

7.5 *Streptococcus pneumoniae*

Streptococcus pneumoniae is a common cause of upper respiratory tract infections such as sinusitis and otitis media, but is also a common pathogen found in invasive pneumonia, bloodstream infections and meningitis. Since 2002, all invasive isolates of *S. pneumoniae* are sent by the clinical microbiology laboratories to the National Reference Center for invasive *S. pneumoniae*, located at the Institute for Infectious Diseases of the University of Bern. Serotyping (to survey the impact of vaccinations on serotype distribution) and antibacterial resistance testing is performed for all isolates. Results of the latter are then sent to anresis.ch. However, in this report we analyzed data from the ANRESIS database, which may differ slightly from data of the National Reference Center for invasive *S. pneumoniae*. Penicillin-susceptible isolates (PSSP) were considered as ceftriaxone-susceptible, even if not tested.

In 2019, 6.7% of all isolates were penicillin non-susceptible (PNSP, Table 7. i). In comparison, PNSP rates in EU/EEA countries in 2020 ranged from 0.1% in Belgium to 40% in Romania. However, an exact comparison with other countries is difficult, as different breakpoints are used. Therefore, no average non-susceptibility rate is given for Europe.

Despite these restrictions, non-susceptibility rates essentially seem to be higher in France (29.1%) than in Italy (9.2%) and Germany (5.3%) [2]. These differences are mirrored within Switzerland, with higher PNSP rates in the French and Italian speaking parts as well (Table 7. i). Ceftriaxone non-susceptibility is below 1%. With 8.3%, the macrolide non-susceptibility rate is slightly higher than the penicillin non-susceptibility rate, with higher resistance rates in western and southern Switzerland. Resistance against levofloxacin was 1% in Switzerland in 2019, with a decreasing trend since 2013 (maximum 3.1%). As shown in Figure 7. j, resistance is higher in PNSP than in PSSP for ceftriaxone, trimethoprim-sulfamethoxazole and erythromycin.

Over the last ten years, significant decreases in antibiotic resistance in *S. pneumoniae* were observed for ceftriaxone, trimethoprim-sulfamethoxazole, erythromycin and levofloxacin (Table 7. i, Figure 7. k). This could at least in part be attributed to a vaccine-related decrease of the intrinsically more resistant serotypes [6].

Table 7. i: Non-susceptibility rates of invasive *Streptococcus pneumoniae* isolates in humans in 2019.

<i>Streptococcus pneumoniae</i>											2019	
Antimicrobial	West		North–East		South		Total			Trend		
	n	%	n	%	n	%	n	%	95% CI	4y	10y	
Penicillin ¹	124	11.3%	544	5.1%	38	13.2%	706	6.7%	5.8–7.6	–	–	
Ceftriaxone ²	124	0.0%	544	0.9%	38	0.0%	706	0.7%	0.4–1.0	–	↓	
Trimethoprim-sulfamethoxazole	69	10.1%	262	6.9%	38	7.9%	369	7.6%	6.2–9.0	–	↓	
Erythromycin	126	10.3%	379	7.1%	38	13.2%	543	8.3%	7.1–9.5	–	↓	
Levofloxacin	101	2.0%	357	0.8%	38	0.0%	496	1.0%	0.6–1.4	–	↓	

¹ Penicillin non-susceptible defined as MIC ≥ 0.064 mg/l, penicillin-resistant defined as MIC ≥ 2 mg/l

² Penicillin-susceptible isolates were not tested but set automatically to ceftriaxone-susceptible

West (GE, NE, VD, JU, FR), South (TI), North–East (other cantons) according to linguistic regions.

95% confidence intervals (CI) were calculated by the Wilson score method, calculations of trends were performed by logistic regression.

Trends were modelled with logistic regressions. Arrows represent a significant effect (p < 0.05) of the year on the correspondent outcome (increase, decrease).

Figure 7. j: Non-susceptibility rates in invasive PSSP (penicillin-susceptible *Streptococcus pneumoniae*) and PNSP (penicillin non-susceptible *Streptococcus pneumoniae*) isolates in humans in 2019.

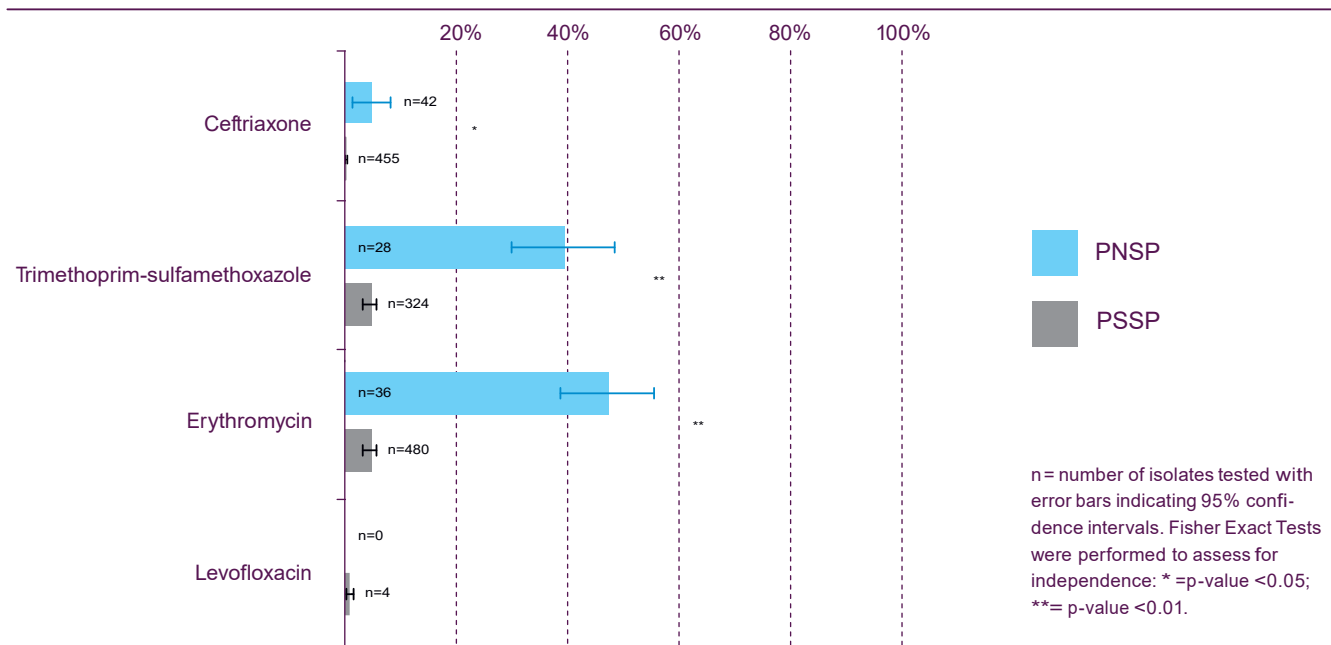


Figure 7. k: Non-susceptibility rates of invasive *Streptococcus pneumoniae* in humans between 2010 and 2019.

