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Australian Gonococcal Surveillance Programme, 1 October to 31 December 2022

Monica M Lahra, Siobhan M Hurley, Sebastiaan Van Hal and Tiffany R Hogan

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 4, 2022.

Ceftriaxone

The AGSP has historically reported the category of ceftriaxone decreased susceptibility (DS) at minimum inhibitory concentration (MIC) values ≥ 0.06 mg/L, and has further differentiated those isolates with a MIC ≥ 0.125 mg/L in line with the 2012 World Health Organization criteria.¹ The sharp rise in the proportion of *N. gonorrhoeae* isolates with ceftriaxone MICs ≥ 0.06 mg/L, seen in quarter one, was sustained throughout 2022 and largely attributable to the expansion of multilocus sequence type (ST)-7827 clone circulating in New South Wales (all resistant to penicillin and ciprofloxacin and susceptible to azithromycin).²

In quarter 4 of 2022, five *N. gonorrhoeae* isolates from New South Wales (3), Victoria (1) and non-remote Western Australia (1) all had ceftriaxone MIC values of 0.5 mg/L. Genomic analysis of these isolates indicated the presence of the mosaic *penA* 60.001 allele. Increased notifications of such isolates have been reported in the United Kingdom, associated with travel from the Asia-Pacific region and conferring ceftriaxone resistance.³ Critically, the Western Australian isolate additionally demonstrated extensive drug resistance to azithromycin (high level resistance, MIC ≥ 256 mg/L), ciprofloxacin and penicillin, and identified as ST-16406. Comparative genomic analyses continue as resistant isolates arise. Globally, extensively drug-resistant and ceftriaxone decreased susceptible *N. gonorrhoeae* harbouring the mosaic *penA* 60.001 allele have been sporadic and isolated occurrences.

Table 1: Gonococcal isolates resistant to azithromycin, ciprofloxacin, and penicillin, Australia, 1 October to 31 December 2022, by state or territory

Jurisdiction	Number of isolates tested	Resistance ^a					
		Azithromycin		Ciprofloxacin		Penicillin	
	Q4, 2022	n	%	n	%	n	%
Australian Capital Territory	63	4	6.3	36	57.1	23	36.5
New South Wales	636	43	6.8	458	72.0	236	37.1
Queensland	381	15	3.9	208	54.6	139	36.5
South Australia	126	3	2.4	58	46.0	49	38.9
Tasmania	17	1	5.9	7	41.2	6	35.3
Victoria	628	41	6.5	464	73.9	312	49.7
Northern Territory non-remote	23	1	4.3	3	13.0	3	13.0
Northern Territory remote	50	0	0	1	2.0	0	0
Western Australia non-remote	146	3	2.1	60	41.1	31	21.2
Western Australia remote	14	0	0	1	7.1	1	7.1
Australia	2,084	111	5.3	1,296	62.2	800	38.4

a Resistance as defined by jurisdictional reporting criteria.

Azithromycin

The proportion of isolates resistant to azithromycin in Australia gradually increased over 2022 and in the fourth quarter reached 5.3% (Table 2), higher than annual proportions reported nationally in 2021 (4.7%) and 2020 (3.9%).⁴ 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.⁵ Of note, three isolates from Queensland, Victoria and non-remote Western Australia exhibited high-level resistance to azithromycin (defined as MIC values ≥ 256 mg/L). Azithromycin resistance was reported by all

jurisdictions in quarter 4 of 2022, except for the remote regions of Western Australia and the Northern Territory.

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 ≥ 0.125 mg/L and resistance to azithromycin, Australia, 2010 to 2021 and 1 January to 31 March 2022, 1 April to 30 June 2022, 1 July to 30 September 2022 and 1 October to 31 December 2022

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 Q1	2022 Q2	2022 Q3	2022 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	1,812	2,152	2,193	2,084
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%	7.25%	5.28%
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%	0.33%	0.60%	0.50%	0.58%
Total proportion of isolates with ceftriaxone MIC values ≥ 0.06 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%	4.30%	4.13%	7.75%	5.86%
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%	3.7%	5.3%

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References

1. World Health Organization (WHO). Global action plan to control the spread and impact of antimicrobial resistance in *Neisseria gonorrhoeae*. Geneva: WHO; 2012. Available from: <https://apps.who.int/iris/handle/10665/44863>.
2. Lahra MM, Hurley SM, Hogan TR. Australian Gonococcal Surveillance Programme, 1 July to 30 September 2022. *Commun Dis Intell (2018)*. 2023;47. doi: <https://doi.org/10.33321/cdi.2023.47.29>
3. Day M, Pitt R, Mody N, Saunders J, Rai R, Nori A et al. Detection of 10 cases of ceftriaxone-resistant *Neisseria gonorrhoeae* in the United Kingdom, December 2021 to June 2022. *Euro Surveill*. 2022;27(46):2200803. <https://doi.org/10.2807/1560-7917.ES.2022.27.46.2200803>
4. Lahra MM, Armstrong BH, Hogan TR. Australian Gonococcal Surveillance Programme Annual Report 2021. *Commun Dis Intell (2018)*. 2022;46. <https://doi.org/10.33321/cdi.2022.46.52>.
5. Unemo M. Current and future antimicrobial treatment of gonorrhoea – the rapidly evolving *Neisseria gonorrhoeae* continues to challenge. *BMC Infect Dis*. 2015;15:364. doi: <https://doi.org/10.1186/s12879-015-1029-2>.