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## **Australian Gonococcal Surveillance Programme, 1 April to 30 June 2022**

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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 2 2022.

## Ceftriaxone

The AGSP has historically reported the category of ceftriaxone decreased susceptibility (DS) at minimum inhibitory concentration (MIC) values  $\geq 0.06$  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 second quarter of 2022, 4.1% of *N. gonorrhoeae* isolates had MIC values  $\geq 0.06$  mg/L, continuing the sharp rise in proportion of these isolates seen in the first quarter of 2022, as shown in Table 2. Of ongoing concern is the increasing proportion of *N. gonorrhoeae* with ceftriaxone MICs  $\geq 0.125$  mg/L, with thirteen such isolates reported; the majority of such isolates were reported from New South Wales (7) with other instances reported from Victoria (3), non-remote Western Australia (2) and South Australia (1). Jurisdictional genomic investigations are in progress.<sup>2</sup>

## Azithromycin

In the second quarter of 2022, the proportion of isolates resistant to azithromycin in Australia was 3.8% (Table 2), higher than in the first quarter of 2022 (2.2%) but remaining lower than the annual proportions reported nationally in 2021 (4.7%) and 2020 (3.9%). 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.<sup>3</sup> Of note, two isolates from New South Wales and Queensland exhibited high-level resistance to azithromycin,

**Table 1: Gonococcal isolates resistant to azithromycin, ciprofloxacin, and penicillin, Australia, 1 April to 30 June 2022, by state or territory**

Jurisdiction	Number of isolates tested	Resistance <sup>a</sup>					
		Azithromycin		Ciprofloxacin		Penicillin	
	Q2, 2022	n	%	n	%	n	%
Australian Capital Territory	40	0	0	21	52.5	17	42.5
New South Wales	767	16	2.1	589	76.8	300	39.1
Queensland	312	1	0.3	143	45.8	111	35.6
South Australia	125	0	0	63	50.4	47	37.6
Tasmania	27	0	0	17	63.0	9	33.3
Victoria	687	60	8.7	498	72.5	345	50.2
Northern Territory non-remote	23	0	0	4	17.4	6	26.1
Northern Territory remote	43	0	0	2	4.7	2	4.7
Western Australia non-remote	103	5	4.9	40	38.8	41	39.8
Western Australia remote	25	0	0	1	4.0	0	0
<b>Australia</b>	<b>2,152</b>	<b>82</b>	<b>3.8</b>	<b>1,378</b>	<b>64.0</b>	<b>878</b>	<b>40.8</b>

a Resistance as defined by jurisdictional reporting criteria.

defined as MIC values  $\geq 256$  mg/L. In the second quarter of 2022, all jurisdictions reported isolates with resistance to azithromycin, except for the Australian Capital Territory, the Northern Territory, South Australia, Tasmania 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  $\geq 0.125$  mg/L and resistance to azithromycin, Australia, 2010 to 2021 and 1 January to 31 March 2022 and 1 April to 30 June 2022.**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 Q1	2022 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	1,812	2,152
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%
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%	0.33%	0.60%
<b>Total proportion of isolates with ceftriaxone MIC values <math>\geq 0.06</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>4.30%</b>	<b>4.13%</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%	2.2%	3.8%

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