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## Australian Gonococcal Surveillance Programme, 1 July to 30 September 2023

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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 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, 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> In the third quarter of 2023, the proportion of *N. gonorrhoeae* isolates with ceftriaxone MIC values  $\geq 0.064$  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.<sup>2</sup>

In quarter three of 2023, seven isolates nationally had ceftriaxone MIC values  $\geq 0.125$  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  $\geq 256$  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,<sup>3</sup> and two recent reports of extensively drug-resistant *N. gonorrhoeae* harbouring the mosaic *penA* 60.001 allele in Europe,<sup>4,5</sup> with links to travel in South-East Asia.

**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	Resistance <sup>a</sup>					
	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
<b>Australia</b>	<b>2,520</b>	<b>125</b>	<b>5.0</b>	<b>1,550</b>	<b>61.5</b>	<b>749</b>	<b>29.7</b>

a Resistance as 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 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.<sup>6</sup> 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  $\geq 256$  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.<sup>7</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 and 1 July to 30 September 2023**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 Q1	2023 Q2	2023 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	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 $\geq 0.125$ 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%
<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>
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%

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