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Australian Gonococcal Surveillance Program, 1 July to 30 September 2023

Monica M Lahra, Sebastiaan Van Hal, Tiffany R Hogan

# Introduction

The National Neisseria Network (NNN), Australia, established in 1979, comprises reference laboratories in each state and territory. Since 1981, the NNN has reported data for the Australian Gonococcal Surveillance Programme (AGSP), on antimicrobial susceptibility profiles for Neisseria gonorrhoeae isolated from each jurisdiction for an agreed group of agents. The antibiotics reported represent current or potential agents used for the treatment of gonorrhoea, and include ceftriaxone, azithromycin, ciprofloxacin and penicillin. More recently, gentamicin susceptibilities are included in the AGSP Annual Report.

Ceftriaxone, combined with azithromycin, is the recommended treatment regimen for gonorrhoea in the majority of Australia. However, there are substantial geographic differences in susceptibility patterns across Australia, with certain remote regions of the Northern Territory and Western Australia having low gonococcal antimicrobial resistance rates. In these regions, an oral treatment regimen comprising amoxycillin, probenecid, and azithromycin is recommended for the treatment of gonorrhoea. Additional data on other antibiotics are reported in the AGSP Annual Report. The AGSP has a programme-specific quality assurance process.

# Results

Table 1 provides a summary of the proportion of *Neisseria gonorrhoeae* isolates resistant to azithromycin, ciprofloxacin and penicillin for Quarter 3, 2023.

Table 1: Gonococcal isolates resistant to azithromycin, ciprofloxacin, and penicillin, Australia, 1 July to 30 September 2023, by state or territory

| Jurisdiction | Number of isolates tested | Resistancea |
| --- | --- | --- |
| Q3, 2023 | Azithromycin | Ciprofloxacin | Penicillin |
| n | % | n | % | n | % |
| Australian Capital Territory | 71 | 0 | 0 | 35 | 49.3 | 21 | 29.6 |
| New South Wales | 896 | 44 | 4.9 | 589 | 65.7 | 231 | 25.8 |
| Queensland | 373 | 10 | 2.7 | 199 | 53.4 | 104 | 27.9 |
| South Australia | 150 | 3 | 2.0 | 74 | 49.3 | 55 | 36.7 |
| Tasmania | 37 | 2 | 5.4 | 22 | 59.5 | 12 | 32.4 |
| Victoria | 671 | 50 | 7.5 | 469 | 69.9 | 236 | 35.2 |
| Northern Territory non-remote | 24 | 0 | 0 | 5 | 20.8 | 2 | 8.3 |
| Northern Territory remote | 17 | 0 | 0 | 3 | 17.6 | 0 | 0 |
| Western Australia non-remote | 262 | 15 | 5.7 | 151 | 57.6 | 85 | 32.4 |
| Western Australia remote | 19 | 1 | 5.3 | 3 | 15.8 | 3 | 15.8 |
| Australia | 2,520 | 125 | 5.0 | 1,550 | 61.5 | 749 | 29.7 |

a Resistance as defined by jurisdictional reporting criteria.

## Ceftriaxone

The AGSP has historically reported the category of ceftriaxone decreased susceptibility (DS) at minimum inhibitory concentration (MIC) values ≥ 0.064 mg/L, and has further differentiated those isolates with a MIC ≥ 0.125 mg/L in line with the 2012 World Health Organization criteria.1 In the third quarter of 2023, the proportion of *N. gonorrhoeae* isolates with ceftriaxone MIC values ≥ 0.064 mg/L (3.61%) remained lower than in 2022 (5.56%), and was lower also than the equivalent proportions in the first and second quarters of 2023 (3.81% and 4.27% respectively). Ceftriaxone DS in the third quarter of 2023 was mostly attributable to *Neisseria gonorrhoeae* with MIC values of 0.064 mg/L (3.33%), to which the largest contribution was from New South Wales (6.03%; 54/896). New South Wales has reported a clonal expansion of multilocus sequence type (MLST) ST-7827 *N. gonorrhoeae* strains in 2021 to 2022 and genomic analysis on these isolates is ongoing.2

In quarter three of 2023, seven isolates nationally had ceftriaxone MIC values ≥ 0.125 mg/L (0.28%; 7/2,520), reported from New South Wales (4), Victoria (2) and South Australia (1). Of these seven isolates, one of the two from Victoria (MIC value 0.25 mg/L), with travel history in South-East Asia, demonstrated extensive drug resistance to azithromycin (MIC value ≥ 256 mg/L), ciprofloxacin and penicillin. Results of genomic analysis of these isolates from the jurisdictions will be included in the annual report. Recently, there has been a spike of *N. gonorrhoeae* isolates with alert ceftriaxone MIC values in the United Kingdom,3 and two recent reports of extensively drug-resistant *N. gonorrhoeae* harbouring the mosaic *penA* 60.001 allele in Europe,4,5 with links to travel in South-East Asia.

## Azithromycin

Dual therapy using ceftriaxone plus azithromycin has been the recommended treatment for gonorrhoea in Australia since 2014 as a strategy to temper development of more widespread ceftriaxone resistance. The proportion of azithromycin resistant *N. gonorrhoeae* in Australia increased in the third quarter of 2023 from 4.0% to 5.0% (Table 2); this proportion has nonetheless remained relatively stable since 2019. Globally, there have been reports of increased azithromycin resistance in *N. gonorrhoeae*, heightened since dual therapy was introduced.6 The AGSP trend data for azithromycin resistance since 2010 is shown in Table 2.

Of note since 2022, there has been a rising number of *N. gonorrhoeae* isolates reported by the AGSP exhibiting high-level azithromycin resistance (defined as MIC values ≥ 256 mg/L). In the third quarter of 2023 there were a total of eight isolates nationally exhibiting high-level azithromycin resistance, six from Victoria (including one isolate demonstrating extensive drug resistance) and two from New South Wales.

Patients with extragenital gonococcal infections, and those with infections with *N. gonorrhoeae* with raised MIC values to ceftriaxone, should have test of cure cultures collected following treatment.7 Continued surveillance to monitor *N. gonorrhoeae* with elevated MIC values, coupled with sentinel site surveillance in high-risk populations, remain essential to inform therapeutic strategies, identify incursion of resistant strains, and detect instances of treatment failure.

Table 2: Proportion of gonococcal isolates with ceftriaxone MIC values 0.064 and ≥ 0.125 mg/L and resistance to azithromycin, Australia, 2010 to 2022 and 1 January to 31 March 2023 and 1 April to 30 June 2023 and 1 July to 30 September 2023

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023Q1 | 2023Q2 | 2023Q3 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of isolates tested nationally | 4,100 | 4,230 | 4,718 | 4,897 | 4,804 | 5,411 | 6,378 | 7,835 | 9,006 | 9,668 | 7,222 | 6,254 | 8,199 | 2,413 | 2,454 | 2,520 |
| Ceftriaxone MIC 0.064 mg/L | 4.80% | 3.20% | 4.10% | 8.20% | 4.80% | 1.70% | 1.65% | 1.02% | 1.67% | 1.19% | 0.87% | 0.83% | 5.05% | 3.52% | 4.03% | 3.33% |
| Ceftriaxone MIC ≥ 0.125 mg/L | 0.10% | 0.10% | 0.30% | 0.60% | 0.60% | 0.10% | 0.05% | 0.04% | 0.06% | 0.11% | 0.07% | 0.03% | 0.51% | 0.29% | 0.24% | 0.28% |
| **Total proportion of isolates with ceftriaxone MIC values ≥ 0.064 mg/L** | 4.90% | 3.30% | 4.40% | 8.80% | 5.40% | 1.80% | 1.70% | 1.06% | 1.73% | 1.30% | 0.94% | 0.86% | 5.56% | 3.81% | 4.27% | 3.61% |
| Azithromycin resistance | n/a | 1.1% | 1.3% | 2.1% | 2.5% | 2.6% | 5.0% | 9.3% | 6.2% | 4.6% | 3.9% | 4.7% | 3.9% | 4.5% | 4.0% | 5.0% |

# Author details

Monica M Lahra1,2

Sebastiaan van Hal3

Tiffany R Hogan1

1. The World Health Organization Collaborating Centre for STI and AMR, Sydney and Neisseria Reference Laboratory, NSW Health Pathology, Microbiology, The Prince of Wales Hospital, Randwick, NSW 2031, Australia
2. School of Medical Sciences, Faculty of Medicine, the University of New South Wales, Kensington, NSW 2052, Australia
3. Molecular Microbiology, Royal Prince Alfred Hospital, Camperdown, NSW 2050, Australia

Corresponding author

Professor Monica M Lahra

The World Health Organization Collaborating Centre for STI and AMR, Sydney and Neisseria Reference Laboratory, NSW Health Pathology Microbiology, The Prince of Wales Hospital, Randwick, NSW 2031, Australia

Telephone: +61 2 9382 3678

Facsimile: +61 2 9382 3720

Email: monica.lahra@health.nsw.gov.au

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