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Australian Gonococcal Surveillance Programme, 1 April to 30 June 2024

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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. 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 amoxicillin, 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.

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Results

Table 1 provides a summary of the proportion of *Neisseria gonorrhoeae* isolates resistant to azithromycin, ciprofloxacin and penicillin for Quarter 2, 2024.

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

^a Resistance as defined by jurisdictional reporting criteria.

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%

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