

Incidence of Carbapenemase-Producing Enterobacterales (CPE) in Switzerland 2020 - 2021

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Background and Aim

Carbapenemase-producing Enterobacterales (CPE) represent a great concern since they are frequently associated to resistance to multiple antibiotics thus reducing therapeutic options. Increasing CPE rates have been observed in Europe and all over the world. Gasser and Ramette et al. [1] reported an aggravation of the situation in Switzerland over the last years with an increase from 66 yearly isolates in 2013 to 189 in 2018.

In this current study it is examined if this increasing trend continued during the last 1.5 years (i.e. since the onset of the COVID-19 pandemic) and how species and genotypes were distributed.

Methods

Since 2019 all suspected human CPE isolates from primary laboratories are sent to the national reference laboratory (NARA) which performs the genotyping. Data from NARA were analysed and interactive graphics were built by the Swiss Centre for Antibiotic Resistance (ANRESIS) using R 4.0.4. Data from before 2019 were collected by the Swiss Antibiogramm Committee (SAC) (2013-2015) and the Swiss Federal Office of Public Health (SFPOH).

Results

After an increase from 189 CPE isolates in 2018 to 286 in 2019 (+51%*) the incidence remained on a stable level in 2020 (238 isolates, -17%) and in 2021 (236 isolates, -1%, extrapolated value). *Klebsiella pneumoniae* (39% in 2020, 46% in 2021) and *Escherichia coli* (37% in 2020, 34% in 2021) were observed to be the most abundant species with slightly increasing proportions of *E. coli* in the long term (Figures 1 and 2).

* Please interpret with care as the reporting system changed between 2018 and 2019.

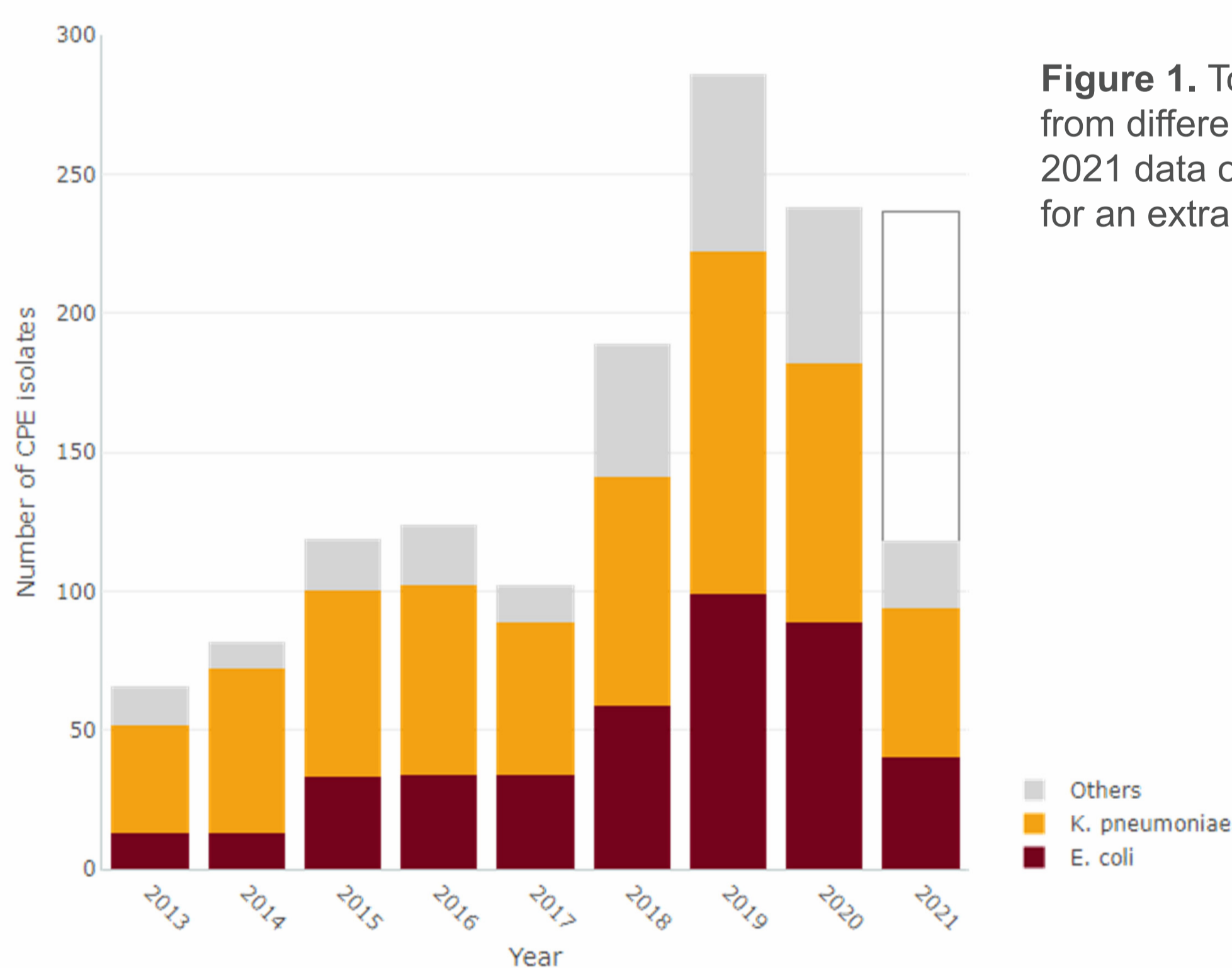


Figure 1. Total number of CPE isolates from different species (2013-2021). For 2021 data of the first half-year was used for an extrapolation.

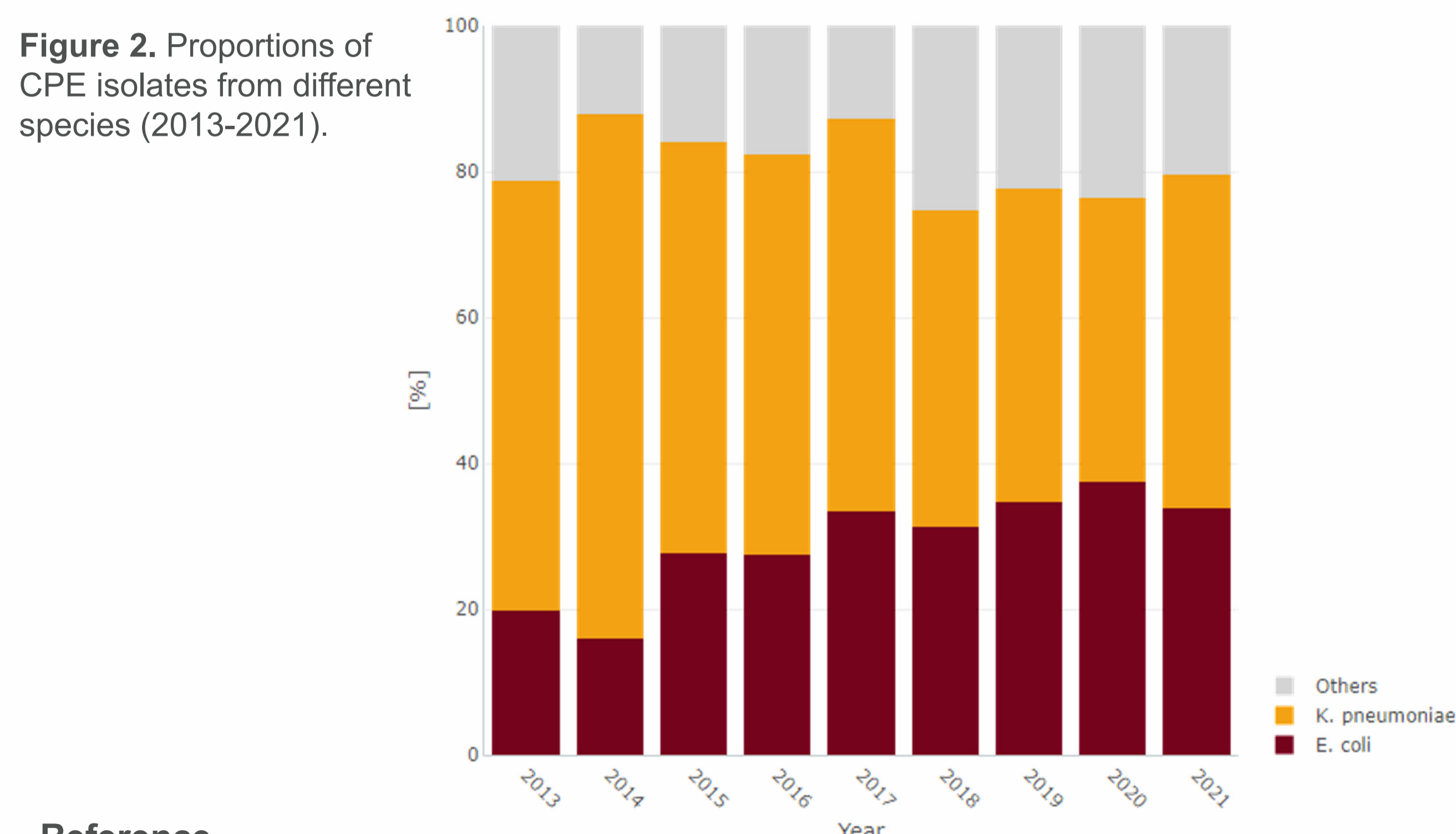


Figure 2. Proportions of CPE isolates from different species (2013-2021).

The most abundant genotypes during the last 1.5 years were the OXA-48-type (30% in 2020, 29% in 2021), NDM (29% in 2020, 30% in 2021), KPC (16% in 2020, 21% in 2021), and OXA-other (23% in 2020, 17% in 2021) which were mainly consisting of OXA-181 and OXA-244 (Figure 3).

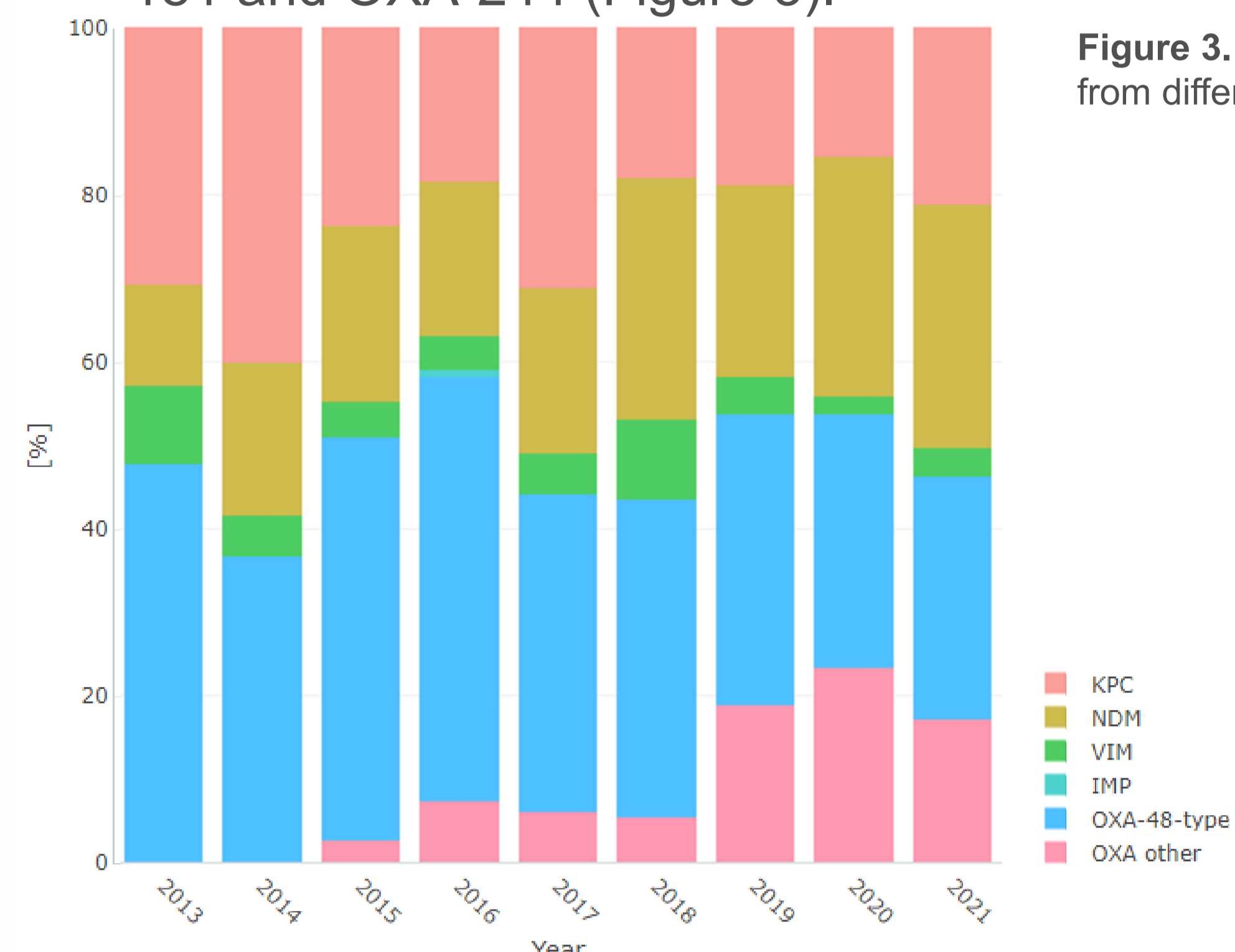


Figure 3. Proportions of CPE isolates from different genotypes (2013-2021).

In 2020 and 2021 OXA-48-type was the predominant genotype observed in western parts (e.g. Geneva 49% in 2020, 65% in 2021) whereas NDM was the most frequent genotype in northern and eastern parts (e.g. North-East 38% in 2020, 29% in 2021) and KPC in Ticino (44% in 2020, 67% in 2021) (Figure 4).

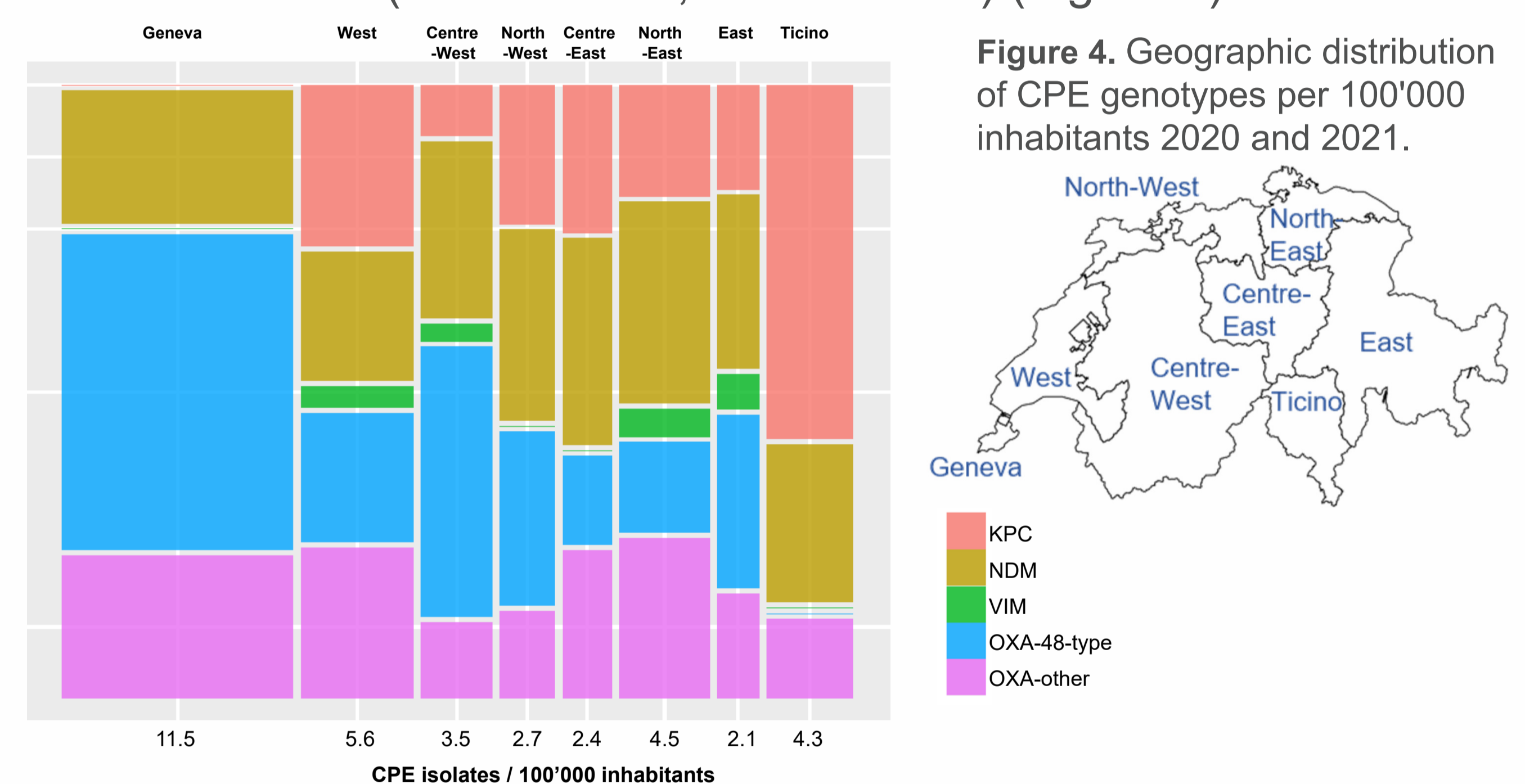


Figure 4. Geographic distribution of CPE genotypes per 100'000 inhabitants 2020 and 2021.

More analyses of CPE data can be accessed via <https://www.anresis.ch/antibiotic-resistance/resistance-data-human-medicine/#CPE> (or by the QR-code below), an interactive platform, which was recently developed to visualize the latest antimicrobial resistance data from Switzerland.



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Download the Swiss CPE study 2013-2018 [1]



More CPE statistics on ANRESIS.CH

Discussion and Conclusion

A comparison of CPE data from 2020 and 2021 with our previous study [1] from 2013-2018 shows an increase and consolidation of OXA-181 and OXA-244 genotypes. By focusing on the geographical distribution of genotypes within Switzerland patterns remain relatively stable i.e. the OXA-48-type was still predominant in Geneva whereas KPC was predominantly detected in Ticino. Further a relative (in comparison to other regions) decrease of the incidence was observed in Ticino. Total numbers of CPE isolates in Switzerland show a stabilisation in 2020 and 2021. This finding is in contrast to the long-term increase observed from 2013 to 2018 and might be due to decreased mobility during the COVID-19 pandemic. However, definite conclusions are not yet possible and the role of underlying factors needs to be further investigated.

Reference

1. Gasser and Ramette et al. Euro Surveill. 2021;26(15)