



# Antimicrobial Resistant Gonorrhoea in BC, 2012-2021

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Treatment of *Neisseria gonorrhoeae* has long been challenged by the bacterium's ability to acquire resistance to multiple classes of antibiotics. Antibiotics previously effective against gonorrhoea - penicillin, doxycycline, and ciprofloxacin - can no longer be used, leaving few remaining options. BC treatment guidelines currently recommend third-generation cephalosporins for the treatment of gonorrhoea: injectable ceftriaxone (250 mg) or oral cefixime (800 mg), co-treated with 1 g of azithromycin.(1) Recent international surveillance data and case reports however, suggest that susceptibility of gonorrhoea to these current first-line treatments is also now threatened.(2,3) In this context, local surveillance is critical.

The BCCDC Public Health Laboratory (PHL) and National Microbiology Laboratory (NML) routinely tests gonorrhoea isolates for susceptibility to a panel of antimicrobial drugs, including cefixime, ceftriaxone, and azithromycin. Data presented here summarize the minimum inhibitory concentration (MIC) of these drugs among isolates from BC. The MIC is the lowest amount of antibiotic required to inhibit growth of the bacterium; a higher MIC means the bacterium is less susceptible to the antibiotic. Minimum inhibitory concentration (MIC) breakpoints to define "resistance" to cefixime, ceftriaxone, and azithromycin have not yet been established. However, the World Health Organization have defined decreased susceptibility to cefixime as MIC  $\geq 0.25\mu\text{g/mL}$  and decreased susceptibility to ceftriaxone as MIC  $\geq 0.125\mu\text{g/mL}$ .(4) The US Centers for Disease Control and Prevention (CDC) has proposed MIC  $2\mu\text{g/mL}$  as elevated MIC for azithromycin.(5) The Public Health Agency of Canada's enhanced surveillance of antimicrobial resistant gonorrhoea uses the same breakpoints.(6)

A total of 4,703 isolates were tested between 2012 and 2021, representing 17.0% (4,703/27,688) of all gonorrhoea cases reported in the province. Fifty percent (2,357/4,703) of isolates tested for drug susceptibility were sampled from the urethra, 20.6% (967/4,703) from the rectum, 11.9% (562/4,703) from the throat, and 11.3% (531/4,703) from the cervix. The remaining 286 isolates (6.1%) were from another body site. The majority of isolates were from males (4,017/4,703, 85.4%) while 665 isolates were from females (14.1%). The remaining isolates were from clients whose sex was unknown (21/4,703, 0.4%).

Since 2012, 0.4% (17/4,703) of isolates showed decreased susceptibility to cefixime (i.e. MIC  $\geq 0.25\mu\text{g/mL}$ ) (Figure 1), 0.2% (9/4,703) of isolates showed decreased susceptibility to ceftriaxone (i.e. MIC  $\geq 0.125\mu\text{g/mL}$ ) (Figure 2), and 1.7% (82/4,703) of isolates had MIC  $\geq 2\mu\text{g/mL}$  to azithromycin (Figure 3). There was a marked increase in the percentage of isolates with elevated MIC (i.e., MIC  $\geq 0.064\mu\text{g/mL}$ ) to cefixime observed from 2019 (10.3%) to 2020 and 2021 (21.0% and 19.0%, respectively). In contrast, there was a decrease in the percentage of isolates with elevated MIC (i.e. MIC  $\geq 0.5\mu\text{g/mL}$ ) to azithromycin from 2019 (23.9%) to 2020 and 2021 (12.3% and 16.2%, respectively). Note that the data are preliminary and subject to change.

The number of isolates tested in 2020 and 2021 were lower than previous years. In 2020 and 2021, 405 and 332 isolates, respectively, were tested for antimicrobial resistance compared with an annual mean of 496 isolates from 2012-2019. The decrease in antimicrobial resistance testing was predominantly among males and may be due to decreases in routine testing during the COVID-19 pandemic. Thus, clients who are symptomatic or with persistent symptoms may be over-represented

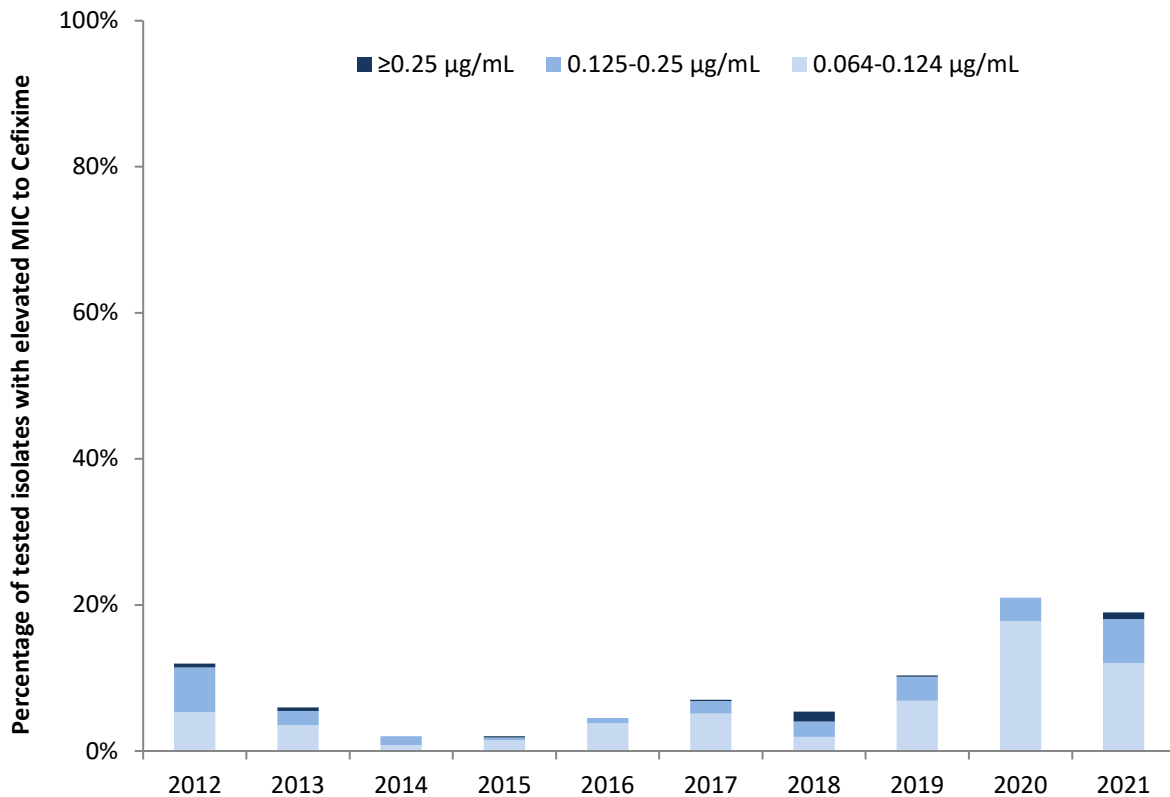


in the isolates tested in 2020 and 2021 compared to previous years. More investigation is needed to understand the reason for the increase in the proportion of isolates with reduced susceptibility.

Monitoring trends in MICs help inform empiric treatment guidance for gonorrhoea. Clinicians should be vigilant for treatment failure using current first line agents. Test of cure is also recommended for individuals with more serious infections or at risk of severe outcomes, such as individuals diagnosed with pelvic inflammatory disease, disseminated gonococcal infection, and pregnant individuals.(1)

The continued threat of emerging resistance reinforces the need for gonorrhoea prevention and control measures such as increased testing for gonorrhoea, partner testing and treatment of gonorrhoea, and tests of cure, as well as the need for antibiotic stewardship to ensure effective treatments for bacterial infections.

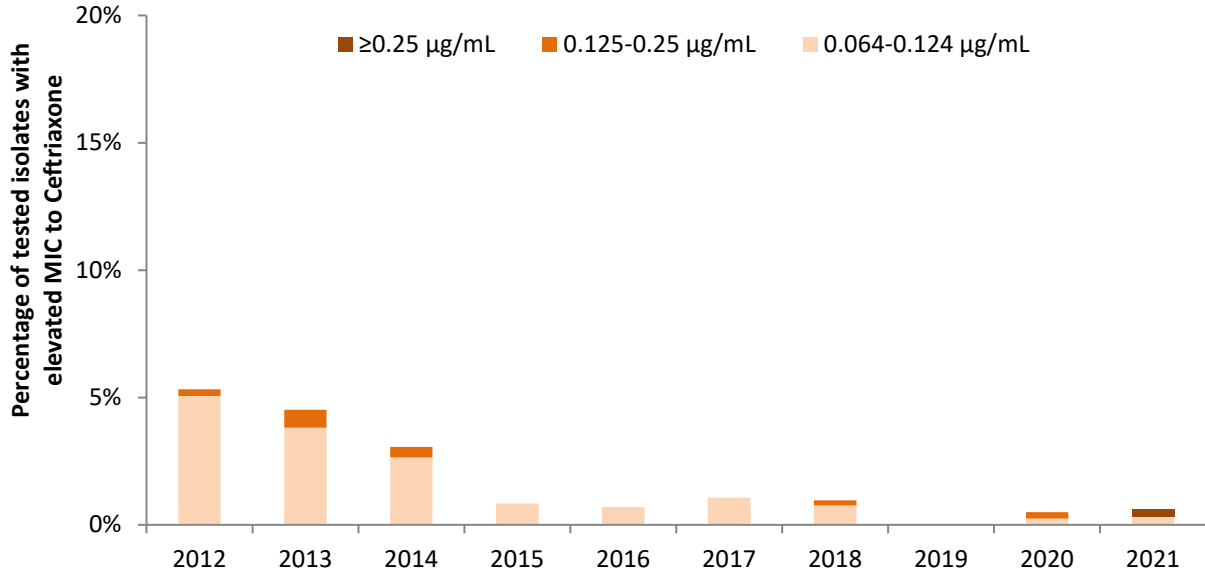
**Figure 1. Percentage of tested *N. gonorrhoeae* isolates with elevated minimum inhibitory concentrations (MIC) to Cefixime in BC, 2012 to 2021**



*\*Preliminary data and subject to change*

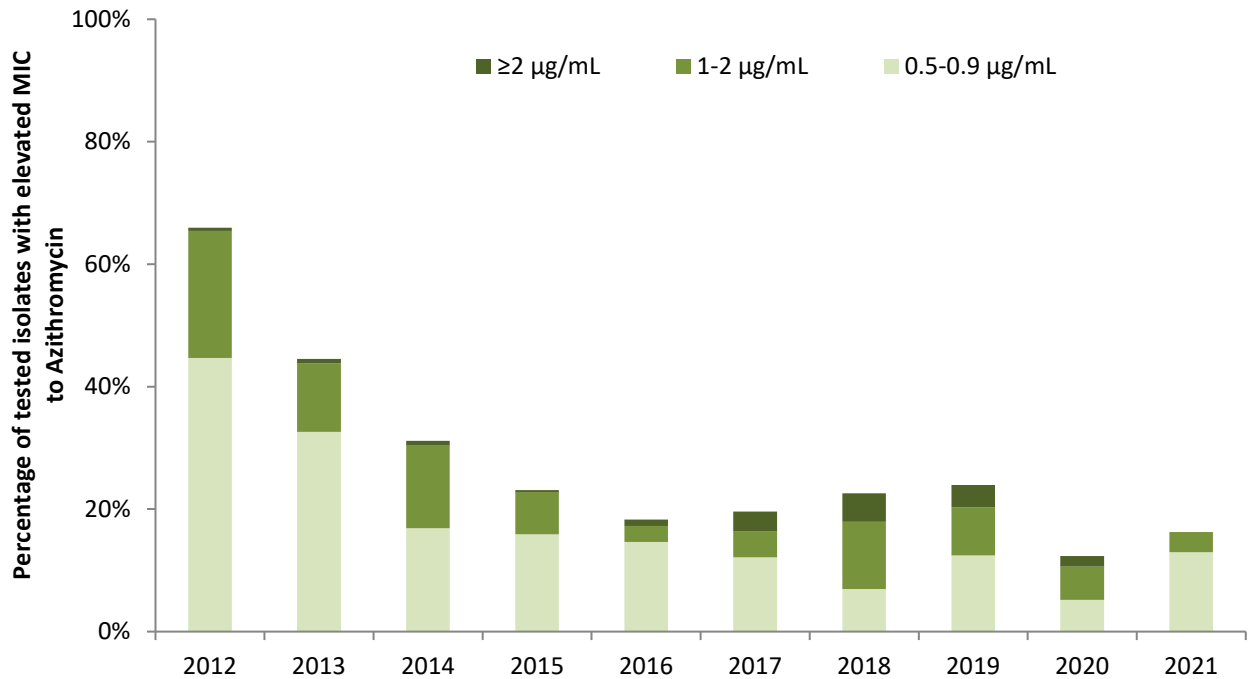


**Figure 2. Percentage of tested *N. gonorrhoeae* isolates with elevated minimum inhibitory concentrations (MIC) to Ceftriaxone in BC, 2012 to 2021**



*\*Preliminary data and subject to change*

**Figure 3. Percentage of tested *N. gonorrhoeae* isolates with elevated minimum inhibitory concentrations (MIC) to Azithromycin in BC, 2012 to 2021**



*\*Preliminary result and subject to change*

## References

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