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Australian Gonococcal Surveillance Programme, 1 July to 30 September 2018

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Introduction

The National Neisseria Network (NNN), Australia comprises reference laboratories in each State and Territory that report data on susceptibilities for an agreed group of antimicrobial agents for the Australian Gonococcal Surveillance Programme (AGSP). The antibiotics are penicillin, ceftriaxone, azithromycin and ciprofloxacin and represent current or potential agents used for the treatment of gonorrhoea. Azithromycin combined with ceftriaxone 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 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

A summary of the proportion of isolates with decreased susceptibility to ceftriaxone (MIC 0.06-0.25 mg/L), and the proportion resistant to azithromycin (MIC ≥ 1.0 mg/L), penicillin (MIC ≥ 1.0 mg/L), and ciprofloxacin (MIC ≥ 1.0 mg/L) for Quarter 3 2018 are 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. In the third quarter of 2018, the proportion of isolates with ceftriaxone DS in Australia was 1.55%, slightly higher than the proportion in the first and second quarters of 2018, and slightly higher than the annual proportion for 2017 (Table 2). There were no isolates reported in the second or third quarters of 2018 in Australia with an MIC >0.125 mg/L. Of note, there were

two isolates exhibited DS to ceftriaxone (MIC = 0.06mg/L) and resistance to azithromycin, one from Victoria, and one from urban/rural Western Australia. One of these isolates, from urban Western Australia, was also resistant to penicillin, but sensitive to ciprofloxacin.

The national trend of isolates with ceftriaxone decreased susceptibility (MIC 0.06 and ≥ 0.125 mg/L) since 2012 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, 2018 by state or territory, and by sex (male/female) is shown in Table 3.

Table 1: Gonococcal isolates showing decreased susceptibility to ceftriaxone, and resistance to azithromycin, penicillin, and ciprofloxacin, Australia, 1 July to 30 September 2018, by State or Territory.

State or Territory	Number of isolates tested	Decreased Susceptibility		Resistance					
		Ceftriaxone MIC 0.06-0.25 mg/L	%	Azithromycin MIC ≥ 1.0 mg/L	%	Penicillin* MIC ≥ 1.0 mg/L	%	Ciprofloxacin MIC ≥ 1.0 mg/L	%
Australian Capital Territory	44	2	4.5	1	2.3	6	13.6	5	11.4
New South Wales	950	9	0.9	78	8.2	218	22.9	291	30.6
Queensland	352	2	0.6	16	4.5	67	19.0	91	25.9
South Australia	48	1	2.1	2	4.2	9	18.8	16	33.3
Tasmania	14	1	7.1	1	7.1	1	7.1	4	28.6
Victoria	644	23	3.6	61	9.5	125	19.4	159	24.7
Northern Territory Urban & Rural	13	0	0	0	0	1	7.7	2	15.4
Northern Territory Remote	51	0	0	0	0	0	0	1	2.0
Western Australia Urban & Rural	141	3	2.1	3	2.1	25	17.7	31	22.0
Western Australia Remote	32	0	0	0	0	1	3.1	0	0
AUSTRALIA	2,289	41	1.8	162	7.1	453	19.8	600	26.2

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

Table 2: Percentage of gonococcal isolates with decreased susceptibility to ceftriaxone (MIC 0.06 and ≥ 0.125 mg/L), Australia, 2011 to 2017, 1 January to 31 March 2018, 1 April to 30 June 2018, and 1 July to 30 September 2018.

Ceftriaxone MIC mg/L	2012	2013	2014	2015	2016	2017	2018 Q1	2018 Q2	2018 Q3
0.06	4.10%	8.20%	4.80%	1.70%	1.65%	1.02%	1.60%	1.55%	1.70%
≥ 0.125	0.30%	0.60%	0.60%	0.10%	0.05%	0.04%	0.10%	0%	0.09%

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, Australia, 1 July to 30 September 2018.

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	2	0	0	2	100	0	0	2	100
New South Wales	9	6	67	8	89	1	11	0	0
Queensland	2	2	100	2	100	0	0	0	0
South Australia	1	0	0	1	100	0	0	1	100
Tasmania	1	1	100	1	100	0	0	1	100
Victoria	23	19	83	16	70	7	30	8	35
Northern Territory Urban & Rural	0	0	0	0	0	0	0	0	0
Northern Territory Remote	0	0	0	0	0	0	0	0	0
Western Australia Urban & Rural	3	2	67	1	33	2	67	1	33
Western Australia Remote	0	0	0	0	0	0	0	0	0
AUSTRALIA	41	30	73.2	31	75.6	10	24.4	13	31.7

Table 4: Percentage of gonococcal isolates with resistance to azithromycin (MIC \geq 1.0 mg/L), Australia, 2012 to 2017, 1 January to 31 March 2018, 1 April to 30 June 2018, and 1 July to 30 September 2018.

Azithromycin Resistance	2012	2013	2014	2015	2016	2017	2018 Q1	2018 Q2	2018 Q3
MIC \geq 1 mg/L	1.3%	2.1%	2.5%	2.6%	5.0%	9.3%	6.0%	5.8%	7.1%

Azithromycin

In the third quarter of 2018, the proportion of isolates with resistance to azithromycin (MIC \geq 1.0 mg/L) in Australia was 7.1%, higher than the proportion reported nationally in the first and second quarters of 2018, but lower than for 2017 (9.3%), and three times the level reported in Australia for 2013-2015 (2.1%-2.6%) (Table 4).¹ Globally there have been increasing reports of azithromycin resistance in *N. gonorrhoeae*.²

In quarter 3 2018, most states reported isolates with resistance to azithromycin, with the exception of Northern Territory and remote Western Australia. The states that reported an increase in the number and proportion of *N. gonorrhoeae* isolates with resistance to azithromycin when compared with the previous quarter of 2018 were New South Wales, Australian Capital Territory, Tasmania, and South Australia. There were two isolates that exhibited resistance to azithromycin and DS to ceftriaxone (MIC = 0.064mg/L). One of these isolates, from urban Western Australia, was also resistant to penicillin, but sensitive to ciprofloxacin. There were no isolates in this quarter that exhibited high level resistance to azithromycin (MIC \geq 256 mg/L).

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 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 remains important to inform therapeutic strategies, to identify incursion of resistant strains, and to detect instances of treatment failure.

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