Tools to collect data on detection and prevalence of carbapenem-resistant Gram-negative bacteria among European laboratories part of the COMBACTE Laboratory network (LAB-Net)

Tomislav Kostyanev, Christine Lammens, Leen Timbermont, Tuba Vilken, Annemarie van't Veen, Surbhi Malhotra-Kumar, Herman Goossens
Department of Medical Microbiology, Vaccine & Infectious Disease Institute, University of Antwerp, Antwerp, Belgium

Facts & Figures

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COMBACTE LAB-Net survey

COMBACTE LAB-Net conducted a pilot survey on distribution and usage of carbapenem resistance detection methods among laboratories in the COMBACTE network at the occasion of two clinical trials as part of the COMBACTE-CARE project. The purpose of this survey was to select sites for participation in the observational study EURECA (EUropean prospective cohort study on Enterobacteriaceae showing REsistance to Carbapenems) (Clintrials.gov NCT02709408) and the phase III clinical trial REVISIT (Revisiting serious bacterial infections with innovation) (NCT03329092). The survey was sent out to 211 laboratories in 20 European countries between May 2015 and June 2017.

External Quality Assessment (EQA) Panel

An EQA panel was carried out to reflect the performance of the laboratories involved in the EURECA study and their ability to detect carbapenem-resistant Gram-negative bacteria (CR-GNB) with routinely used phenotypic methods. Twenty well-characterized Gram-negative isolates were sent blinded to 50 labs in 11 European countries involved in EURECA (Albania, Bulgaria, Croatia, Greece, Italy, Kosovo, Montenegro, Romania, Serbia, Spain and Turkey) between May 2016 and January 2017 **(Table).** Labs were asked to perform identification and antimicrobial susceptibility testing (AST) using their local routine procedures. Instructions were developed and sent to all labs explaining how to handle the EQA panel. Results were collected via two online questionnaires which were built to capture data on the used detection methods, as well as on the identification and susceptibility data for each of the 20 strains.

Strain number	CR Resistance gene
CR01-CR05	none
CR06-CR09	NDM-1
CR10-CR12	VIM-1
CR13	SPM-1
CR14	SIM-1
CR15	OXA-24
CR16, CR17	OXA-23
CR18, CR19	OXA-48
CR20	KPC-3

Table. List of strains sent to laboratories participating in the EURECA study.

Results

Answers to the survey were collected from 165 laboratories (78%) **(Fig.1).** Sixty laboratories (36%) reported an outbreak of carbapenem-resistant (CR) *Enterobacteriaceae* during one of the two years preceding the completion of the survey. High rates of CR *Acinetobacter spp.* above 50% were reported by 74 laboratories (47%). Laboratories from Western Balkan countries reported extremely high rates of CR *Acinetobacter spp.,* sometimes higher than 90%.
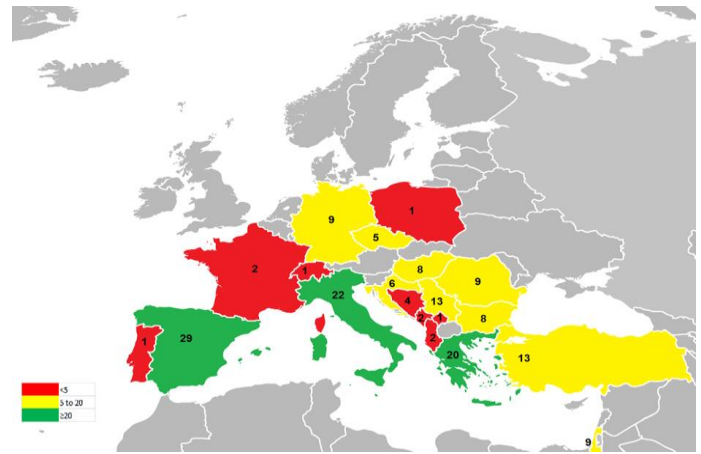

Fig.1. Geographical distribution of number of questionnaires received (n=165) per country (red: <5; yellow: 5-20; green: ≥20).

Forty-five labs (90%) reported results on the EQA panel **(Fig. 2).** The most used routine methods for identification were Vitek (49%), MALDI-TOF (41%) and conventional biochemical tests (27%). Gram-stain was also used by 46% of the labs. The majority of the labs (65%) interpreted the AST results according to the EUCAST guidelines. Eighteen labs (40%) reported all strains correctly.
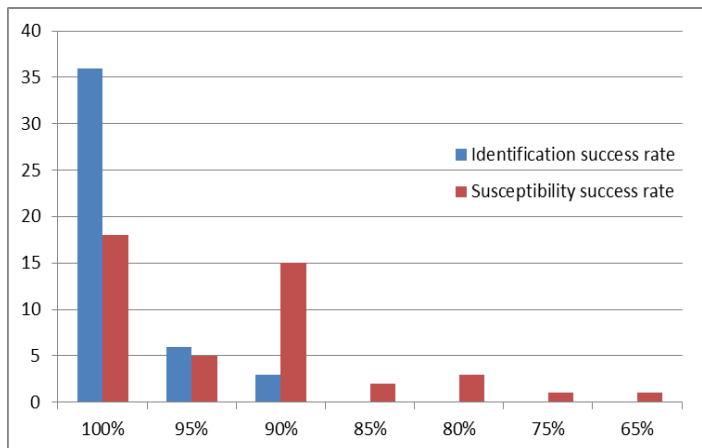

Fig.2. Distribution of labs (n=45) according to their success rate in identifying and determining the susceptibility profile of the EQA strains.

The COMBACTE LAB-Net survey and the EQA panel allowed us to unravel the methods used locally for the detection of CR-GNB. Based on these results, we were able to select sites for the EURECA clinical study with high prevalence of CR-GNB which enabled them to subsequently recruit successfully many patients in this study. Last but not least, the EQA exercise provided an opportunity for these sites to be trained for participation in clinical trials.