

## Antimicrobial susceptibility of invasive *Neisseria meningitidis*, 2022

The antimicrobial susceptibility of 30 viable meningococcal isolates received at ESR from cases of invasive disease from 1<sup>st</sup> January to 22<sup>nd</sup> September 2022 were 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:<sup>1</sup> meningococci with penicillin MICs  $\geq 0.5$  mg/L were categorised as resistant while those with MICs of 0.12 and 0.25 mg/L were categorised as intermediate.

The 30 meningococcal isolates tested for susceptibility included 25 group B isolates, three group Y isolates and two group W isolates. The group B isolates included 13 isolates belonging to the B:P1.7-12,14 strain and five isolates belonging to the B:P1.7-2,4 strain.

20.0% (6/30) of isolates were categorised as penicillin resistant (i.e. MICs  $\geq 0.5$  mg/L) (Table 1). The prevalence of penicillin resistance in each of the meningococcal groups was:

- 16.0% (4/25) group B isolates, including
  - 23.1% (3/13) of the B:P1.7-12,14 strain
  - 0.0% (0/5) of the B:P1.7-2,4 strain
- 0.0% (0/3) group Y isolates
- 100.0% (2/2) group W isolate

66.7% (20/30) of isolates were penicillin non-susceptible (i.e. penicillin intermediate or resistant, with MICs  $\geq 0.12$  mg/L). The prevalence of penicillin non-susceptibility in each of the meningococcal groups was:

- 64.0% (16/25) group B isolates, including
  - 100% (13/13) of the B:P1.7-12,14 strain
  - none (0/5) of the B:P1.7-2,4 strain
- 67.7% (2/3) group Y isolates
- 100.0% (2/2) group W isolates

In 2022 most cases of meningococcal disease were found in the North Island (22/30, 73.3%). Of the six penicillin resistant isolates identified, four were from cases in the North Island and two were from cases in the South Island. Of the 20 penicillin non-susceptible isolates, 15 were from cases in the North Island.

All 2022 isolates to 22<sup>nd</sup> September were susceptible to ciprofloxacin, ceftriaxone and rifampicin (Table 1).

**Table 1. Antimicrobial susceptibility, MIC range and MIC<sub>90</sub> of *N. meningitidis* from invasive disease cases, 1 January 2022 to 22 September 2022**

Antimicrobial	Percent (number)			MIC range (mg/L)	MIC <sub>90</sub> (mg/L)
	Susceptible	Intermediate	Resistant		
penicillin <sup>1</sup>	33.3 (10)	46.7 (14)	20.0 (6)	0.06-0.5	0.5
ceftriaxone	100 (30)	- <sup>2</sup>	0.0 (0)	<0.002-0.004	0.004
rifampicin	100 (30)	0.0 (0)	0.0 (0)	0.008-0.06	0.06
ciprofloxacin	100 (30)	0.0 (0)	0.0 (0)	0.004-0.004	0.004

<sup>1</sup> penicillin susceptible, MIC ≤0.06 mg/L; intermediate, MIC 0.12-0.25 mg/L; resistant, MIC ≥0.5 mg/L

<sup>2</sup> there is no intermediate or resistant category for ceftriaxone

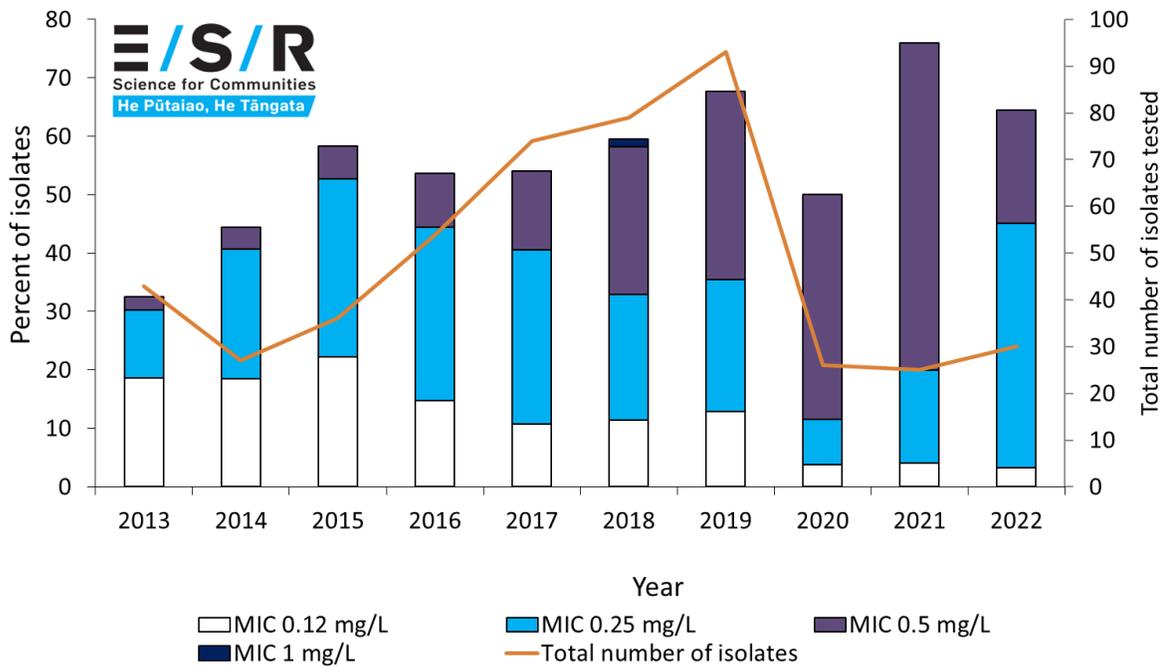
Over the last 10 years the proportion of isolates non-susceptible to penicillin has been increasing, until 2020 where the proportion of penicillin non-susceptible isolates decreased (Figure 1). There were low case numbers from 2020 to 2022 and penicillin non-susceptibility has fluctuated from 50.0% in 2020, increasing to 76% in 2021 and decreasing to 66.7% in 2022. The proportion of penicillin resistant isolates (MIC ≥0.5 mg/L) continued to increase between 2013 and 2021 to a high of 56.0%, but decreased in 2022.

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 ever been identified among meningococci isolated from cases of invasive disease in New Zealand.

**Figure 1. Penicillin-non-susceptible *N. meningitidis* from invasive disease, 2013 to 22 September 2022**



<sup>1</sup> Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing. 32<sup>nd</sup> ed. Wayne, USA: CLSI; 2022. CLSI supplement M100.