

## 7.4 *Acinetobacter* spp.

*Acinetobacter* spp. are Gram-negative, strictly aerobic coccobacilli. These opportunistic pathogens, which can be found in soil and water, are intrinsically resistant to many antibiotic agents. *Acinetobacter* spp. can roughly be divided into two groups: the *Acinetobacter calcoaceticus* – *Acinetobacter baumannii* (ACB) complex and the non-ACB group, including a large number of environmental species with low pathogenicity. Because the correct identification to the species level is difficult, we herein analyze resistance trends on the genus level, in accordance with the European resistance networks EARS-Net and CAESAR.

*Acinetobacter* spp. infections are an important concern regarding hospital-acquired infections in immunocompromised patients. They can cause respiratory, urinary, wound infections and septicemia. Meningitis has also been reported. Risk factors for multidrug-resistant *Acinetobacter* spp. are severe underlying diseases, prolonged hospital stays, especially in ICUs during antibiotic administration, mechanical ventilation and surgical procedures.

With the new EUCAST clinical breakpoint definition, version 9.0 from 1.1.2019, a broad intermediate category was newly introduced for ciprofloxacin, to reflect that higher dosing may be needed for the treatment of these infections. This led to an artificial increase in the ciprofloxacin non-susceptibility rates as reported in our tables and figures. When considering resistance only, ciprofloxacin-resistance is stable, with 10.7% in 2010 and 6.3% in 2019. In general, non-susceptibility rates are higher in western Switzerland than in north-eastern Switzerland (Table 7. g). Although a north-south gradient in antibiotic resistance can be observed in Europe for nearly all antibiotics, differences are most prominent for *Acinetobacter* spp. In 2018, resistance rates ranged from < 5% in northern countries to > 90% in southern countries for all of the antibiotics tested. The EU/EEA population means in 2018 were 32% for carbapenems and aminoglycosides, and 36% for fluoroquinolones [2]. Taking into consideration the changing breakpoints over time, it is probable that no significant trends are observed in Switzerland from 2010 to 2019. We performed a detailed analysis for carbapenem resistance, showing stable resistance rates from 2005 to 2016 [5]. A detailed analysis of other antibiotics has not been performed so far. Details on multiresistances are given in Table 7. h and Figure 7. i

**Table 7. g:** Non-susceptibility rates of invasive *Acinetobacter* spp. isolates in humans for 2019. Due to small numbers, non-susceptibility rates for southern Switzerland are not shown.

<i>Acinetobacter</i> spp.	2019										
	West		North-East		South		Total			Trend	
Antimicrobial	n	%	n	%	n	%	n	%	95% CI	4y	10y
Carbapenems <sup>1</sup>	11	–	50	6.0%	5	–	66	4.5%	1.9–7.1	–	–
Aminoglycosides	11	18.2%	49	10.2%	5	–	65	10.8%	7.0–14.6	–	–
Trimethoprim-sulfamethoxazole	7	28.6%	46	6.5%	5	–	58	8.6%	4.9–12.3	↓	↓
Ciprofloxacin	10	60.0%	48	50.0%	5	40.0%	63	50.8%	44.5–57.1	↑	↑

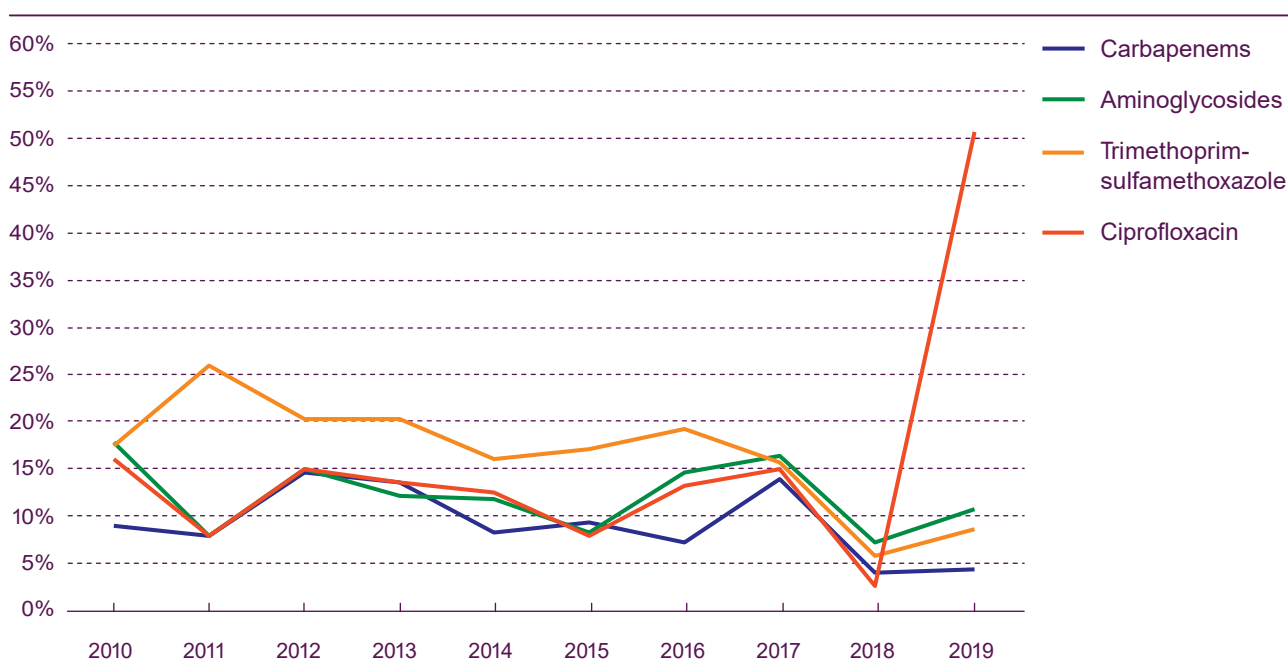
<sup>1</sup> Carbapenems: imipenem, meropenem

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. h:** Non-susceptibility rates of invasive *Acinetobacter* spp. isolates in humans between 2010 and 2019.



**Table 7. h:** Non-susceptibility combinations in invasive *Acinetobacter* spp. isolates in humans in 2019. Only isolates tested against all three antibiotic groups (aminoglycosides, ciprofloxacin and carbapenems) were considered ( $n = 61/67$  [91.0%]).

Resistance patterns	Number of isolates	% of total
Fully susceptible	29	47.5%
<b>Single resistance (to indicated antimicrobial group)</b>		
<b>Total (all single resistance types)</b>	<b>26</b>	<b>42.6%</b>
Ciprofloxacin	26	42.6%
<b>Resistance to two antimicrobial groups</b>		
<b>Total (all two-group combinations)</b>	<b>4</b>	<b>6.6%</b>
Carbapenems + ciprofloxacin	1	1.6%
Aminoglycosides + ciprofloxacin	3	4.9%
<b>Resistance to three antimicrobial groups</b>		
<b>Total (all three-group combinations)</b>	<b>2</b>	<b>3.3%</b>
Aminoglycosides + carbapenems + ciprofloxacin	2	3.3%

**Figure 7. i:** Multiresistance in invasive *Acinetobacter* spp. isolates in humans between 2010 and 2019 (for details refer to Table 7. h).

