Australian Gonococcal Surveillance Programme

1 October to 31 December 2020

Monica M Lahra, Masoud Shoushtari, Tiffany R Hogan

# Introduction

The National Neisseria Network (NNN), Australia comprises reference laboratories in each state and territory that report data on Neisseria gonorrhoeae antimicrobial resistance to an agreed group of agents for the Australian Gonococcal Surveillance Programme (AGSP). The antibiotics—ceftriaxone, azithromycin, ciprofloxacin and penicillin—represent current or potential drugs 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 gonococcal susceptibility patterns in Australia, with certain remote regions of the Northern Territory and Western Australia having low 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 (DS) to ceftriaxone (minimum inhibitory concentration, MIC 0.06–0.25 mg/L), and the proportions resistant to azithromycin (MIC ≥ 1.0 mg/L), penicillin (MIC ≥ 1.0 mg/L), and ciprofloxacin (MIC ≥ 1.0 mg/L) for Quarter 4 2020, is shown in Table 1**.**

Table 1: Gonococcal isolates showing decreased susceptibility to ceftriaxone and resistance to ciprofloxacin, azithromycin and penicillin, Australia, 1 October to 31 December 2020, by state or territory

| State or territory | Number of isolates testedQ4, 2020 | Decreased susceptibility | Resistance |
| --- | --- | --- | --- |
| CeftriaxoneMIC 0.06–0.25 mg/L | AzithromycinMIC ≥ 1.0 mg/L | PenicillinaMIC ≥ 1.0 mg/L | CiprofloxacinMIC ≥ 1.0 mg/L |
| n | % | n | % | n | % | n | % |
| Australian Capital Territory | 28 | 0 | 0.0 | 4 | 14.3 | 6 | 21.4 | 13 | 46.4 |
| New South Wales | 607 | 3 | 0.5 | 51 | 8.4 | 279 | 46.0 | 318 | 52.4 |
| Queensland | 297 | 7 | 2.4 | 7 | 2.4 | 60 | 20.2 | 114 | 38.4 |
| South Australia | 99 | 0 | 0.0 | 0 | 0.0 | 3 | 3.0 | 8 | 8.1 |
| Tasmania | 4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Victoria | 250 | 2 | 0.8 | 0 | 0.0 | 81 | 32.4 | 94 | 37.6 |
| Northern Territory non remote | 24 | 0 | 0.0 | 0 | 0.0 | 1 | 4.2 | 2 | 8.3 |
| Northern Territory remote | 35 | 0 | 0.0 | 0 | 0.0 | 1 | 2.9 | 1 | 2.9 |
| Western Australia non remote | 106 | 0 | 0.0 | 5 | 4.7 | 28 | 26.4 | 33 | 31.1 |
| Western Australia remote | 29 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Australia** | **1,479** | **12** | **0.81** | **67** | **4.5** | **459** | **31.0** | **583** | **39.4** |

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

## Ceftriaxone

In the fourth quarter of 2020, the proportion of isolates with ceftriaxone decreased susceptibility in Australia was 0.81%, higher than the previous quarter, but lower than the proportion in first two quarters of 2020, and cumulatively lower than 2019, (1.3%) as shown in Table 2. The national trend data of isolates with ceftriaxone decreased susceptibility (MIC 0.06 and ≥ 0.125 mg/L) since 2010 is shown in Table 2.

Table 2: Percentage of gonococcal isolates with decreased susceptibility to ceftriaxone MIC 0.06 mg/L and ≥0.125 mg/L, Australia, 2010 to 2019, 1 January to 31 March 2020, 1 April to 30 June 2020, 1 July to 30 September, and 1 October to 31 December 2020

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ceftriaxone MIC mg/L | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 Q1 | 2020 Q2 | 2020 Q3 | 2020 Q4 |
| 0.06 | 4.80% | 3.20% | 4.10% | 8.20% | 4.80% | 1.70% | 1.65% | 1.02% | 1.67% | 1.19% | 1.25% | 0.84% | 0.48% | 0.74% |
| ≥0.125 | 0.10% | 0.10% | 0.30% | 0.60% | 0.60% | 0.10% | 0.05% | 0.04% | 0.06% | 0.11% | 0.12% | 0.13% | 0.00% | 0.07% |
| **Total** | **4.90%** | **3.30%** | **4.40%** | **8.80%** | **5.40%** | **1.80%** | **1.70%** | **1.06%** | **1.73%** | **1.30%** | **1.37%** | **0.97%** | **0.48%** | **0.81%** |

## Azithromycin

In the fourth quarter of 2020, the proportion of N. gonorrhoeae isolates with resistance to azithromycin (MIC ≥ 1.0 mg/L) in Australia was 4.5%, continuing the trend of a lower proportion of azithromycin resistance observed nationally in each quarter of 2020 compared to 2019, and to recent years as shown in Table 3. Whilst the proportion of isolates resistant to azithromycin nationally continues to decline, the current rate remains higher than that reported in Australia for 2013–2015 (2.1–2.6%).1 Globally there have been increasing reports of azithromycin resistance in N. gonorrhoeae.2 In quarter 4 2020, the eastern jurisdictions of New South Wales, Queensland and the Australian Capital Territory, as well as non-remote regions of Western Australia, reported isolates with resistance to azithromycin. No resistance to azithromycin in gonococcal isolates was reported from Tasmania, South Australia, Victoria and all regions of the Northern Territory. No isolates exhibited high-level resistance to azithromycin (MIC ≥ 256 mg/L).

Table 3: Percentage of gonococcal isolates with resistance to azithromycin (MIC ≥ 1.0 mg/L), Australia, 2012 to 2019, 1 January to 31 March 2020, 1 April to 30 June 2020, 1 July to 30 September 2020, and 1 October to 31 December 2020

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Azithromycin resistance | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 Q1 | 2020 Q2 | 2020Q3 | 2020Q4 |
| MIC ≥ 1.0 mg/L | 1.3% | 2.1% | 2.5% | 2.6% | 5.0% | 9.3% | 6.2% | 4.6% | 4.2% | 3.1% | 4.2% | 4.5% |

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

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