, Public Health Ontario (PHO) Laboratory identified a first of its kind isolate of *Neisseria gonorrhoeae* (*N. gonorrhoeae*) from a urethral specimen with non-susceptibility to cefixime and ceftriaxone (minimum inhibitory concentration [MIC] $\geq 0.5\text{mg/L}$) as well as resistance to ciprofloxacin, penicillin, and tetracycline. The isolate was susceptible to azithromycin (MIC $\leq 0.25\text{ mg/L}$). Whole genome sequencing (WGS) conducted at PHO identified this strain as ST13943 (PubMLST) and ST-21711 (NG-MAST).

The case is a symptomatic male who reported sex with the opposite sex with one sexual contact and no recent travel outside of Ontario. Empiric treatment with 250mg ceftriaxone and 1g azithromycin was effective as demonstrated by a negative test of cure (by culture) collected 18 days post-treatment. Additional testing at pharyngeal site was recommended as it was not completed initially. Testing status and risk factors for the contact are unknown.

Background

There is evidence of ongoing multi-drug resistance among gonorrhea isolates globally. The isolate identified in Ontario is a variant of a strain of ceftriaxone non-susceptible *N. gonorrhoeae* that has been found in Southeast Asia and Australia. Earlier this year, a multi-drug non-susceptible *N. gonorrhoeae* isolate that was adequately treated with 500mg ceftriaxone was identified in [Massachusetts](#). This isolate was identified as MLST 8123 which has also been identified in the Asia-Pacific region and the United Kingdom. In September 2022, a multi-drug ceftriaxone non-susceptible isolate (SE690, MLST ST8130) was also identified in [Sweden](#); this case was treated with 1g ceftriaxone but did not return for test of cure.

Recommended public health actions for ceftriaxone non-susceptible *N. gonorrhoeae*:

If a public health unit in Ontario is notified of a gonorrhea case with an *N. gonorrhoeae* isolate that is ceftriaxone non-susceptible, it is recommended that they email PHO at healthprotection@oahpp.ca to discuss next steps for public health follow-up.

Recommended clinical and public health actions for all gonorrhea investigations:

Testing and Treatment

- At a minimum, *N. gonorrhoeae* culture is recommended **plus nucleic acid amplification test (NAAT)** for the following scenarios:
 1. Symptomatic patients, when antimicrobial resistance is suspected
 2. Test of cure
 3. Pelvic inflammatory disease (PID)
 4. Pregnancy
 5. Sexual abuse or sexual assault

- Treat suspected or confirmed gonorrhea cases as per the current recommendations in the [Ontario Gonorrhea Testing and Treatment Guidelines, 2018](#). Please note that Ontario's guidelines are currently under review.
 - Note that re-treatment is not required for those who are treated as per other evidence-based guidelines (e.g., United States Centers for Disease Control and Prevention [Sexually Transmitted Infections Treatment Guidelines, 2021](#)).

Treatment Failure

- Treatment failure is defined as an absence of reported sexual contact during the post-treatment period AND one of the following:
 - Presence of intracellular Gram-negative diplococci on microscopy in specimens taken at least 72 hours after treatment completion treatment (for penile urethral swabs only);
 - Positive *N. gonorrhoeae* on culture taken at least 72 hours after treatment completion;
 - Positive *N. gonorrhoeae* NAAT taken at least 2-3 weeks post-treatment.
- In the event of cephalosporin treatment failure, consultation with an infectious disease specialist is recommended.

Clinical Follow-up

- Test of cure is recommended for **ALL** positive cases of *N. gonorrhoeae*, **at all positive sites**.
 - Culture is the preferred method for test of cure and should be performed three to seven days after treatment completion.
 - If culture is not available, test of cure by NAAT is acceptable and can be performed two to three weeks after treatment completion.
- Repeat gonorrhea screening is recommended six months post-treatment for all individuals with *N. gonorrhoeae* infection.
- Clinicians should provide general counselling on sexually transmitted and bloodborne infections (STBBI) and consider offering testing for other STBBIs including syphilis, chlamydia, HIV and hepatitis C, as appropriate, if not already completed.

Public Health follow-up

- Case information: Collect exposure history for all cases of positive *N. gonorrhoeae* including travel history (within and outside of Ontario).
- Partner notification: All sexual contacts of the case within 60 days of their symptom onset or date of specimen collection (if the index case is asymptomatic) should be notified, referred for testing at all exposed sites, and offered empiric treatment.

Education and Counselling

- To avoid reinfection, individuals should be instructed to abstain from sex for seven days after they (and their sexual partners) have completed treatment and symptoms have resolved.

- Cases should be counselled on the risk of re-infection, routine screening, and the importance of test of cure.
- Consider providing counselling on STBBI prevention strategies including but not limited to:
 - Use of barrier methods such as use of condoms/dental dams
 - [Pre-exposure prophylaxis \(PrEP\)](#) for human immunodeficiency virus (HIV) for those at risk;
 - Vaccination for hepatitis A, hepatitis B, human papillomavirus (HPV), and mpox for those eligible/at risk

Resources:

[Ontario Public Health Standards: Requirements for Programs, Services and Accountability Infectious Diseases Protocol: Appendix 1: Case Definitions and Disease Specific Information: Gonorrhea](#)

[Ontario Gonorrhea Testing and Treatment Guidelines, 2018](#)

[Canadian Guidelines on Sexually Transmitted Infections: Gonorrhea](#)

[Public Health Ontario Laboratory Test Information Index: *Neisseria gonorrhoeae* - Culture](#)

[Public Health Ontario Laboratory Test Information Index: *Chlamydia trachomatis/Neisseria gonorrhoeae* \(CT/NG\) – Nucleic Acid Amplification Testing \(NAAT\)](#)