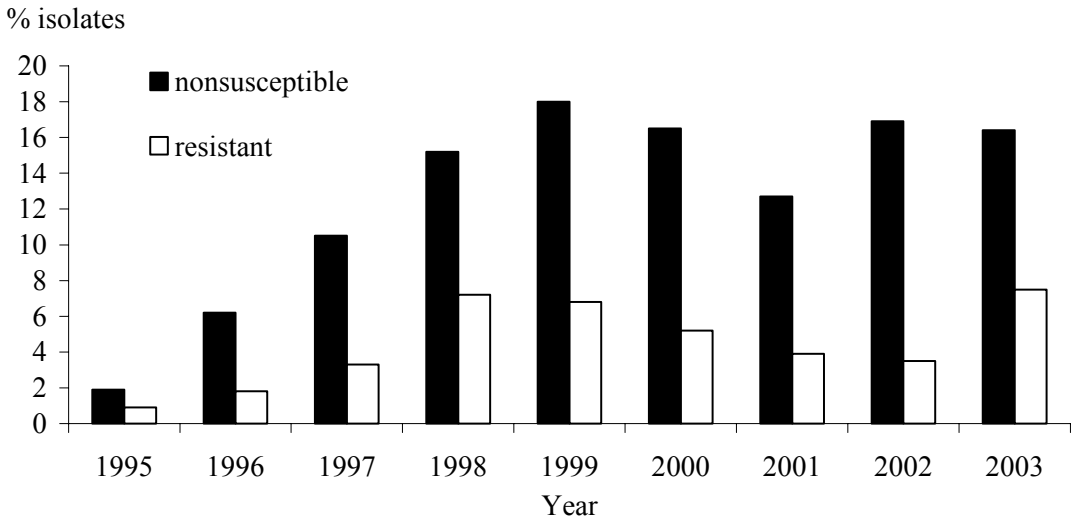
Antimicrobial susceptibility of invasive *Streptococcus pneumoniae*, 2003

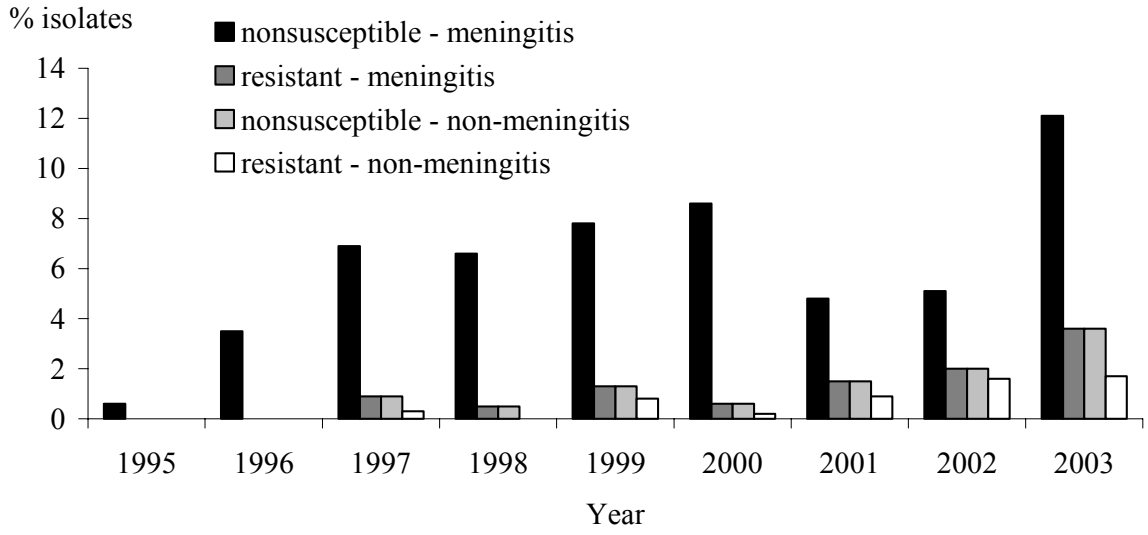
The antimicrobial susceptibility of all 523 viable invasive isolates of *S. pneumoniae* referred to ESR in 2003 was tested. 16.4% (86) were categorised as penicillin nonsusceptible (MIC ≥0.12 mg/L): 7.5% (39) as resistant (MIC ≥2 mg/L) and 9.0% (47) as intermediate (MIC 0.12-1 mg/L). Penicillin resistance increased in 2003, following four successive years of declining resistance since 1998 (Figure 1). There has not been any significant change in penicillin nonsusceptibility since 1998.

Figure 1. Penicillin resistance and nonsusceptibility among pneumococci from invasive disease, 1995-2003



Applying the NCCLS meningitis interpretive standards, 12.1% (63) of the 523 invasive isolates were categorised as cefotaxime nonsusceptible (MIC ≥1 mg/L): 3.6% (19) as resistant (MIC ≥2 mg/L) and 8.4% (44) as intermediate (MIC 1 mg/L). Applying the non-meningitis interpretive standards, 3.6% (19) were categorised as cefotaxime nonsusceptible (MIC ≥2 mg/L): 1.7% (9) as resistant (MIC ≥4 mg/L) and 1.9% (10) as intermediate (MIC 2 mg/L). Trends in cefotaxime resistance and nonsusceptibility since 1995 are shown in Figure 2, and indicate a trend of increasing resistance to 3rd-generation cephalosporins.

Figure 2. Cefotaxime resistance and nonsusceptibility among pneumococci from invasive disease, 1995-2003



The rates of resistance to other antibiotics among the 523 invasive isolates tested in 2003 included 3.4% chloramphenicol resistance, 33.8% co-trimoxazole resistance, 9.4% erythromycin resistance, and 8.6% tetracycline resistance. All isolates were vancomycin susceptible.

The majority of the penicillin-nonsusceptible isolates belonged to the capsular types usually associated with penicillin resistance (see table below). In recent years there has been a notable increase in the proportion of penicillin-resistant and cefotaxime-resistant invasive pneumococci that are due to serotype 19F. The majority of these resistant serotype 19F isolates belong to a multiresistant strain which is resistant to penicillin, cefotaxime, co-trimoxazole, erythromycin and tetracycline.

Distribution of capsular types among penicillin-nonsusceptible and cefotaxime-nonsusceptible invasive pneumococcal isolates, 2003

Capsular type	**Number (%[1]) isolates**			
	Penicillin		**Cefotaxime**	
	Nonsusceptible MIC ≥0.12 mg/L	**Resistant MIC ≥2 mg/L**	**Nonsusceptible[2] MIC ≥1 mg/L**	**Resistant[2] MIC ≥2 mg/L**
19F	25 (29.1)	19 (48.7)	24 (38.1)	12 (63.2)
9V	17 (19.8)	5 (12.8)	13 (20.6)	0
14	15 (17.4)	10 (25.6)	13 (20.6)	6 (31.6)
6B	11 (12.8)	2 (5.1)	6 (9.5)	0
19A	6 (7.0)	1 (2.6)	1 (1.6)	1 (5.3)
23F	5 (5.8)	2 (5.1)	5 (7.9)	0
Others	7[3] (8.1)	0	1[4] (1.6)	0
Total	86 (100)	39 (100)	63 (100)	19 (100)

[1] Percentage of the nonsusceptible or resistant isolates.
[2] Based on meningitis interpretive standards.
[3] Two serotype 29, one 6A, one 9A, one 15 and two nontypable.
[4] One serotype 29