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Antimicrobial susceptibility of invasive *Neisseria meningitidis,* 2018

The antimicrobial susceptibility of 79 viable meningococcal isolates received at ESR from cases of invasive disease in 2018 was tested. Ceftriaxone, ciprofloxacin, penicillin and rifampicin minimum inhibitory concentrations (MICs) were determined by Etest on Mueller-Hinton agar + 5% sheep blood. MICs were interpreted according to Clinical and Laboratory Standards Institute (CLSI) breakpoints.[1] In reports for previous years, meningococci with penicillin MICs of 0.12, 0.25 and 0.5 mg/L were categorised as having reduced penicillin susceptibility or intermediate resistance. In this report CLSI breakpoints have been applied. Meningococci with penicillin MICs ≥0.5 mg/L are accordingly categorised as resistant while those with MICs of 0.12 and 0.25 mg/L are categorised as intermediate.

The 79 meningococcal isolates tested for susceptibility included 23 group B isolates (including 6 NZ B:P1.7-2,4 epidemic strain), nine group C, 33 group W, one group X and 13 group Y isolates.

26.6% (21/79) of isolates were categorised as penicillin resistant (ie, MICs ≥0.5 mg/L) (Table 1).

59.5% (47/79) of isolates were penicillin non-susceptible (i.e. penicillin intermediate or resistant, with MICs ≥0.12 mg/L). The prevalence of penicillin non-susceptibility in each of the meningococcal groups was:

- 30.4% (7/23) group B isolates, of which none belonged to the NZ B:P1.4 epidemic strain
- 77.8% (7/9) group C isolates
- 78.8% (26/33) group W isolates
- 53.8% (7/13) group Y isolates

One 2018 isolate was resistant to ciprofloxacin. This isolate was a group X isolate with an MIC of 0.12 mg/L. All isolates were susceptible to ceftriaxone and rifampicin (Table 1). All penicillin resistant isolates were from the North Island and 63/79 (80%) cases of meningococcal disease were from the North Island.

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Table 1. Antimicrobial susceptibility, MIC range and MIC_{90} of *N. meningitidis* from invasive disease cases, 2018

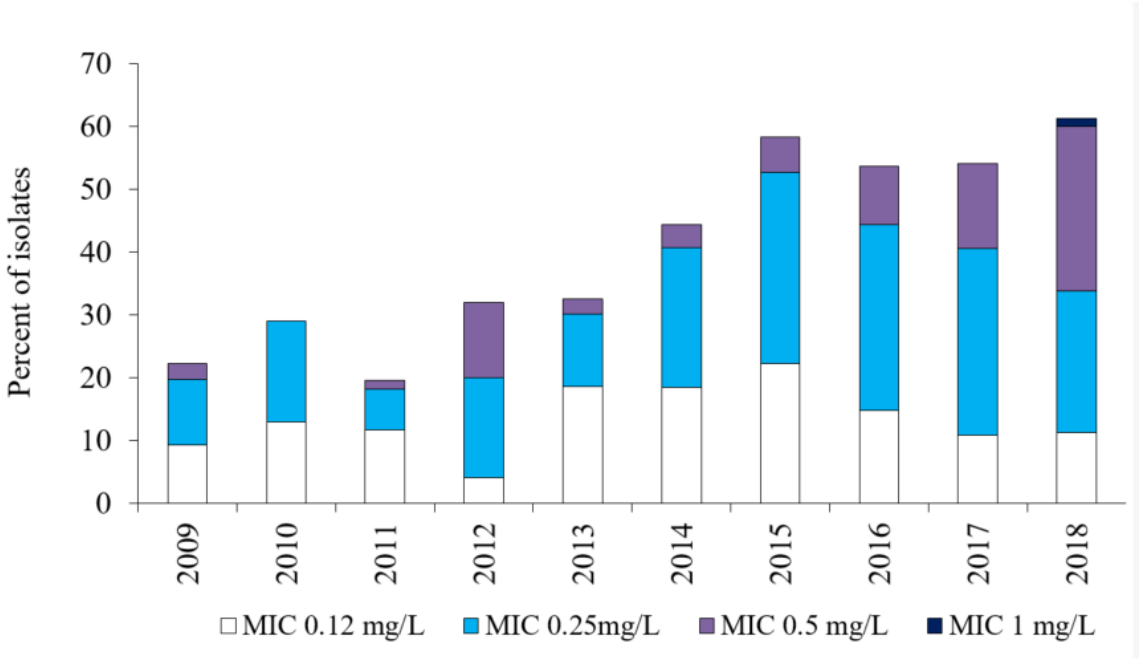
Antimicrobial	Percent (number)			MIC range (mg/L)	MIC_{90} (mg/L)
	Susceptible	Intermediate	Resistant		
penicillin	40.5 (32)[1]	32.9 (26)[1]	26.6 (21)[1]	0.016-1.0	0.5
ceftriaxone	100 (79)	-[2]	-[2]	<0.002-0.004	<0.002
rifampicin	100 (79)	0.0 (0)	0.0 (0)	0.004-0.5	0.12
ciprofloxacin	98.7 (78)	0.0 (0)	1.3 (1)	0.002-0.12	0.008

[1] penicillin susceptible, MIC ≤0.06 mg/L; intermediate, MIC 0.12-0.25 mg/L; resistant, MIC ≥0.5 mg/L

[2] there is no intermediate or resistant category for ceftriaxone

Over the last 10 years there has been a general trend of an increasing proportion of isolates non-susceptible to penicillin (Figure 1).

Figure 1. Penicillin-nonsusceptible *N. meningitidis* from invasive disease, 2009-2018



Rifampicin resistance is rare among meningococci from invasive disease in New Zealand. In total, seven rifampicin-resistant isolates have been identified: one group C (C:2a:P1.5-1,10-1) isolate in 2011, one group B (B:4:P1.19,15) isolate and one group C (C:2a:P1.5-1,10-8) isolate in 2009, one group B (B:4:P1.4) isolate in 2003, one group C (C:2b:P1.2) isolate in 1997, one group B (B:15:P1.7,16) isolate in 1992, and one group A isolate in 1986.

Ciprofloxacin resistance is also rare among meningococci from invasive disease in New Zealand. The first isolate was identified in 2010 and was a group C meningococcus (C:ns:P1.20,23-7). A second isolate was identified in 2017, and a third single isolate was identified in 2018; the 2018 isolate was the sole group X isolate in the 2018 data.

No resistance to ceftriaxone has been identified among meningococci isolated from cases of invasive disease in New Zealand.

[1] Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing. 28th ed. Wayne, USA: CLSI; 2018. CLSI supplement M100.