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Introduction and purpose

Increasing rate of carbapenem-producing *Enterobacteriaceae* (CPE) has been observed in Europe and all over the world. CPE represent a great concern because of their broad resistance to multiple antibiotics, which reduces considerably therapeutic options. In 2016 CPE were defined as notifiable disease to the Swiss Federal Office of Public Health. Here we compare the prevalence and distribution of CPE in Switzerland from 2013 to 2017.

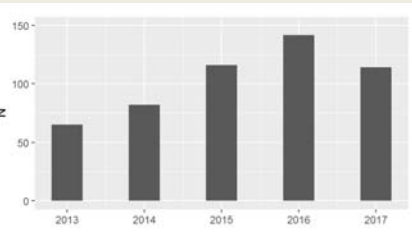


Fig. 1. Total number of CPE isolates.

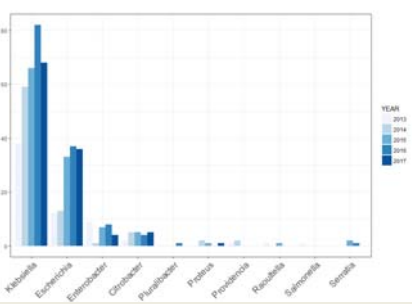


Fig. 2. Temporal distribution of the most prevalent CPE genera.

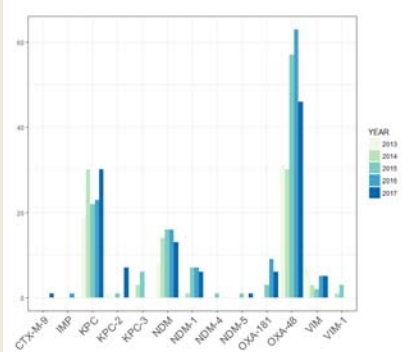


Fig. 3. Number of CPE genotypes over time



Fig. 4. Regions defined in the study.

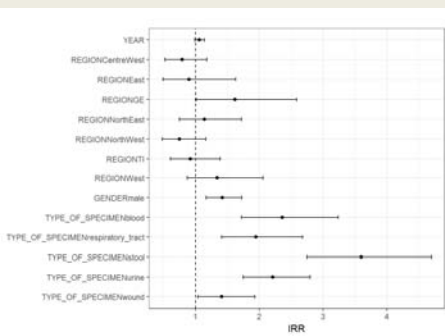


Fig. 6. Factors affecting the number of CPE isolates per canton per year. IRR: incidence rate ratio; multivariable Poisson regression.

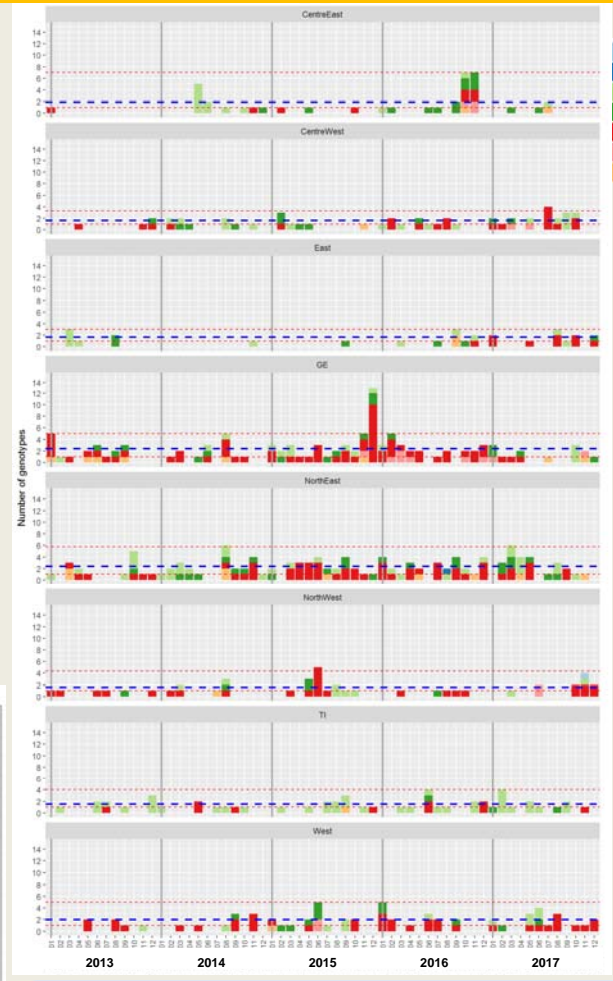


Fig. 5. Regional and temporal variations. The blue dotted line represents the average per region, and the red dotted lines the 95% CI around the average.

Results

- From 2013 to 2015, a total of 65, 82, and 116 CPE isolates were reported for each year, respectively. In 2016 and 2107, total CPE numbers were 142 and 114, respectively, indicating a stabilization of the number of CPE cases in the last three years (Fig. 1).
- The species most frequently isolated were consistently *K. pneumoniae*, followed by *E. coli* (Fig. 2). The most frequent carbapenemase genotypes were OXA-48 and -like, KPC, and NDM (Fig. 3).
- At the regional level (Fig. 4), highest CPE numbers were identified in the Geneva and North East regions from 2013 to 2016 (Fig. 5), and potential regional outbreaks could be identified.
- Multivariable analyses of regional and temporal trends of the CPE isolates confirmed a marginal temporal increase in total number, and higher prevalence in the GE region and in male patients (Fig. 6). All type of specimens (blood, colonization) were associated with higher CPE numbers.
- Sensitivity analyses that included the 18 common laboratories in 2013-2105 and 2016 (93.7% of the cases) did not change the observed trends and results reported.

Conclusions and outlook

Molecular data indicate different carbapenemases, with OXA-48-like, KPC- and NDM-type carbapenemases being the most prevalent in Switzerland. Overall OXA-48-like and NDM producers are increasing slightly over time, in contrast to neighboring European countries where the increase has been more substantial. Temporal and regional trends were identified and due to the current mandatory reporting scheme, a continuous surveillance of the situation in Switzerland is achieved.

Methods

Before 2016, the Swiss Society for Microbiology defined a network of 8 Swiss expert laboratories, capable of identifying and characterizing CPE according to EUCAST guidelines. All Swiss laboratories were asked to send all suspected CPE cases to one of the expert laboratories for characterization of the isolates.

Data from 2013-2015 (before mandatory reporting) and from 2016-2107 were then collated by the Swiss Antibiotic Resistance Centre ANRESIS and analysed for temporal and regional trends. Results from 2013-2016 data were presented at ECCMID 2017 and this is an update of the analyses with data from 2017.