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Antimicrobial susceptibility of invasive *Neisseria meningitidis,* 2019

The antimicrobial susceptibility of 93 viable meningococcal isolates received at ESR from cases of invasive disease in 2019 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] Meningococci with penicillin MICs ≥0.5 mg/L are categorised as resistant while those with MICs of 0.12 and 0.25 mg/L are categorised as intermediate.

The 93 meningococcal isolates tested for susceptibility included 39 group B isolates (including 13 NZ B:P1.7-2,4 epidemic strain), seven group C, one group E, 33 group W and 13 group Y isolates.

32.3% (30/93) of isolates were categorised as penicillin resistant (ie, MICs ≥0.5 mg/L) (Table 1). The prevalence of penicillin resistance in each of the meningococcal groups was:

- 17.9% (7/39) group B isolates, of which none belonged to the NZ B:P1.4 epidemic strain
- 57.1% (4/7) group C isolates
- 0.0% (0/1) group E isolates
- 54.6% (18/33) group W isolates
- 7.7% (1/13) group Y isolates

67.7% (63/93) 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:

- 58.3% (21/39) group B isolates, of which none belonged to the NZ B:P1.4 epidemic strain
- 85.7% (6/7) group C isolates
- 100.0% (1/1) group E isolates
- 87.9% (29/33) group W isolates
- 46.2% (6/13) group Y isolates

In 2019 most cases of meningococcal disease were found in the North Island (81/93, 87.1%). Of the 30 penicillin resistant isolates identified in New Zealand in 2019, two were from cases in the South Island. Of the 63 penicillin non-susceptible isolates six were from cases in the South Island. By contrast all penicillin resistant isolates were from the North Island in 2018.

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All 2019 isolates were susceptible to ciprofloxacin, ceftriaxone and rifampicin (Table 1).

Table 1. Antimicrobial susceptibility, MIC range and MIC_{90} of *N. meningitidis* from invasive disease cases, 2019

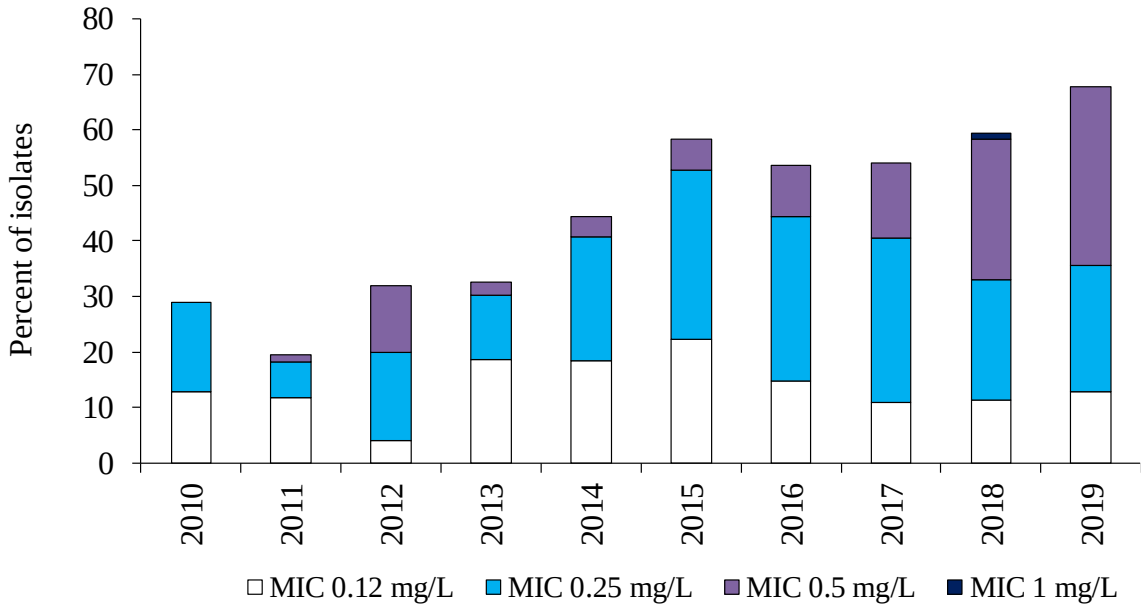
	Percent (number)			MIC range (mg/L)	MIC_{90} (mg/L)
Antimicrobial	**Susceptible**	**Intermediate**	**Resistant**		
penicillin	32.3 (30)[1]	35.5 (33)[1]	32.3 (30)[1]	0.008-0.5	0.5
ceftriaxone	100 (93)	-[2]	-[2]	<0.002-0.004	0.004
rifampicin	100 (93)	0.0 (0)	0.0 (0)	0.008-0.5	0.12
ciprofloxacin	100 (93)	0.0 (0)	0.0 (0)	0.002-0.008	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-non-susceptible *N. meningitidis* from invasive disease, 2010-2019



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. In total three ciprofloxacin-resistant isolates have been identified: group C meningococci in 2010 (C:ns:P1.20,23-7) and 2017 (C:P1.5,2) as well as a group X meningococcus in 2018.

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. 29th ed. Wayne, USA: CLSI; 2019. CLSI supplement M100.