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Australian Gonococcal Surveillance Programme

1 July to 30 September 2019

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Quarterly report

Australian Gonococcal Surveillance Programme

1 July to 30 September 2019

Monica M Lahra and Tiffany R Hogan

Introduction

The National Neisseria Network (NNN), Australia, comprises reference laboratories in each state and territory that report data on susceptibility profiles for clinical *Neisseria gonorrhoeae* isolates from each jurisdiction for an agreed group of antimicrobial agents, for the Australian Gonococcal Surveillance Programme (AGSP). The antibiotics are ceftriaxone, azithromycin, ciprofloxacin and penicillin; they represent current or potential agents used for the treatment of gonorrhoea. 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 in 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 amoxycillin, 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

A summary of the proportion of isolates with decreased susceptibility to ceftriaxone (minimum inhibitory concentration, MIC 0.06–0.25 mg/L), and the proportion resistant to azithromycin (MIC ≥ 1.0 mg/L), ciprofloxacin (MIC ≥ 1.0 mg/L), and penicillin (MIC ≥ 1.0 mg/L) for Quarter 3 2019 is shown in Table 1.

Ceftriaxone

For the AGSP, the category of ceftriaxone decreased susceptibility (DS) includes the MIC values 0.06–0.25 mg/L. The breakpoint for ceftriaxone resistance is yet to be determined. Where isolates are detected with ceftriaxone MIC values > 0.25 mg/L, these are also included in this category.

In the third quarter of 2019, the proportion of isolates with ceftriaxone decreased susceptibility (MIC values 0.06–0.25 mg/L) in Australia was 1.3%, slightly lower than the first quarter (1.9%) of 2019. The mean percentage of the year to date data indicates an overall decline in the rate of decreased susceptibility in 2019 compared to that of 2018 (Table 2). In the third quarter of 2019, New South Wales, South Australia and Victoria each have reported one isolate with a ceftriaxone MIC value greater than 0.125 mg/L. Of note, there was one isolate from Victoria that exhibited DS to ceftriaxone (MIC = 0.06 mg/L) and resistance to azithromycin, ciprofloxacin, and penicillin. All other isolates with decreased susceptibility to ceftriaxone recorded in Table 3 were susceptible to azithromycin (Table 3). The national trend of strains with ceftriaxone decreased susceptibility (MIC 0.06 and ≥ 0.125 mg/L) since 2010 is shown in Table 2.

A summary of ceftriaxone DS strains that were penicillin and ciprofloxacin resistant, or isolated from extragenital sites (rectal and pharyngeal) for Quarter 3, 2019 by state or territory, and by sex is shown in Table 3.

Azithromycin

In the third quarter of 2019, the percentage of isolates with resistance to azithromycin (MIC ≥ 1.0 mg/L) has declined over each quarter of 2019 and is lower than the proportion (6.3%) resistant to azithromycin in 2018. Whilst the national data from the 2019 year to date demonstrate approximately double the rate of resistance to azithromycin compared with 2013–2015 data (2.1–2.6%),[1] a trend towards declining resistance since 2017 in Australia has been observed, despite reports of increasing azithromycin resistance in *Neisseria gonorrhoeae* worldwide.[2]

In quarter 3 2019, all Australian states and territories reported isolates with resistance to azithromycin, except for remote areas of the Northern Territory. Compared with the previous quarter of 2019, the states and territories reporting an increase in the number and proportion of *N. gonorrhoeae* isolates with resistance to azithromycin were Queensland, Tasmania, Victoria and Western Australia (the latter showing a significant rise in its urban area). There was one isolate from Victoria that exhibited resistance to azithromycin, decreased susceptibility to ceftriaxone (MIC = 0.064 mg/L), and resistance to both ciprofloxacin and penicillin.

Notably, four isolates in this quarter have demonstrated high-level resistance to azithromycin (MIC ≥ 256 mg/L), and they were found in four different states: New South Wales, Queensland, Tasmania, and metropolitan Western Australia. In addition, six strains from Victoria, three strains in New South Wales, one strain from Queensland and another from South Australia, isolated from extragenital sites, showed decreased susceptibility to ceftriaxone. The national trend of azithromycin resistance in isolates since 2012 is shown in Table 4.

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 a test of cure cultures collected. Continued surveillance to monitor *N. gonorrhoeae* with elevated MIC values, coupled with sentinel site surveillance in high-risk populations, remains essential to inform therapeutic strategies, to identify incursion of resistant strains, and to detect instances of treatment failure.

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Table 1: Gonococcal isolates showing decreased susceptibility to ceftriaxone, and resistance to azithromycin, ciprofloxacin and penicillin, Australia, 1 July to 30 September 2019, by state or territory

State or territory	Number of isolates tested	Decreased susceptibility		Resistance					
	Q3, 2019	Ceftriaxone		Azithromycin		Penicillin[a]		Ciprofloxacin	
		n	%	n	%	n	%	n	%
Australian Capital Territory	43	0	0.0	2	4.7	2	4.7	9	20.9
New South Wales	892	6	0.7	38	4.3	253	28.4	264	29.6
Queensland	451	3	0.7	9	2.0	100	22.2	87	19.3
South Australia	133	2	1.5	1	0.8	21	15.8	27	20.3
Tasmania	16	0	0.0	1	6.3	7	43.8	5	31.3
Victoria	715	16	2.2	41	5.7	139	19.4	201	28.1
Northern Territory urban & rural	18	0	0.0	1	5.6	3	16.7	3	16.7
Northern Territory remote	14	0	0.0	0	0.0	0	0.0	0	0.0
Western Australia urban & rural	176	3	1.7	6	3.4	44	25.0	53	30.1
Western Australia remote	19	1	5.3	1	5.3	2	10.5	1	5.3
Australia	**2477**	**31**	**1.3**	**100**	**4.0**	**571**	**23.1**	**650**	**26.2**

a Penicillin resistance includes MIC value of ≥ 1.0 mg/L, or penicillinase production.

Table 2: Percentage of gonococcal isolates with decreased susceptibility to ceftriaxone at MIC values of 0.06 mgL, ≥ 0.125 mg/L, and total percentage, Australia, 2011 to 2017, 1 January to 31 March 2019, 1 April to 30 June 2019, and 1 July to 30 September 2019

Ceftriaxone MIC mg/L	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019 Q1	2019 Q2	2029 Q3
0.06	4.8%	3.2%	4.1%	8.2%	4.8%	1.7%	1.7%	1.0%	1.7%	1.8%	0.7%	1.1%
≥ 0.125	0.1%	0.1%	0.3%	0.6%	0.6%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.1%
Total	**4.9%**	**3.3%**	**4.4%**	**8.8%**	**5.4%**	**1.8%**	**1.7%**	**1.1%**	**1.7%**	**1.9%**	**0.8%**	**1.3%**

Table 3 Percentage of gonococcal isolates with decreased susceptibility to ceftriaxone (MIC ≥ 0.06 mg/L) and that were penicillin (Pen) and ciprofloxacin (Cip) resistant (R), isolated from extragenital sites, and by sex, Australia, 1 July to 30 September 2019

Strains with ceftriaxone decreased susceptibility (CRO DS)									
State or territory	Total	Pen R + Cip R		Males		Females		Extragenital sites	
		n	%	n	%	n	%	n	%
Australian Capital Territory	0	0	0.0	0	0.0	0	0.0	0	0.0
New South Wales	6	5	83.3	5	83.3	1	16.7	3	50.0
Queensland	3	0	0.0	3	100.0	0	0.0	1	33.3
South Australia	2	1	50.0	2	100.0	0	0.0	1	50.0
Tasmania	0	0	0.0	0	0.0	0	0.0	0	0.0
Victoria	16	10	62.5	11	68.8	4	25.0	6	37.5
Northern Territory urban & rural	0	0	0.0	0	0.0	0	0.0	0	0.0
Northern Territory remote	0	0	0.0	0	0.0	0	0.0	0	0.0
Western Australia urban & rural	3	2	66.7	2	66.7	1	33.3	0	0.0
Western Australia remote	1	1	100.0	1	100.0	0	0.0	0	0.0
Australia	**31**	**19**	**61.3**	**24**	**77.4**	**6**	**19.4**	**11**	**35.5**

Table 4: Percentage of gonococcal isolates with resistance to azithromycin (MIC ≥ 1.0 mg/L), Australia, 2012 to 2018, 1 January to 31 March 2019, 1 April to 30 June 2019, and 1 July to 30 September 2019

Azithromycin resistance	2012	2013	2014	2015	2016	2017	2018	2019 Q1	2019 Q2	2019 Q3
MIC ≥ 1mg/L	1.3%	2.1%	2.5%	2.6%	5.0%	9.3%	6.3%	5.9%	5.1%	4.1%