

Antimicrobial susceptibility of invasive *Neisseria meningitidis*, 2020

The antimicrobial susceptibility of 26 viable meningococcal isolates received at ESR from cases of invasive disease in 2020 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 26 meningococcal isolates tested for susceptibility included 12 group B isolates (including 7 NZ B:P1.7-2,4 epidemic strain), one group C, 11 group W and 2 group Y isolates.

38.5% (10/26) 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:

- 16.7% (2/12) group B isolates, of which none belonged to the NZ B:P1.4 epidemic strain
- 100.0% (1/1) group C isolates
- 63.6% (7/11) group W isolates
- 0.0% (0/2) group Y isolates

50.0% (13/26) 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:

- 25.0% (3/12) group B isolates, of which none belonged to the NZ B:P1.4 epidemic strain
- 100.0% (1/1) group C isolates
- 72.7% (8/11) group W isolates
- 50.0% (1/2) group Y isolates

In 2020 most cases of meningococcal disease were found in the North Island (20/26, 76.9%). Of the 10 penicillin resistant isolates identified in New Zealand in 2020, all were from cases in the North Island. Of the 13 penicillin non-susceptible isolates one was from a case in the South Island. There were two deaths, both in cases with group W meningococci.

All 2020 isolates were susceptible to ciprofloxacin, ceftriaxone and rifampicin (Table 1).

Table 1. Antimicrobial susceptibility, MIC range and MIC₉₀ of *N. meningitidis* from invasive disease cases, 2019

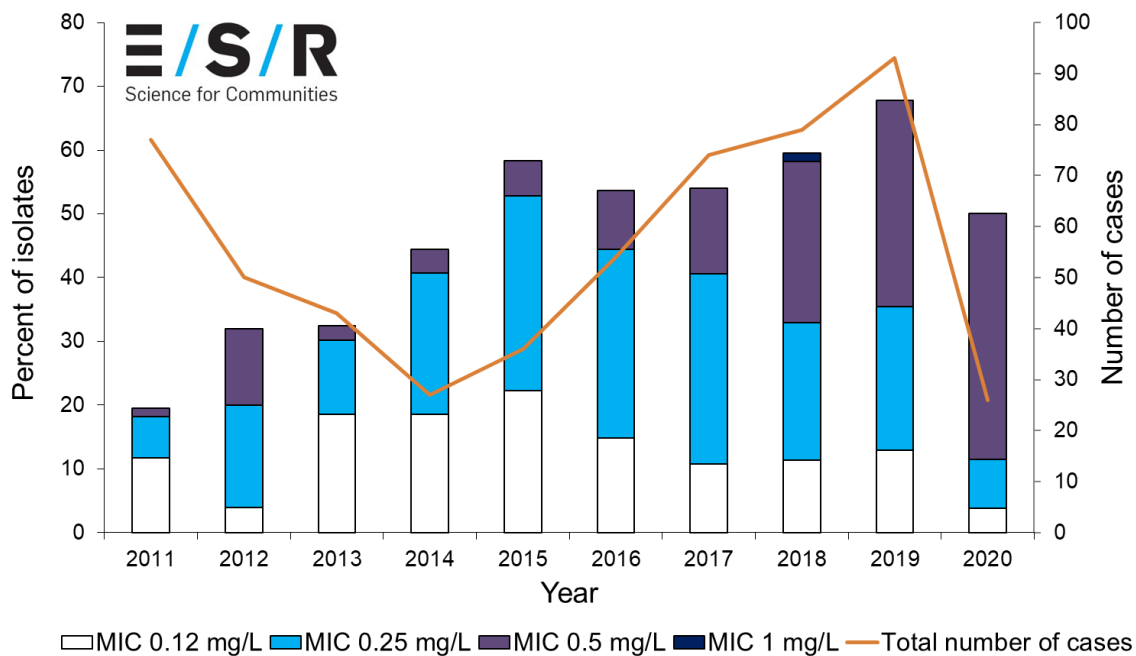
Antimicrobial	Percent (number)			MIC range (mg/L)	MIC ₉₀ (mg/L)
	Susceptible	Intermediate	Resistant		
penicillin	50.0 (13) ¹	11.5 (3) ¹	38.5 (10) ¹	0.03-0.5	0.5
ceftriaxone	100 (26)	- ²	- ²	<0.002-0.004	0.002
rifampicin	100 (26)	0.0 (0)	0.0 (0)	0.008-0.5	0.12
ciprofloxacin	100 (26)	0.0 (0)	0.0 (0)	0.002-0.008	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 the proportion of isolates non-susceptible to penicillin has been increasing (Figure 1). However, in 2020 the proportion of penicillin non-susceptible isolates decreased, as did the total number of cases. The proportion of penicillin resistant isolates (MIC ≥0.5 mg/L) continued to increase in 2020.

Figure 1. Penicillin-non-susceptible *N. meningitidis* from invasive disease, 2011-2020



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. 30th ed. Wayne, USA: CLSI; 2020. CLSI supplement M100.