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## Australian Gonococcal Surveillance Programme, 1 October to 31 December 2023

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# Communicable Diseases Intelligence

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## 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. 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 4, 2023.

## Ceftriaxone

The AGSP has historically reported the category of ceftriaxone decreased susceptibility (DS) at minimum inhibitory concentration (MIC) values  $\geq 0.064$  mg/L, and has further differentiated those isolates with a MIC  $\geq 0.125$  mg/L in line with the 2012 World Health Organization criteria.<sup>1</sup> The proportion of *N. gonorrhoeae* with ceftriaxone MIC values  $\geq 0.125$  mg/L declined from 0.51% in 2022 to 0.24–0.29% in the first three quarters of 2023 (Table 2). In quarter four of 2023, there were two such isolates reported nationally (2/2,719; 0.07%) (Table 2), one from Queensland and one from Victoria. Of note, the Victorian isolate had a ceftriaxone MIC value of 1.0 mg/L and was also resistant to ciprofloxacin and penicillin but susceptible to azithromycin. Results of genomic analysis identified the isolate as sequence type ST-1901 and possessing the mosaic *penA* 60.001 allele, the key target associated with ceftriaxone resistance.<sup>2</sup>

The AGSP has traditionally monitored *N. gonorrhoeae* isolates with ceftriaxone MIC values of 0.064 mg/L and the proportion of these continues to decrease, with 2.35% reported this quarter, down from 5.05% in 2022 and 3.33–4.03% in the first three quarters of 2023 (Table 2). This followed a surge in ceftriaxone DS strains reported in 2022, mostly attributed to *N. gonorrhoeae* with ceftriaxone MIC values 0.064 mg/L (5.05%), and which, when investigated, were found to be largely caused by the clonal expansion of sequence type ST-7827 in New South Wales.<sup>3</sup>

**Table 1: Gonococcal isolates resistant to azithromycin, ciprofloxacin, and penicillin, Australia, 1 October to 31 December 2023, by state or territory**

Jurisdiction	Number of isolates tested	Resistance <sup>a</sup>					
	Q4, 2023	Azithromycin		Ciprofloxacin		Penicillin	
		n	%	n	%	n	%
Australian Capital Territory	62	0	0	35	56.5	16	25.8
New South Wales	1,026	42	4.1	625	60.9	229	22.3
Queensland	373	10	2.7	216	57.9	159	42.6
South Australia	152	1	0.7	65	42.8	31	20.4
Tasmania	35	5	14.3	19	54.3	7	20.0
Victoria	736	40	5.4	391	63.2	216	34.9
Northern Territory non-remote	31	3	9.7	12	38.7	1	3.2
Northern Territory remote	14	0	0	2	14.3	2	14.3
Western Australia non-remote	267	27	10.1	175	65.5	80	30.0
Western Australia remote	23	1	4.3	3	13.0	1	4.3
<b>Australia</b>	<b>2,719</b>	<b>129</b>	<b>4.7</b>	<b>1,543</b>	<b>56.7</b>	<b>742</b>	<b>27.3</b>

a Resistance defined by jurisdictional reporting criteria.

## 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 lower in the fourth quarter of 2023 (4.7%) than in the third quarter of 2023 (5.0%) (Table 2) but has remained at a relatively stable level since 2019. Globally, there have been reports of increased azithromycin resistance in *N. gonorrhoeae*, heightened since dual therapy was introduced.<sup>4</sup> The AGSP trend data for azithromycin resistance since 2010 are 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  $\geq 256$  mg/L). In the fourth quarter of 2023, nine isolates reported from New South Wales (5) and Victoria (4) exhibited high-level resistance to azithromycin. Twenty-seven such isolates were reported in total for 2023, predominantly from New South Wales and Victoria.

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.<sup>5</sup> 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: The national number of gonococcal isolates and proportion of *N. gonorrhoeae* with ceftriaxone MIC values 0.064 and  $\geq 0.125$  mg/L and resistance to azithromycin, Australia, 2010 to 2022 and 1 January to 31 March 2023, 1 April to 30 June 2023, 1 July to 30 September 2023 and 1 October to 31 December 2023**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 Q1	2023 Q2	2023 Q3	2023 Q4
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	2,719
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%	2.35%
Ceftriaxone MIC $\geq 0.125$ 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%	0.07%
<b>Total proportion of isolates with ceftriaxone MIC values <math>\geq 0.064</math> mg/L</b>	<b>4.90%</b>	<b>3.30%</b>	<b>4.40%</b>	<b>8.80%</b>	<b>5.40%</b>	<b>1.80%</b>	<b>1.70%</b>	<b>1.06%</b>	<b>1.73%</b>	<b>1.30%</b>	<b>0.94%</b>	<b>0.86%</b>	<b>5.56%</b>	<b>3.81%</b>	<b>4.27%</b>	<b>3.61%</b>	<b>2.42%</b>
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%	4.7%

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