

BURKHOLDERIA CEPACIA COMPLEX AND OTHER GRAM NEGATIVE NONFERMENTERS IN BELGIUM: 2012-2020

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National Reference Center for Burkholderia cepacia complex

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BACKGROUND

The main task of the Belgian national reference center for *Burkholderia cepacia* complex (BCC) and other Gram-negative non-fermenters (GNNF) is to conduct surveillance of these microorganisms in CF patients. Belgian laboratories are asked to send up to two BCC and GNNF isolates (excluding *P. aeruginosa* and *Acinetobacter* spp.) per colonized patient each year. Each strain is first identified to the genus level by MALDI-TOF mass spectrometry at LM-UZ Brussel. Antibiotic susceptibility tests are performed on all submitted isolates. Secondly, RAPD is used if an earlier isolate of BCC and GNNF from the same patient has been identified at the NRC within the same year. All first isolates and isolates that do not match with previous ones from the same genus within a 12-month period are sent to LM-UGent for further characterization. This consists of the identification on species level by gene sequencing of appropriate genes (*recA*, *nrdA*, *rpoD* or 16S rRNA) and performing MLST typing based on WGS data. This MLST characterization of the isolates is performed to further investigate the possible association between some subtypes and pulmonary unfavorable disease evolution in CF patients. BCC isolates from non-CF patients are also regularly sent to the NRC for confirmation of identification and antibiotic susceptibility determination. Molecular typing is also performed for isolates from non-CF patients, especially in case of cluster or outbreak suspicion.

RESULTS

- A total of 313 BCC and other *Burkholderia* species were received from 2012 to 2020. *B. multivorans* represented 47% of the total number of *Burkholderia* isolates followed by *B. cenocepacia* (14%), *B. vietnamiensis* (12%), and the other species at lower proportions.
- A total of 832 GNNF species were received from 2012 to 2020. *Achromobacter* spp. represented 48% of the total number of GNNF isolates followed by *Stenotrophomonas maltophilia* (22%) and the other GNNF species at lower proportions.
- On average, 106 (mostly CF: 76%) patients, were followed up annually at the NRC with 445 patients in the whole period from 2012 to 2020. The mean age of the patients that were followed at the NRC from 2012 to 2020 was 25 years, and the number of males was slightly higher than that of females.
- Regarding the geographical distribution of the patients, Antwerp, Flemish Brabant, East Flanders and Brussels-capital region are the most represented provinces. Namur Walloon Brabant and Luxembourg are the least represented. In terms of the distribution of cases according to the centers attended by the patients, the hospitals contributing the most cases are UZ Brussel, UCL Saint Luc and UZ Leuven.

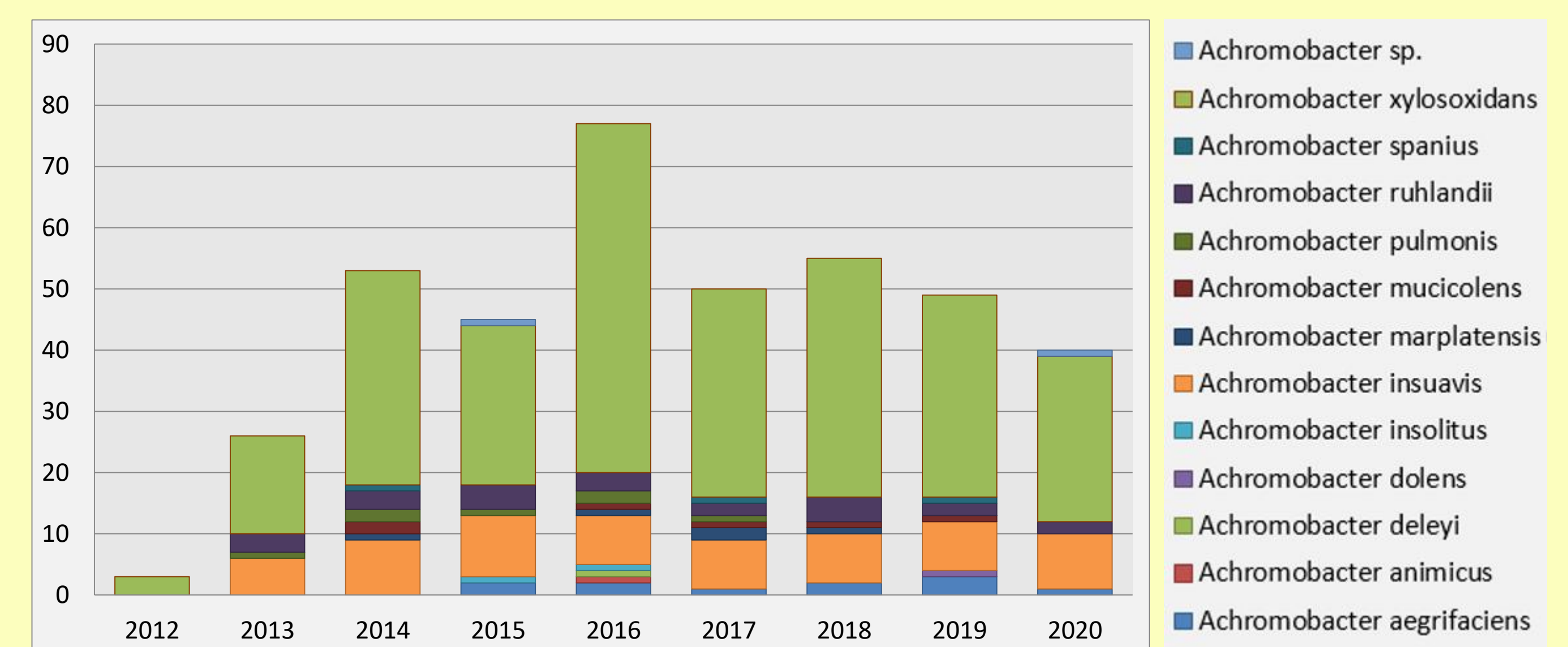


Figure 4. Distribution of the different *Achromobacter* spp. isolated from 2012 to 2020

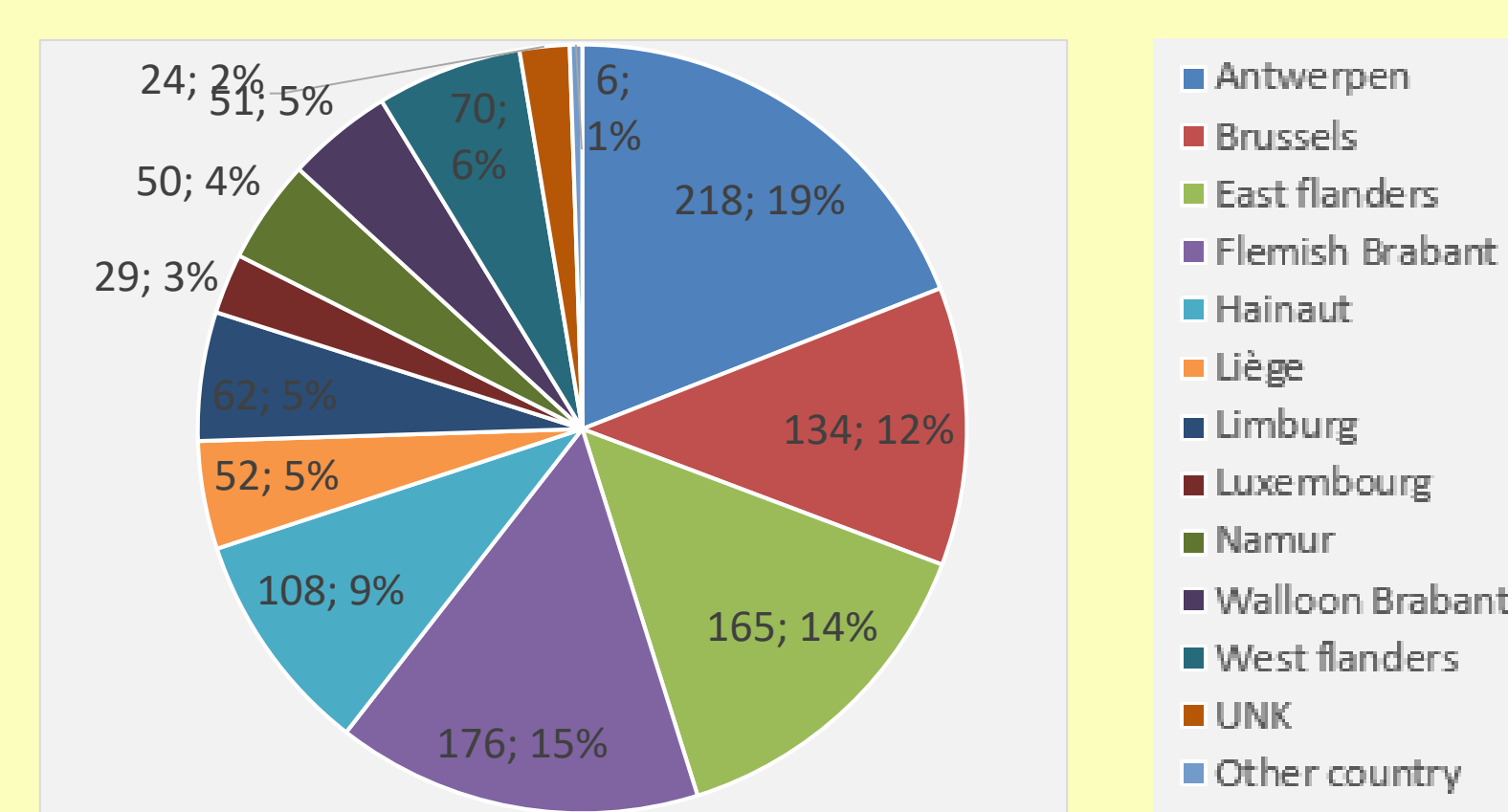


Figure 5. BCC-GNNF cases distribution per province for 2012-2020

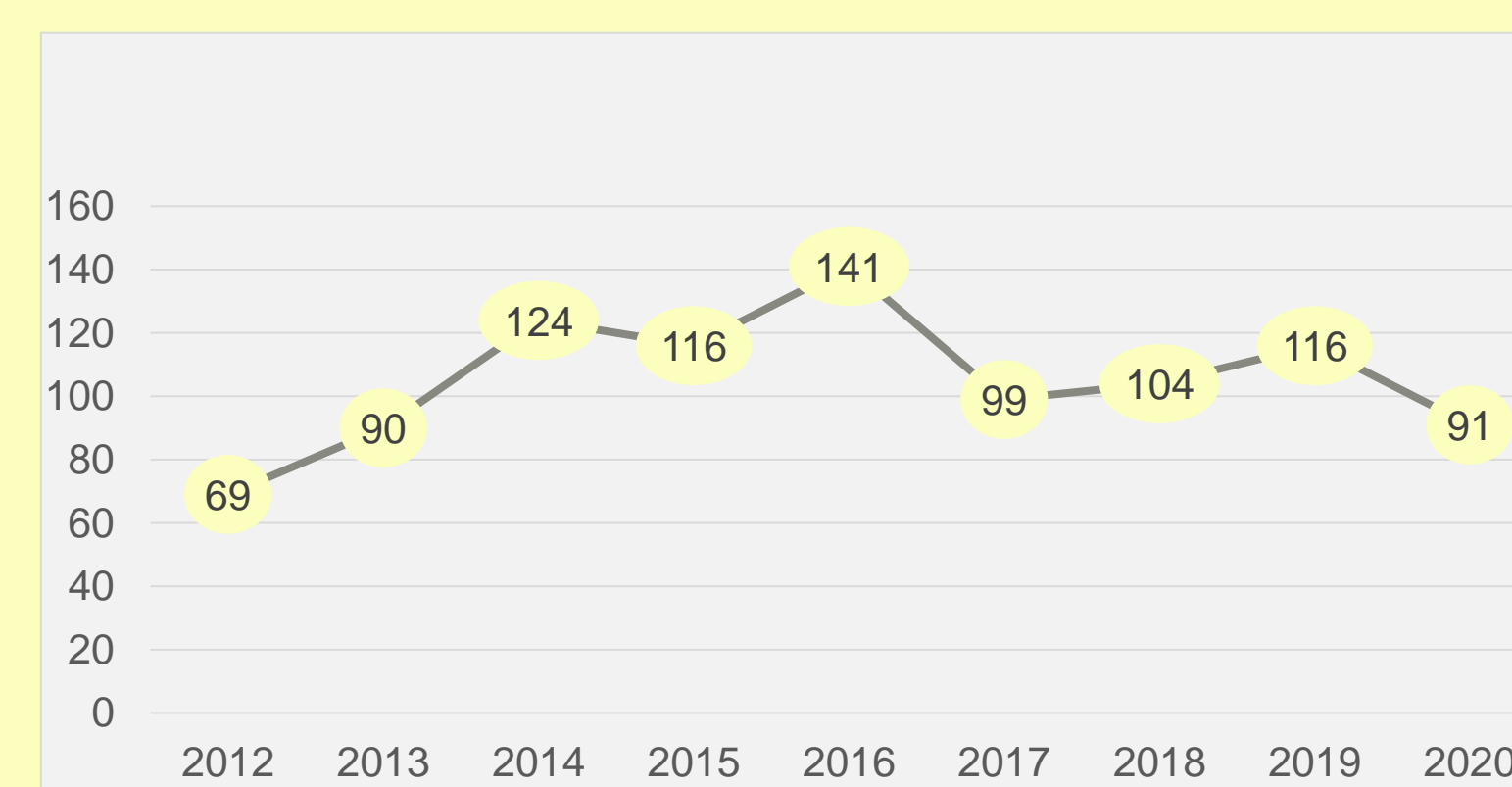


Figure 6. Yearly total number of the patients included at NRC-BCC-GNNF

CONCLUSION

- The proportion of *Burkholderia* spp. isolates has been declining over the years while the proportion of other GNNF isolates has been increasing: in 2012: 59% *Burkholderia*, 41% GNNF and in 2020: 26% *Burkholderia*, 73% GNNF.
- A slight decline in the number of samples referred to the NRC was observed in 2020. This decline was due to NRC activity reduction for a few months at the beginning of the COVID-19 pandemic.
- Unfortunately, it is not possible to determine the national prevalence of BCC and GNNF among CF patients based solely on the isolates referred to the NRC, since not all Belgian centers send all their isolates. To address this issue, our NRC plans to organize a new national surveillance study and invite all Belgian CF centers to participate.