



Australian Government
**Department of Health
and Aged Care**

2023 · Volume 47

Communicable Diseases Intelligence

Australian Gonococcal Surveillance Programme, 1 July to 30 September 2022

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<https://doi.org/10.33321/cdi.2023.47.29>

Electronic publication date: 25/05/2023

<http://health.gov.au/cdi>

Communicable Diseases Intelligence

ISSN: 2209-6051 Online

This journal is indexed by Index Medicus and Medline.

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Communicable Diseases Intelligence (CDI) is a peer-reviewed scientific journal published by the Office of Health Protection, 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.

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Australian Gonococcal Surveillance Programme, 1 July to 30 September 2022

Monica M Lahra, Siobhan M Hurley, Sanghamitra Ray and 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 amoxicillin, 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, 2022.

Ceftriaxone

The AGSP has historically reported the category of ceftriaxone decreased susceptibility (DS) at minimum inhibitory concentration (MIC) values ≥ 0.06 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 The acute increase in the proportion of *N. gonorrhoeae* isolates with ceftriaxone MICs ≥ 0.06 mg/L, seen in the first quarter of 2022, was sustained into the third quarter of the year and now accounts for 7.8% of national isolates. Most of the increase in quarter three is attributable to the rise of isolates with MIC values of 0.06 mg/L (7.3% nationally), largely from New South Wales (131/159, 82.4%), where these isolates were resistant to ciprofloxacin but susceptible to azithromycin. There were eleven *N. gonorrhoeae* isolates with ceftriaxone MIC values ≥ 0.125 mg/L reported in this quarter, again predominantly from New South Wales (8), two from Victoria and one from non-remote Western Australia. In New South Wales, genomic analysis has identified the 139 isolates with ceftriaxone MIC values ≥ 0.06 mg/L as highly clonal with limited genomic diversity within multilocus sequence type (ST) 7827. The New South Wales isolates are tightly clustered, indicating widespread dissemination of a single clone across the state, in both males and females. Other jurisdictions are investigating.

Azithromycin

In the third quarter of 2022, the proportion of isolates resistant to azithromycin in Australia was 3.7% (Table 2), similar to quarter 2 but higher than the first quarter of 2022 (2.2%), and yet remaining lower than the annual

Table 1: Gonococcal isolates resistant to azithromycin, ciprofloxacin, and penicillin, Australia, 1 July to 30 September 2022, by state or territory

Jurisdiction	Number of isolates tested	Resistance ^a					
		Azithromycin		Ciprofloxacin		Penicillin	
	Q3, 2022	n	%	n	%	n	%
Australian Capital Territory	71	3	4.2	39	54.9	24	33.8
New South Wales	793	31	3.9	600	75.7	297	37.5
Queensland	363	11	3.0	196	54.0	124	34.2
South Australia	104	0	0	60	57.7	55	52.9
Tasmania	21	1	4.8	6	28.6	4	19.0
Victoria	629	32	5.1	443	70.4	267	42.4
Northern Territory non-remote	30	0	0	11	36.7	9	30.0
Northern Territory remote	38	0	0	1	2.6	1	2.6
Western Australia non-remote	127	4	3.1	52	40.9	35	27.6
Western Australia remote	17	0	0	2	11.8	3	17.6
Australia	2,193	82	3.7	1,410	64.3	819	37.3

a Resistance as defined by jurisdictional reporting criteria.

proportions reported nationally in 2021 (4.7%) and 2020 (3.9%).² It should be noted that there is variation in antimicrobial susceptibility testing methodology in the jurisdictions and so resistance is defined accordingly. The AGSP trend data for azithromycin resistance since 2010 is shown in Table 2. Globally, there have been reports of increased azithromycin resistance in *N. gonorrhoeae*, heightened since dual therapy was introduced.³ Of note, there were two isolates reported from Queensland displaying high-level resistance to azithromycin, defined as MIC values ≥ 256 mg/L. In the third quarter of 2022, all jurisdictions reported isolates with resistance to azithromycin, except for the Northern Territory, South Australia and remote regions of Western Australia.

Dual therapy using ceftriaxone plus azithromycin is the recommended treatment for gonorrhoea as a strategy to temper development of more widespread ceftriaxone resistance. Patients with infections in extragenital sites, where the isolate has decreased susceptibility to ceftriaxone, should have test of cure cultures

collected. 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: Percentage of gonococcal isolates with ceftriaxone MIC values 0.06 and ≥ 0.125 mg/L and resistance to azithromycin, Australia, 2010 to 2021 and 1 January to 31 March 2022, 1 April to 30 June 2022 and 1 July to 30 September 2022

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 Q1	2022 Q2	2022 Q3
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	1,812	2,152	2,193
Ceftriaxone MIC 0.06 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%	3.97%	3.53%	7.25%
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%	0.33%	0.60%	0.50%
Total proportion of isolates with ceftriaxone MIC values ≥ 0.06 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%	4.30%	4.13%	7.75%
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%	2.2%	3.8%	3.7%

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