2025 • Volume • • Electronic publication date:

Australian Gonococcal Surveillance Programme, 1 April to 30 June 2024

Monica M Lahra, Sebastiaan Van Hal, Sonya Natasha Hutabarat, 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 and tetracycline are included in the AGSP Annual Report.

Ceftriaxone, combined with azithromycin, is the recommended treatment regimen for gonorrhoea in the majority of Australia. Historically, there were 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 was recommended. However, since January 2023, an increase in cases of penicillin-resistant *N. gonorrhoeae* reported in the Northern Territory has led to a change in recommendations to align with the majority of Australia for the treatment of gonorrhoea.1 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 2, 2024.

Table 1: Gonococcal isolates resistant to azithromycin, ciprofloxacin, and penicillin, Australia, 1 April to 30 June 2024, by state or territory

| Jurisdiction | Number of isolates tested Q2, 2024 | Resistancea | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Azithromycin | | Ciprofloxacin | | Penicillin | |
| n | % | n | % | n | % |
| Australian Capital Territory | 72 | 2 | 2.8 | 40 | 55.6 | 14 | 19.4 |
| New South Wales | 954 | 42 | 4.4 | 511 | 53.6 | 357 | 37.4 |
| Queensland | 358 | 13 | 3.6 | 231 | 64.5 | 108 | 30.2 |
| South Australia | 201 | 17 | 8.5 | 111 | 55.2 | 43 | 21.4 |
| Tasmania | 27 | 0 | 0 | 14 | 51.9 | 10 | 37.0 |
| Victoria | 925 | 71 | 7.7 | 532 | 57.5 | 346 | 37.4 |
| Northern Territory non-remote | 19 | 1 | 5.3 | 2 | 10.5 | 1 | 5.3 |
| Northern Territory remote | 19 | 1 | 5.3 | 0 | 0 | 1 | 5.3 |
| Western Australia non-remote | 265 | 16 | 6.0 | 165 | 62.3 | 71 | 26.8 |
| Western Australia remote | 19 | 0 | 0 | 4 | 21.1 | 3 | 15.8 |
| Australia | 2,859 | 163 | 5.7 | 1,610 | 56.3 | 954 | 33.4 |

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.2 The proportion of *N. gonorrhoeae* with ceftriaxone MIC values ≥ 0.125 mg/L declined from 0.51% in 2022 to 0.22% in 2023 (Table 2). In the second quarter of 2024, there were 21 *N. gonorrhoeae* with ceftriaxone MIC values ranging from 0.125 to 0.5 mg/L reported nationally (21/2,859; 0.73%) (Table 2). There were 11 such isolates from New South Wales, four from Victoria, four from non-remote Western Australia and two from Queensland. Notably, 15/21 isolates carried the mosaic *penA* 60.001 allele (key target associated with ceftriaxone resistance),3 reported from New South Wales (10), non-remote Western Australia (3), Queensland (1) and Victoria (1), and had ceftriaxone MIC values of 0.125 and 0.5 mg/L.

In this quarter there were two isolates from non-remote Western Australia that had the extensively drug-resistant (XDR) phenotype, displaying high-level resistance to azithromycin and resistance to ceftriaxone, both of multilocus sequence type MLST-16406; these follow the report of one such isolate in Western Australia in quarter one 2024. There has been a spike in detection of XDR *N. gonorrhoeae* MLST-16406 isolates in Australia, and globally, since 2022.4

The AGSP has traditionally monitored *N. gonorrhoeae* isolates with ceftriaxone MIC values of 0.064 mg/L; the proportion of these continues to decrease, with 2.24% reported in the second quarter of 2024, down from 5.05% in 2022, 3.29% in 2023 and 2.88% in the first quarter of 2024 (Table 2).5,6

## 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 was 5.7% in the second quarter of 2024, higher than reported in 2023 (4.5%) and in the first quarter of 2024 (3.3%) (Table 2). Globally, there have been reports of increased azithromycin resistance in *N. gonorrhoeae*, heightened since dual therapy was introduced.7 The AGSP trend data for azithromycin resistance since 2010 are shown in Table 2.

Of concern since 2022 has been the rising number of *N. gonorrhoeae* isolates reported by the AGSP with high-level azithromycin resistance (defined as MIC values ≥ 256 mg/L). In the second quarter of 2024, fifteen such isolates (0.52%) were reported, with the majority reported in New South Wales (9), and the remainder in Victoria (2), non-remote Western Australia (2), the Australian Capital Territory (1) and Queensland (1). This follows the 19 isolates with high-level azithromycin resistance in quarter one of 2024, the highest number reported per quarter by the AGSP. From genomic analyses, eleven isolates in quarter two are of sequence type (MLST) 11200 (11/15) with resistance to ciprofloxacin but susceptibility to ceftriaxone.

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.8 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, to identify incursion of resistant strains, and to detect instances of treatment failure.

Table 2: The national number of gonococcal isolates and proportion of *N. gonorrhoeae* with ceftriaxone MIC values 0.064 and ≥ 0.125 mg/L and resistance to azithromycin, Australia, 2010 to 2023 and 1 January to 31 March 2024 and 1 April to 30 June 2024

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 Q1 | 2024 Q2 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 | 10,105 | 2,920 | 2,859 |
| 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% | 3.29% | 2.88% | 2.24% |
| 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% | 0.22% | 0.31% | 0.73% |
| **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%** | **3.51%** | **3.19%** | **2.97%** |
| 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% | 3.3% | 5.7% |

Author details

Monica M Lahra1,2

Sebastiaan van Hal3

Sonya Natasha Hutabarat4

Tiffany R Hogan1

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

Corresponding author

Professor Monica M Lahra

World Health Organization Collaborating Centre for STI and AMR and Neisseria Reference Laboratory, Microbiology Department, NSW Health Pathology, 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

# References

1. Northern Territory Government Department of Health (NT Health) Centre for Disease Control. Penicillinase-producing *Neisseria gonorrhoeae* (PPNG) and treatment recommendations for gonorrhoea. Darwin: NT Health; 11 March 2024. [Accessed on 11 July 2024.] Available from: https://health.nt.gov.au/\_\_data/assets/pdf\_file/0008/1356146/health-alert-ppng-240311.pdf.
2. World Health Organization (WHO). Global action plan to control the spread and impact of antimicrobial resistance in *Neisseria gonorrhoeae*. Geneva: WHO; 2012. Available from: https://apps.who.int/iris/handle/10665/44863.
3. Day M, Pitt R, Mody N, Saunders J, Rai R, Nori A et al. Detection of 10 cases of ceftriaxone-resistant *Neisseria gonorrhoeae* in the United Kingdom, December 2021 to June 2022. *Euro Surveill*. 2022;27(46):2200803. doi: https://doi.org/10.2807%2F1560-7917.ES.2022.27.46.2200803.
4. van Hal SJ, Sherry N, Coombs G, Mowlaboccus, S, Whiley DM, Lahra MM. Emergence of an extensively drug-resistant *Neisseria gonorrhoeae* clone. *Lancet Infect Dis*. 2024;24(9):e547–8. doi: https://doi.org/10.1016/S1473-3099(24)00486-9.
5. Lahra MM, Van Hal S, Hogan TR. Australian Gonococcal Surveillance Programme Annual Report, 2022. *Commun Dis Intell (2018)*. 2023;47. doi: https://doi.org/10.33321/cdi.2023.47.45.
6. van Hal SJ, Whiley DM, Le T, Ray S, Kundu RL, Kerr E et al. Rapid expansion of *Neisseria gonorrhoeae* ST7827 clone in Australia, with variable ceftriaxone phenotype unexplained by genotype. *J Antimicrob Chemother*. 2023;78(9):2203–2208. doi: https://doi.org/10.1093/jac/dkad221.
7. Unemo M. Current and future antimicrobial treatment of gonorrhoea – the rapidly evolving *Neisseria gonorrhoeae* continues to challenge. *BMC Infect Dis*. 2015;15:364. doi: https://doi.org/10.1186/s12879-015-1029-2.
8. Ong JJ, Bourne C, Dean JA, Ryder N, Cornelisse VJ, Murray S et al. Australian sexually transmitted infection (STI) management guidelines for use in primary care, 2022 update. *Sex Health*. 2023;20(1):1–8. doi: https://doi.org/10.1071/SH22134.

© Commonwealth of Australia as represented by the Department of Health and Aged Care

ISSN: 2209-6051 Online

This journal is indexed by Index Medicus and Medline.

Creative Commons Licence

This publication is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International Licence (CC BY-NC-ND) available from https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode (Licence). You must read and understand the Licence before using any material from this publication.

Restrictions

The Licence does not cover, and there is no permission given for, use of any of the following material found in this publication (if any):

* the Commonwealth Coat of Arms (by way of information, the terms under which the Coat of Arms may be used can be found on the Department of Prime Minister and Cabinet website;
* any logos (including the Department of Health and Aged Care’s logo) and trademarks;
* any photographs and images;
* any signatures; and
* any material belonging to third parties.

Disclaimer

Opinions expressed in *Communicable Diseases Intelligence* are those of the authors and not necessarily those of the Department of Health and Aged Care or the Communicable Diseases Network Australia. Data may be subject to revision.

Enquiries

Enquiries regarding any other use of this publication should be addressed to the CDI Editor at: cdi.editor@health.gov.au.

Communicable Diseases Network Australia

Communicable Diseases Intelligence contributes to the work of the [Communicable Diseases Network Australia](http://www.health.gov.au/cdna).

About Communicable Diseases Intelligence

*Communicable Diseases Intelligence* (CDI) is a peer-reviewed scientific journal published by the Health Security & Emergency Management Division, Department of Health and Aged Care. The journal aims to disseminate information on the epidemiology, surveillance, prevention and control of communicable diseases of relevance to Australia.

**Editor**: Christina Bareja • **Deputy Editor**: Simon Petrie • **Design and Production**: Lisa Thompson

**Editorial Advisory Board**: David Durrheim, Mark Ferson, Clare Huppatz, John Kaldor, Martyn Kirk and Meru Sheel

Submit an Article

Submit your next communicable disease related article to CDI for consideration. [Information for authors](https://www1.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-cdi-auth_inst.htm) and details on how to [submit your publication](https://www1.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-cdi-auth_inst.htm#submission_package) is available on our website, or by email at [cdi.editor@health.gov.au](mailto:cdi.editor@health.gov.au).

Contact us

Communicable Diseases Intelligence (CDI)

Health Security & Emergency Management Division

Department of Health and Aged Care

GPO Box 9848, CANBERRA ACT 2601

Website: [www.health.gov.au/cdi](http://www.health.gov.au/cdi)

Email: [cdi.editor@health.gov.au](mailto:cdi.editor@health.gov.au)