

Australian Gonococcal Surveillance Programme,

1 January to 31 March 2018

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Introduction

The National Neisseria Network (NNN), Australia comprises reference laboratories in each State and Territory that report data on sensitivity to an agreed group of antimicrobial agents for the Australian Gonococcal Surveillance Programme (AGSP). The antibiotics are penicillin, ceftriaxone, azithromycin and ciprofloxacin. These are 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 and in certain remote regions of the Northern Territory and Western Australia gonococcal antimicrobial resistance rates are low, and 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, and the proportion resistant to azithromycin, penicillin, and ciprofloxacin for Quarter 1 2018 are shown in **Table 1**.

Table 1:

State or Territory	Number of isolates tested Q1, 2018	Decreased Susceptibility		Resistance					
		Ceftriaxone MIC ≥ 0.06 mg/L		Azithromycin MIC ≥ 1.0 mg/L		Penicillin* MIC ≥ 1.0 mg/L		Ciprofloxacin MIC ≥ 1.0 mg/L	
		n	%	n	%	n	%	n	%
Australian Capital Territory	58	0	0	4	6.9	6	10.3	7	12.1
New South Wales	823	4	0.5	45	5.5	206	25.0	243	29.5
Queensland	300	6	2.0	32	10.7	81	27.0	91	30.3
South Australia	68	0	0	3	4.4	31	45.6	36	52.9
Tasmania	11	1	9.1	0	0	3	27.3	2	18.2
Victoria	688	23	3.3	44	6.4	145	21.1	171	24.9
Northern Territory Urban & Rural	24	0	0	1	4.2	4	16.7	0	0.0
Northern Territory Remote	32	0	0	0	0	1	2.9	2	6.3
Western Australia Urban & Rural	177	4	2.3	3	1.7	41	23.2	45	25.4
Western Australia Remote	24	0	0	0	0	1	4.2	1	4.2
AUSTRALIA	2205	38	1.7	132	6.0	519	23.5	598	27.0

Table 1: Gonococcal isolates showing decreased susceptibility to ceftriaxone and resistance to azithromycin, penicillin, and ciprofloxacin, Australia, 1 January to 31 March 2018, by State or Territory

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

Ceftriaxone

In the first quarter of 2018 the proportion of isolates with ceftriaxone DS in Australia was 1.7%, slightly higher than the proportion in the first quarter of 2017, and the annual proportion for 2017. Of note there two isolates reported in Australia that had high MIC values to ceftriaxone, (0.25mg/L and 0.50mg/L) that also had high level resistance to azithromycin (MIC >256mg/L), and were resistant to penicillin and ciprofloxacin, but susceptible to spectinomycin and gentamicin. Genetic analyses showed these two strains were indistinguishable.¹ Both strains were isolated from persons residing in Queensland. This was the first time NG strains with an extensively drug resistant profile have been reported in Australia, and a strain with a similar profile has also been reported in the United Kingdom.²

The category of ceftriaxone DS as reported by the AGSP includes the MIC values 0.06 and ≥ 0.125 mg/L, and the national trend since 2010 is shown in **Table 2**.

Table 2:

Ceftriaxone MIC mg/L	2010	2011	2012	2013	2014	2015	2016	2017	2018 Q1
0.06	4.80%	3.20%	4.10%	8.20%	4.80%	1.70%	1.65%	1.02%	1.60%
≥ 0.125	0.10%	0.10%	0.30%	0.60%	0.60%	0.10%	0.05%	0.04%	0.10%

Table 2: Percentage of gonococcal isolates with decreased susceptibility to ceftriaxone MIC 0.06 and ≥ 0.125 mg/L, Australia, 2010 to 2017, and 1 January to 31 March 2018.

A summary of ceftriaxone DS strains that were penicillin and ciprofloxacin, or isolated from extra genital sites (rectal and pharyngeal) for Quarter 1, 2018 by state or territory, and by sex (male/female) are shown in **Table 3**.

Table 3:

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
New South Wales	4	3	75	1	25	3	75	2	50
Queensland	6	3	50	4	67	2	33	2	33
South Australia	0	0	0	0	0	0	0	0	0
Tasmania	1	1	100	1	1	0	0	0	0
Victoria	23	14	61	17	74	6	26	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	4	4	100	2	50	2	50	1	25
Western Australia Remote	0	0	0	0	0	0	0	0	0
AUSTRALIA	38	25	65.8	25	65.8	13	34.2	13	34.2

Table 3: Percentage of gonococcal isolates with decreased susceptibility to ceftriaxone (MIC \geq 0.06 mg/L) and that were penicillin (Pen) and ciprofloxacin (Cip) resistant (R), isolated from extra genital sites, and by sex, Australia, Australia, 1 January to 31 March 2018.

Azithromycin

In the first quarter of 2018, the proportion of isolates with resistance to azithromycin in Australia was 6.0%, lower than the proportion reported nationally for 2017 (9.3%), but three times the level reported in Australia for 2013-2015 (2.1%-2.6%).³ Initially, in 2016 the highest incidence of azithromycin resistance was reported from South Australia (19.5% in 2016, compared with 2.8% in 2015), where an outbreak of strains with low level azithromycin was reported in 2016 with a subsequent change in treatment guidelines.⁴ Globally there have been increasing reports of azithromycin resistance in *N. gonorrhoeae*.⁵

In quarter 1 2018 most states reported isolates with resistance to azithromycin, with the exception of Tasmania, remote Northern Territory and remote Western Australia. The states that reported an increase in the proportion of NG isolates with resistance to azithromycin when compared with the annual data for 2017 were Queensland, the Australian Capital Territory and urban Northern Territory, while the other states reported a decrease from 2017 annually.

The national trend of azithromycin resistance in isolates since 2012 is shown in **Table 4**.

Table 4

Azithromycin Resistance	2012	2013	2014	2015	2016	2017	2018 Q1
MIC ≥1mg/L	1.3%	2.1%	2.5%	2.6%	5.0%	9.3%	6.0%

Table 4: Percentage of gonococcal isolates with resistance to azithromycin MIC ≥1.0 mg/L, Australia, 2012 to 2017, and 1 January to 31 March 2018.

Dual therapy of ceftriaxone plus azithromycin is the recommended treatment for gonorrhoea as a strategy to temper development of more widespread resistance. Patients with infections in extra genital sites, where the isolate has decreased susceptibility to ceftriaxone, are recommended to 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.

References

1. Whiley DM, Jennison A, Pearson J, Lahra MM. Genetic characterisation of *Neisseria gonorrhoeae* resistant to both ceftriaxone and azithromycin. *The Lancet Infectious Diseases*. 2018;18(7):717-8.
2. European Centre for Disease Prevention and Control. Rapid Risk Assessment: Extensively drug-resistant (XDR) *Neisseria gonorrhoeae* in the United Kingdom and Australia. 2018.
3. Lahra MM, Enriquez RP. Australian Gonococcal Surveillance Programme Annual Report, 2016. *Communicable Diseases Intelligence* In press.
4. Lahra MM, Ward A, Trembizki E, Hermanson J, Clements E, Lawrence A, et al. Treatment guidelines after an outbreak of azithromycin-resistant *Neisseria gonorrhoeae* in South Australia. *The Lancet Infectious diseases*. 2017;17(2):133-4.
5. Unemo M. Current and future antimicrobial treatment of gonorrhoea - the rapidly evolving *Neisseria gonorrhoeae* continues to challenge. *BMC infectious diseases*. 2015;15:364