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Australian Gonococcal Surveillance Programme, 1 July to 30 September 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 3, 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 first quarter of 2024, the proportion of these isolates increased to 0.31% (9 isolates) and continued to rise to 0.73% (21 isolates) in the second quarter but fell to 0.38% (10/2,628) in the third quarter of 2024. These ten *N. gonorrhoeae* isolates in quarter three had ceftriaxone MIC values ranging from 0.125 to 0.5 mg/L and were reported nationally (Table 2): four from New South Wales, four from Victoria, one from Queensland and one from South Australia. Notably, all isolates carried the mosaic *penA* 60.001 allele (key target associated with ceftriaxone resistance).³

In this quarter, there were two isolates from Queensland and Victoria that had the XDR phenotype (displaying high-level resistance to azithromycin and resistance to ceftriaxone); both had the multilocus sequence type MLST-16406. A total of five XDR isolates have been reported in 2024 to date, all MLST-16406 and harbouring the mosaic *penA* 60.001 allele, from non-remote Western Australia (3), Queensland (1) and Victoria (1). 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 1.67% reported in the third quarter of 2024, down from 5.05% in 2022, 3.29% in 2023, 2.88% in the first quarter of 2024 and 2.24% in the second 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 4.5% in the third quarter of 2024, the same proportion as reported in 2023 (4.5%); this was higher than that reported in the first quarter of 2024 (3.3%) but lower than in the second quarter of 2024 (5.7%) (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 third quarter of 2024, six such isolates (0.23%) were reported, in Victoria (2), the Australian Capital Territory (1), New South Wales (1), Queensland (1) and South Australia (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 and 15 such isolates in quarter two of 2024.

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 July to 30 September 2024, by state or territory

Jurisdiction	Resistance ^a														
	Number of isolates tested Q3, 2024			Azithromycin			Number of isolates tested ^b Q3, 2024			Ciprofloxacin			Penicillin		
	n	%		n	%		n	%		n	%		n	%	
Australian Capital Territory	57		4	7.0		55		33	60.0		13		23.6		
New South Wales	923		28	3.0		708		394	55.6		211		29.8		
Queensland	358		10	2.8		352		224	63.6		111		31.5		
South Australia	157		5	3.2		157		92	58.6		35		22.3		
Tasmania	26		2	7.7		26		19	73.1		2		7.7		
Victoria	759		60	7.9		750		417	55.6		285		38.0		
Northern Territory non-remote	32		0	0		32		6	18.8		5		15.6		
Northern Territory remote	10		0	0		10		1	10.0		2		20.0		
Western Australia non-remote	289		10	3.5		288		147	51.0		66		22.9		
Western Australia remote	17		0	0		17		6	35.3		5		29.4		
Australia	2,628		119	4.5		2,395		1,339	55.9		735		30.7		

a Resistance as defined by jurisdictional reporting criteria.

b A subset of *N. gonorrhoeae* isolates (2,395/2,628; 91.1%) in the third quarter of 2024 underwent antimicrobial susceptibility testing to ciprofloxacin and penicillin.

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, 1 April to 30 June 2024 and 1 July to 30 September 2024

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 Q1	2024 Q2	2024 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	10,105	2,920	2,859	2,628
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%	1.67%
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%	0.38%
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%	2.05%
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%	4.5%

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