

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 Centre for invasive *S. pneumoniae*, located at the Institute for Infectious Diseases of the University of Bern. Serotyping (i. e., to survey the impact of vaccinations on the serotype distribution) and antibacterial resistance testing are performed for all isolates. Results of the latter are then sent to ANRESIS. However, only data delivered by the primary laboratories are analyzed in this report. They may differ slightly from the data of the National Reference Centre for invasive *S. pneumoniae*. Penicillin-susceptible isolates (PSSP) were considered ceftriaxone-susceptible, even if not tested.

In 2021, 4.2% of all isolates were penicillin-resistant (PNSP), (Table 7. i). The average resistance rate for EU/EEA countries in 2020 was 15.6%. PNSP rates in individual EU/EEA countries ranged between 3.9% and 56.3% in 2020 [2]. However, an exact comparison with other countries is difficult, as different breakpoints were used.

Nevertheless, resistance rates essentially seem to be higher in France (32.3%) than in Italy (13.4%) and Germany (6.1%) [2]. These differences were mirrored within Switzerland, with slightly higher PNSP rates in the French-speaking part as well (Table 7. i). Ceftriaxone resistance was below 1%. At 6.1%, the erythromycin resistance rate was slightly higher than the penicillin resistance rate, again with higher resistance rates in the western part of Switzerland. Resistance against levofloxacin was 0.6% in Switzerland in 2021. As shown in Figure 7. j, resistance rates were significantly higher in PNSPs than in PSSPs for trimethoprim-sulfamethoxazole and erythromycin.

Over the last ten years, significant decreases in antibiotic resistance in *S. pneumoniae* were observed for trimethoprim-sulfamethoxazole, erythromycin and levofloxacin (Table 7. i, Figure 7. k). This may at least in part be attributed to a vaccine-related decrease of the intrinsically more resistant serotypes [10].

Table 7. i: Resistance rates of invasive *Streptococcus pneumoniae* isolates in humans in 2021.

<i>Streptococcus pneumoniae</i>										2021	
Antimicrobial	West		North-East		South		Total			Trend	
	n	%	n	%	n	%	n	%	95% CI	4y	10y
Penicillin	70	7.1	383	3.7	22	4.5	475	4.2	3.3–5.1	–	–
Ceftriaxone	70	0	383	0	22	0	475	0	0.0–0.0	–	–
Trimethoprim-sulfamethoxazole	56	3.6	186	4.3	22	0	264	3.8	2.6–5.0	–	↓
Erythromycin	74	10.8	262	5	22	4.5	358	6.1	4.8–7.4	↓	↓
Levofloxacin	72	2.8	226	0	22	0	320	0.6	0.2–1.0	–	↓

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 modeled with logistic regressions. Arrows represent a significant effect ($p < 0.05$) of the year on the corresponding outcome (increase, decrease).

Figure 7. j: Resistance rates in invasive PSSP (penicillin-susceptible isolates) and PNSP (penicillin non-susceptible isolates) in humans in 2021.

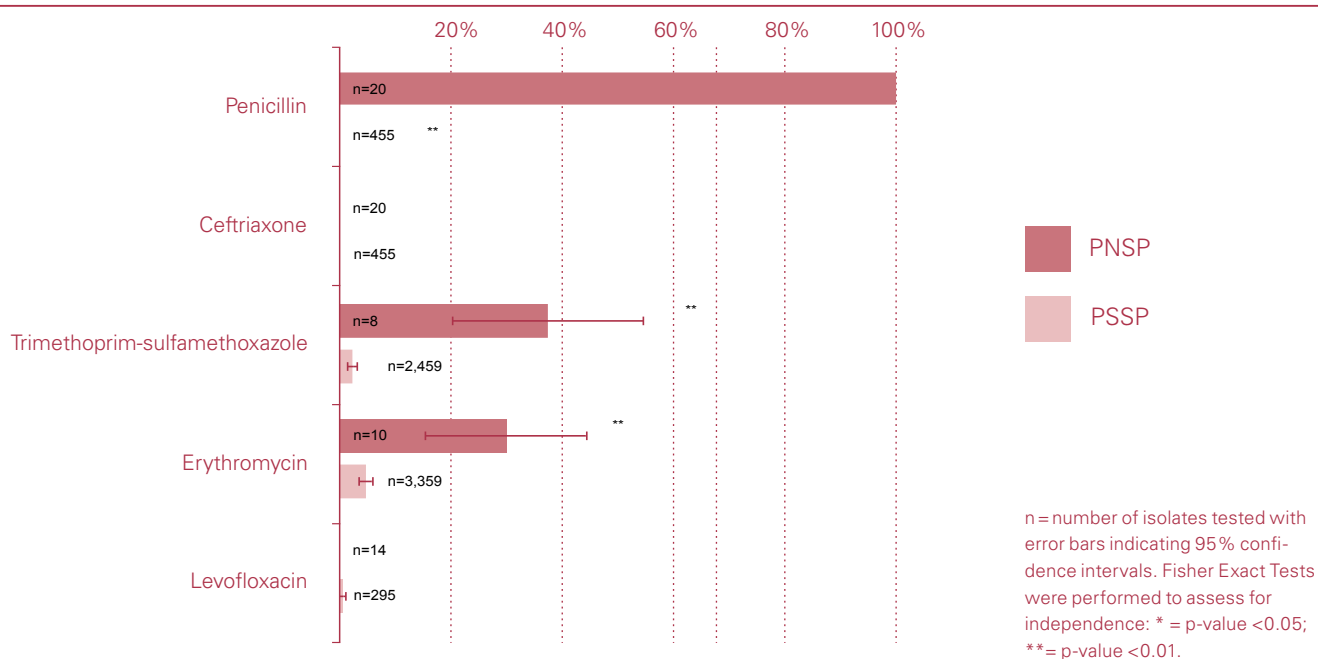


Figure 7. k: Resistance rates of invasive *Streptococcus pneumoniae* isolates in humans between 2012 and 2021.

