

Antimicrobial susceptibility of invasive *Neisseria meningitidis*, 2025

Key findings

In 2025, a total of 41 laboratory-confirmed cases of invasive *N. meningitidis* were reported to EpiSurv. From these cases, 17 viable meningococcal isolates were received at PHF Science and underwent further characterisation and susceptibility testing.

- All isolates were fully susceptible to ciprofloxacin, ceftriaxone and rifampicin.
- Most isolates (15/17, 88.2%) were susceptible to penicillin, according to the European Committee on Antimicrobial Susceptibility testing (EUCAST) breakpoint (≤ 0.25 mg/L). However, 12 of the 17 (70.6%) isolates had intermediate susceptibility to penicillin according to the Clinical and Laboratory Standards Institute (CLSI) breakpoints (MIC 0.12-0.25 mg/L).

Background

The purpose of this report is to describe antibiotic susceptibilities of *Neisseria meningitidis* from clinical cases of invasive meningococcal disease in Aotearoa New Zealand in 2025. Data will inform clinical and public health interventions, to treat and prevent invasive meningococcal disease.

Invasive meningococcal disease is a notifiable disease in New Zealand. All isolates are requested to be referred to PHF Science from diagnostic laboratories for further testing and characterisation.

In 2025, a total of 41 laboratory-confirmed cases of invasive *N. meningitidis* were reported to EpiSurv. Of these cases, PHF Science received 17 viable isolates. Trends should be interpreted with caution given the small numbers. Further information on the epidemiology of invasive meningococcal disease in New Zealand can be found on the PHF Science [website](#).¹

Methods

All viable meningococcal isolates received at PHF Science from cases of invasive disease were tested. Ceftriaxone, ciprofloxacin, penicillin and rifampicin minimum inhibitory concentrations (MICs) were determined by gradient strip on Mueller-Hinton agar with 5% horse blood and 20 mg/L β -NAD (MH-F). MICs were interpreted according to EUCAST breakpoints.² Group, PorA and strain information were provided by the Invasive Pathogens Laboratory, PHF Science.

Results

All 17 viable meningococcal isolates at PHF Science were tested for susceptibility. These included 11 group B, four group Y, and two group W isolates. Four isolates belonged to the B:P1.7-12,14 strain and two belonged to the B:P1.7-2,4 strain.

All 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, 2025

Antimicrobial	Number (percent)		MIC range (mg/L)	MIC ₉₀ (mg/L)
	Susceptible#	Resistant		
Penicillin [#]	15 (88.2)	2 (11.8)	0.06-0.5	0.5
Ciprofloxacin	17 (100.0)	0 (0.0)	0.004	0.004
Ceftriaxone	17 (100.0)	0 (0.0)	<0.002-0.008	0.002
Rifampicin	17 (100.0)	0 (0.0)	0.008-0.12	0.12

[#] penicillin susceptible, standard dosing regimen, MIC $\leq$ 0.25 mg/L; resistant, MIC >0.25 mg/L

Two isolates were penicillin resistant (Table 1), and both had a penicillin MIC of 0.5 mg/L. One was group Y, with the P1.5-2,10-14 PorA, and the other was group W with the P1.5,2 PorA.

Two thirds (10/15) of penicillin-susceptible isolates had an MIC of 0.25 mg/L (Figure 1). They were either group B (9 isolates) or group Y (1 isolate). These isolates would be classified as penicillin-intermediate using CLSI breakpoints.³

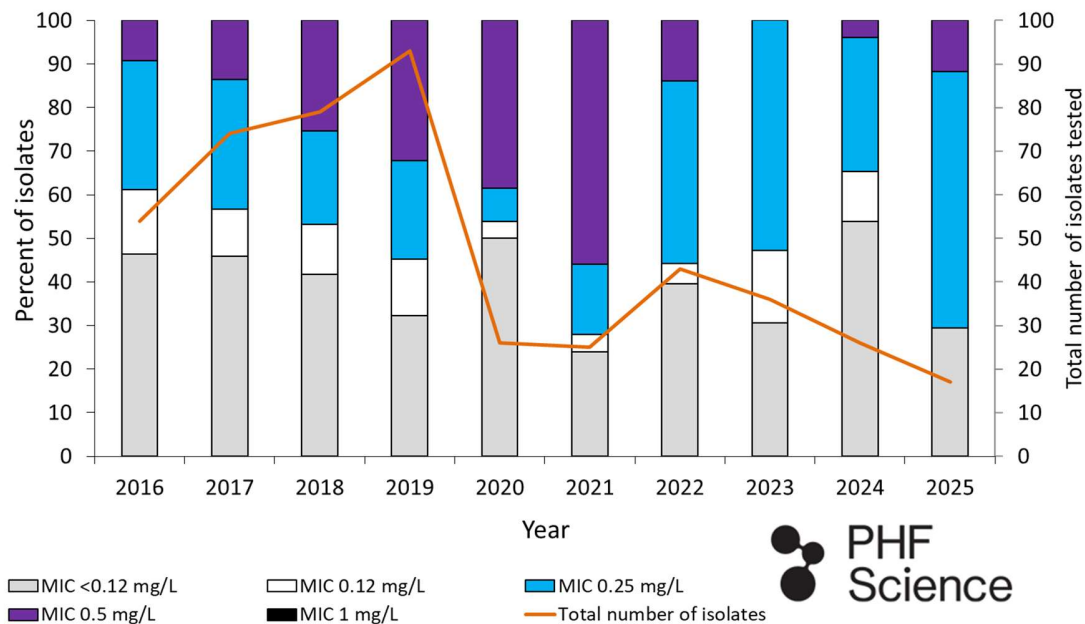


Figure 1. Penicillin susceptibility of *N. meningitidis* from invasive disease, 2016-2025

The 12 meningococci classified as penicillin-intermediate using CLSI breakpoints (MIC 0.12-0.25 mg/L) were diverse. As has been found in previous years,⁴ all isolates belonging to the B:P1.7-12.14 strain in 2025 were penicillin-intermediate by CLSI. However, this strain only accounted for 33.3% (4/12) of isolates with a penicillin MIC 0.12-0.25 mg/L, indicating it is no longer the key strain causing elevated penicillin MICs.

Five *penA* mutations have been strongly associated with reduced penicillin susceptibility,⁵ and our data confirm this relationship. In 2025, all isolates with a penicillin MIC ≥ 0.12 mg/L had a mutation in the *penA* gene reported to confer resistance to penicillin. All isolates with wildtype *penA* had a penicillin MIC < 0.12 mg/L.

Rifampicin resistance is rare among meningococci from invasive disease in New Zealand. In total, seven rifampicin-resistant isolates have been identified in New Zealand: 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. To date, four ciprofloxacin-resistant isolates have been identified: one group C isolate in 2010 (C:P1.20,23-7), 2017 (C:P1.5,2), and 2023 (C:P1.5,2), as well as a group X isolate in 2018. Whole genome sequencing data were available for the ciprofloxacin-resistant isolate from 2023. A mutation in the *gyrA* gene, likely responsible for the observed ciprofloxacin resistance, was found in this isolate. The USA has reported a rise in ciprofloxacin resistance in *N. meningitidis*,⁶ highlighting the need for vigilance in New Zealand.

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

The numbers of isolates from cases of meningococcal disease in New Zealand continue to decrease, leaving a relatively small sample each year and limiting the robustness of data analyses. Consequently, susceptibility results must be interpreted with caution. Despite the limited dataset, the recent surveillance data show a growing proportion of isolates with elevated penicillin minimum-inhibitory concentrations. However, all tested strains in 2025 remain fully susceptible to ceftriaxone, ciprofloxacin and rifampicin.

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- 1 The New Zealand Institute for Public Health and Forensic Science (PHF Science). Meningococcal disease monthly report December 2025. Available at: www.phfscience.nz.
 - 2 The European Committee on Antimicrobial Susceptibility Testing. Breakpoint tables for interpretation of MICs and zone diameters, version 15.0, 2025 (www.eucast.org).
 - 3 Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing. 35nd ed. Wayne, USA: CLSI; 2025. CLSI supplement M100.
 - 4 Institute of Environmental Science and Research (ESR). Antimicrobial susceptibility of invasive *Neisseria meningitidis*, 2024. Porirua, New Zealand. Available at www.phfscience.nz.
 - 5 Thulin S, Olcén P, Fredlund H, Unemo M. Total variation in the *penA* gene of *Neisseria meningitidis*: correlation between susceptibility to beta-lactam antibiotics and *penA* gene heterogeneity. *Antimicrob Agents Chemother*. 2006 Oct;50(10):3317-24.
 - 6 Berry I, Rubis AB, Howie RL, Sharma S, Marasini D, Marjuki H, Crowe S, McNamara LA. Selection of antibiotics as prophylaxis for close contacts of patients with meningococcal disease in areas with ciprofloxacin resistance - United States, 2024. *MMWR Morb Mortal Wkly Rep*. 2024 Feb 8;73(5):99-103. doi: 10.15585/mmwr.mm7305a2. PMID: 38329923; PMCID: PMC10861203.