Special Report

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Future MICROBIOLOGY

# COMBACTE LAB-Net: building a European laboratory network for clinical trials on anti-infectives

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LAB-Net, the laboratory network of COMBACTE, has established itself as an indispensable network for clinical trials in infectious diseases that plays a crucial part across 30 clinical studies not only within, but also outside the COMBACTE consortium. Since its official launch in January 2013, LAB-Net has expanded more than threefold and in Q4 2020 it encompasses 841 labs across 41 countries in Europe. In addition, LAB-Net has crossed the European borders and collaborates with more than 300 laboratories spread across the globe. The tight collaboration with partners within COMBACTE and beyond contributed tremendously to the growth of LAB-Net over the years. A sustainable infrastructure beyond COMBACTE-NET is needed to ensure the smooth handover and continuity of the achievements made by the project.

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**Keywords:** anti-infectives • antibiotics • biorepository • clinical development • clinical trials • external quality assessment panel • laboratory network • laboratory training

## LAB-Net

LAB-Net, the laboratory network of COMBACTE [1], consists of routine diagnostic laboratories, specialized research laboratories and one central coordinating laboratory based at the University of Antwerp, Belgium. Its overarching objective is to establish, train and maintain a high-quality geographically representative European COMBACTE laboratory network to support antibacterial drug development via various clinical trials. LAB-Net has grown enormously since the start of the COMBACTE project [1] in January 2013 and has made a significant progress in completing its specific objectives and tasks set by the Innovative Medicines Initiative (IMI) (Table 1). The purpose of this special report is to outline the achievements made by LAB-Net in the past 8 years (2013–2020).

## Building a geographically representative European laboratory network

Since 2013, LAB-Net has built and maintained a geographically representative European laboratory network (LAB-Net objective one) which currently includes more than 800 routine clinical microbiology laboratories and 14 research laboratories across 41 European countries participating in 30 different clinical studies (Figures 1–3 & Supplementary Table 1). This enormous achievement was accomplished by recruiting laboratories that had already established a close relationship with partners within the COMBACTE consortium, through the build up of collaborations with other European research networks and through national personalized and targeted recruitment strategies.

Due to the nature of most of the studies run in the COMBACTE network and the markedly higher prevalence of multidrug-resistant (MDR) bacteria in southern Europe, the number of laboratories in LAB-Net from this region is substantially higher (n = 322; 38.2%).

The COMBACTE network is able to contribute to all aspects of clinical study development and implementation and LAB-Net, specifically, bringing in all aspects of microbiological expertise to the clinical studies it is involved in, ranging from contributing scientific expertise to clinical protocol development, site selection, lab training, biobanking and the execution of centralized lab assays (Figure 4).

This internationally recognized expertise has led non-COMBACTE member industry sponsors, other large European clinical trial networks and the NIH in the USA to seek European and global clinical research partnerships

**Table 1. LAB-Net objectives.**

| | LAB-Net objectives |
|---|---|
| 1 | To establish a geographically representative European COMBACTE-NET laboratory network. |
| 2 | To collect information from the diagnostic laboratories on specimen types for the target diseases, transport, storage conditions and diagnostic methods (including detection, identification and antimicrobial susceptibility methods). |
| 3 | To collect surveillance data on the prevalence of organisms in relation to AMR in order to optimize site selection for clinical trials within the ND4BB program. |
| 4 | To establish a quality assessment system to assure the high performance of the LAB-Net laboratories. |
| 5 | To evaluate and select appropriate (rapid, point-of-care) diagnostic microbiological tests to allow optimal (early) selection of patients in the context of clinical trials and to guide optimal therapy for target diseases. |
| 6 | To establish a repository of specimens and strains linked to a database, including microbial and anonymized patient information collected in observational and intervention studies within the ND4BB program. |
| 7 | To provide this repository as a core facility to develop new antibacterial agents and novel rapid diagnostic tests, and to study microbial and human biomarkers. |
| 8 | To establish a training and communication academy to ensure LAB-Net members are able to participate in multinational trials. |

AMR: Antimicrobial resistance.

with COMBACTE. This has resulted in numerous successful collaborations and research projects. These collaborations have crossed the boundaries of Europe and the laboratory network of COMBACTE gradually expanded and currently includes 302 labs in 32 non-EU countries (Figure 5).

LAB-Net was also approached by several pharmaceutical companies, that are not partners in the COMBACTE project, for collaboration in different studies. A collaboration was initiated with the Shionogi company on a Phase III study testing the novel siderophore cephalosporin cefiderocol with potential to treat MDR Gram-negative pathogens (CREDIBLE-CR https://clinicaltrials.gov/ct2/show/NCT02714595) that was successfully completed in 2019 [2]. LAB-Net was actively involved in site training on the laboratory procedures for the CREDIBLE-CR study, as well as in the preparation of the laboratory manual and in an external quality assessment (EQA) session for all laboratories participating in the study. The USA NIH looked for collaboration with LAB-Net for the site selection phase of a randomized controlled trial for the treatment of extensively drug-resistant Gram-negative Bacilli (OVERCOME https://clinicaltrials.gov/ct2/show/NCT01597973?cond=extensively+drug-resistant+Gram-negative+Bacilli&draw=2&rank=1). This trial is sponsored by the National Institute of Allergy and Infectious Diseases (NIAID) in the USA, and funded by the NIH. LAB-Net was also involved in the selection of sites for a Phase III study, which is evaluating the safety, tolerability and efficacy of imipenem/cilastatin/relebactam (MK-7655A) versus piperacillin/tazobactam in subjects with hospital-acquired bacterial pneumonia or ventilator-associated bacterial pneumonia (RESTORE-IMI-2 https://clinicaltrials.gov/ct2/show/NCT02493764?term=RESTORE-IMI-2&draw=2&rank=1), sponsored by Merck (Figure 6).

LAB-Net was also approached by the Drugs for Neglected Diseases initiative (DNDi), a collaborative, patients' need driven, nonprofit drug research and development organization that is developing new treatments for neglected diseases and the Global Antibiotic Research and Development Partnership, a joint initiative of DNDi and the WHO. DNDi and Global Antibiotic Research and Development Partnership support an observational study looking at risk factors for neonatal sepsis in low- and middle-income countries (NeoOBS). LAB-Net acted as central laboratory for this observational study and had a leading role in training the local microbiology laboratories in study-specific procedures, preparing the laboratory manual and conducting an EQA panel on detection of carbapenem-resistant Gram-negative bacteria (some of the pathogens of interest for the study).

In 2019, LAB-Net started its involvement in a pediatric community-acquired pneumonia project funded by the European and Developing Countries Clinical Trials Partnership (EDCTP) with 13 partner institutions in Europe and Africa. Pediatric community-acquired pneumonia has a 5-year support until 2024 and includes a main clinical trial, a parallel Phase II pharmacokinetic trial comparing additional different ratios for co-amoxiclav and various capacity building activities. The study and substudy involves the participation of five sites in South Africa, Uganda, Zambia and Zimbabwe. This project assesses the impact of oral step down to amoxicillin or to co-amoxiclav, as well as of the duration of antibiotic therapy on the effectiveness, safety and selection potential of antibiotic resistance in severe childhood community-acquired pneumonia.

LAB-Net is committed to strengthening its laboratory network by focusing on capacity building and education, and ensuring that sites are aware of LAB-Net's commitment for maintaining a sustainable laboratory network. One

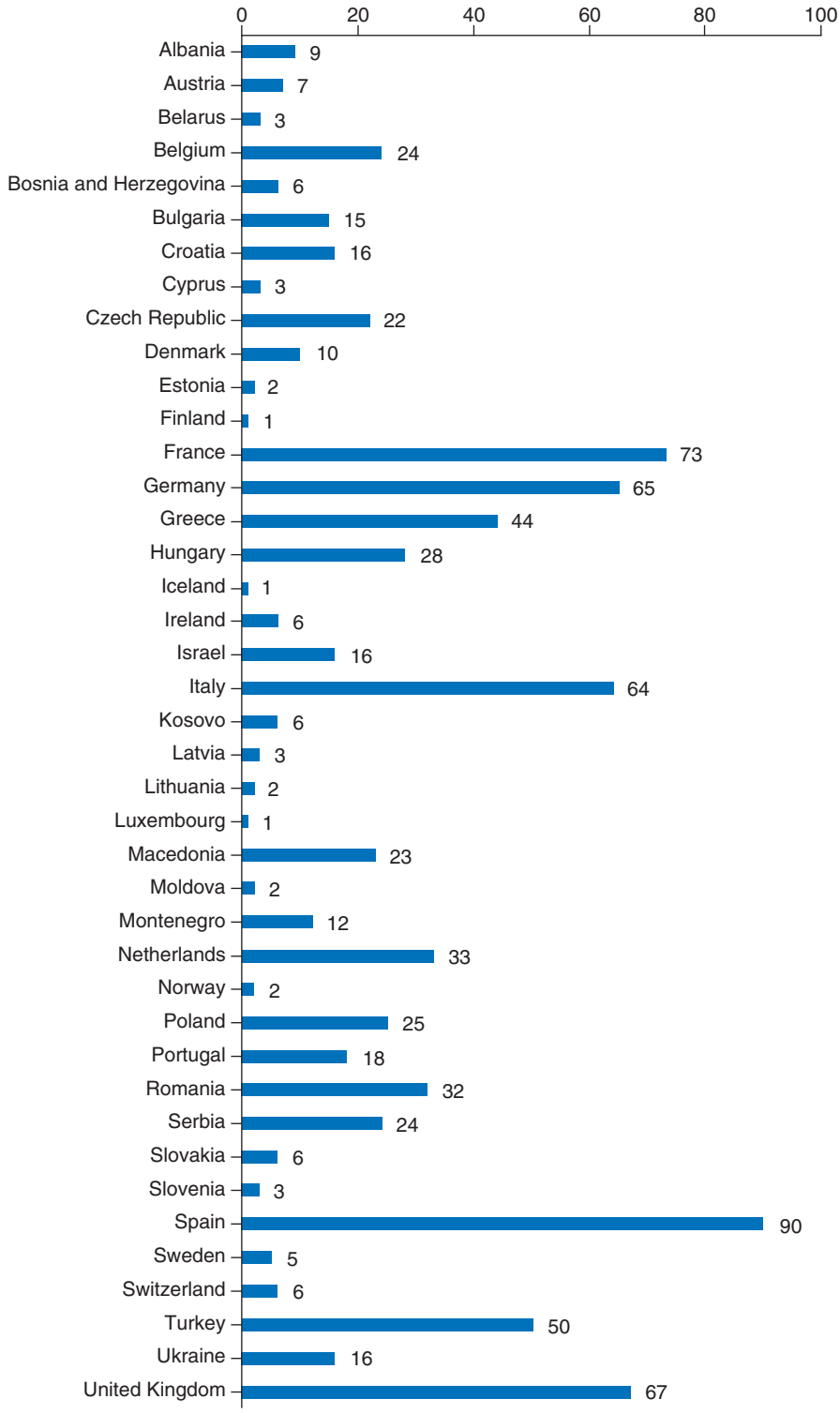


**Figure 1. Distribution of the laboratories in LAB-Net per country in Europe (as per Q4 2020).**

way of accomplishing this is through the support from national coordinators. These are professionals recognized by their peers at the national level and who have demonstrated an interest and commitment to the success of LAB-Net and antibacterial drug discovery and development. In order to support the development of LAB-Net into a sustainable and high-quality clinical laboratory network, an advisory board of LAB-Net national coordinators


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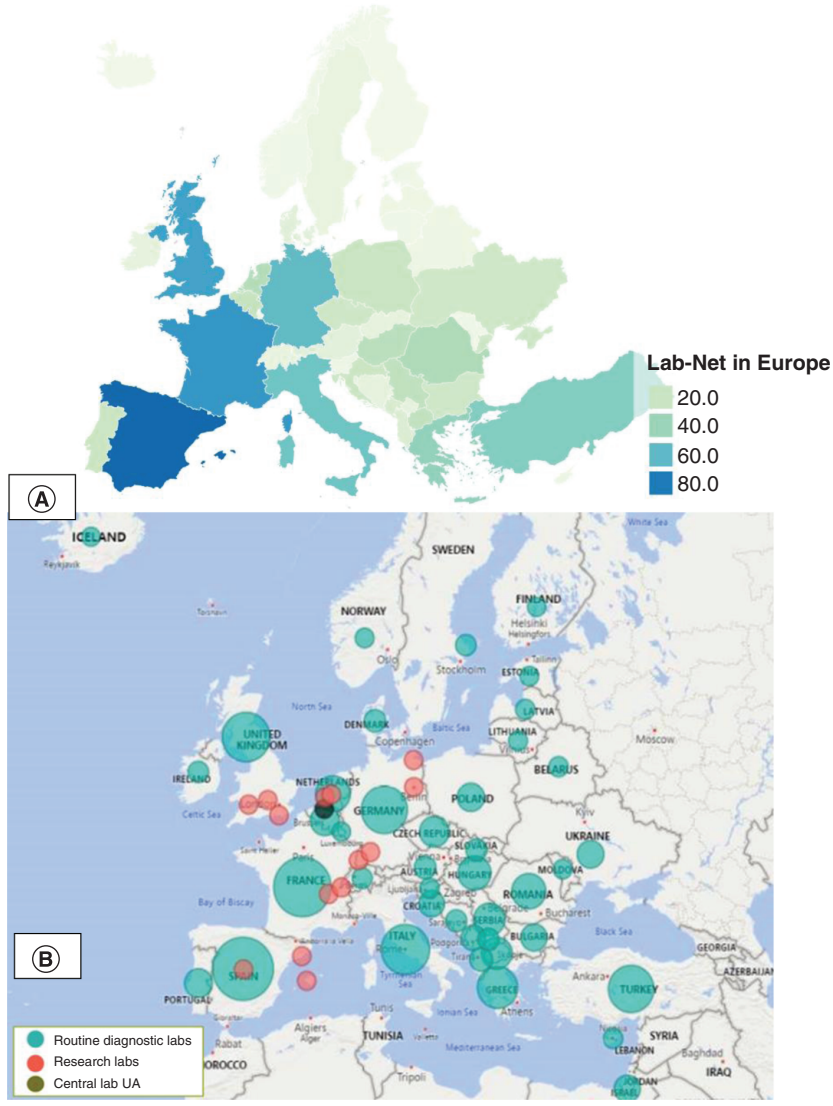


**Figure 2. Laboratories in the LAB-Net network. (A)** Gradient of the distribution of the laboratories in the LAB-Net network in Europe (as per Q4 2020). **(B)** Overview of participating laboratories within the LAB-Net network in Europe (as per Q4 2020). The number of routine diagnostic laboratories per country is represented by a light green circle; the LAB-Net base (University of Antwerp) is represented by a dark green circle; the research laboratories are shown in red. The sizes of the circles are directly proportional to the number of laboratories in each country.

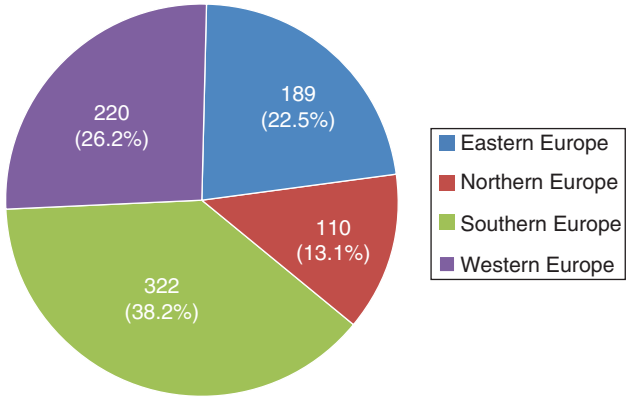


**Figure 3. Distribution of the laboratories in LAB-Net per region in Europe as per WHO definitions (as per Q4 2020).**


**Figure 4. Contribution of LAB-Net to clinical studies by Q4 2020.** The complete names and website links for each project/clinical study can be found in Supplementary Table 1.

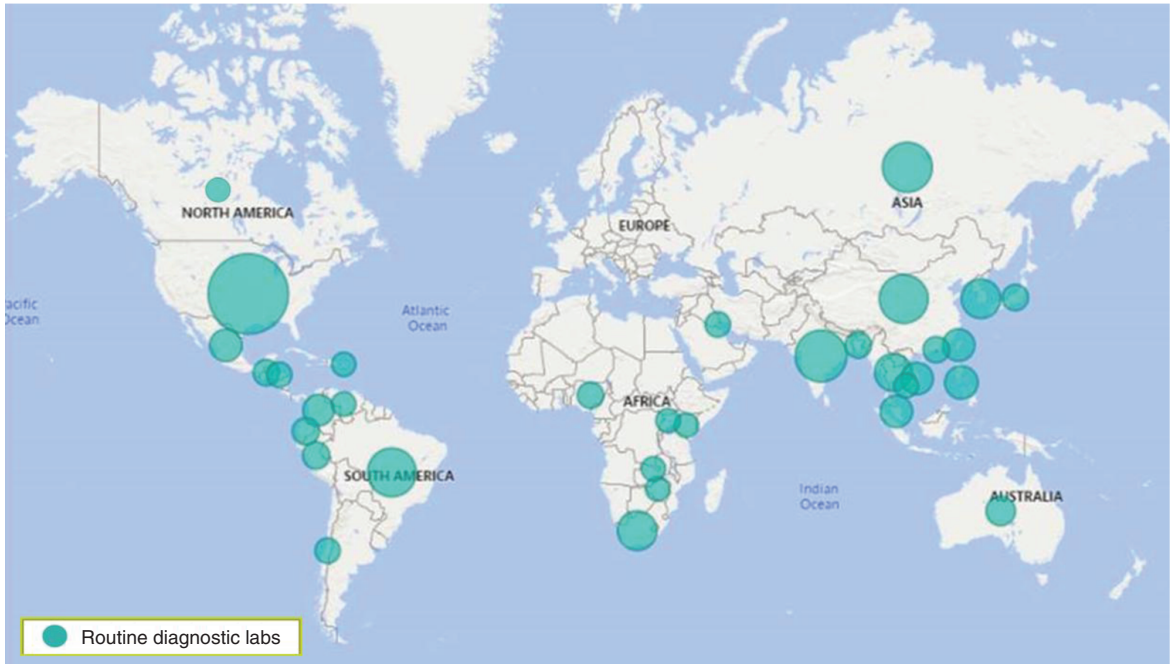


**Figure 5. Overview of laboratories outside of Europe that LAB-Net collaborates with.** The size of the green circle is directly proportionate to the number of laboratories in each country.


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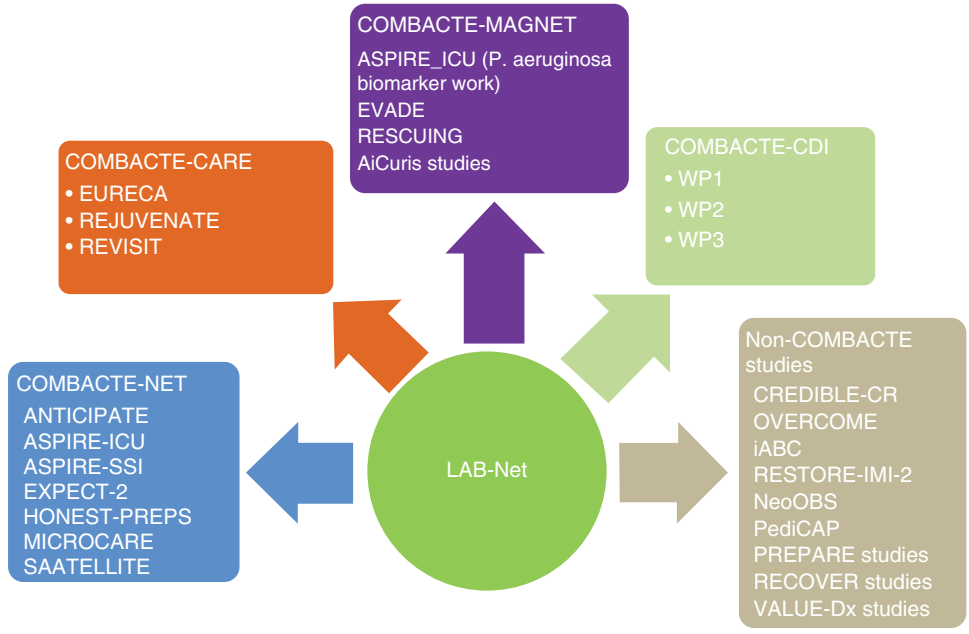


**Figure 6. Links of LAB-Net to various clinical trials within COMBACTE and beyond as per Q4 2020.** The website links for each study can be found in Supplementary Table 1.

has been established. This team is composed of European Federation of Pharmaceutical Industries (EFPIA) leads, academic leads and experts in the field. The modus operandi for the establishment, maintenance and sustainability of LAB-Net was established in June 2016. There are currently LAB-Net national coordinators in 21 countries that collaborate in the identification and preselection of labs for specific studies, address local roadblocks encountered during study planning and implementation and contribute to the expansion and sustainability of a high-quality laboratory network in their country. LAB-Net and CLIN-Net (the COMBACTE clinical site network) have also been coordinating country visits during which representatives from both networks meet with the national coordinators of the country, as well as with clinical and laboratory staff of participating study sites to strengthen the personal ties between these local sites and the networks.

## Data collection

LAB-Net uses electronic questionnaires to collect information from laboratories in order to assess their capability to participate in clinical studies. Using both a general 'baseline questionnaire' to assess laboratories' general capabilities and 'study-specific' questionnaires addressing specific study needs, LAB-Net collects information from diagnostic laboratories on specimen types for target diseases, transport and storage conditions and diagnostic methods used including the detection, identification and antimicrobial susceptibility testing methods of each laboratory, instrumentation, as well as organism-specific antimicrobial resistance (AMR) rates in the population that the lab serves (LAB-Net objective two).

LAB-Net questionnaires are being sent out via a data management platform, called network management system (NMS), created in collaboration with CLIN-Net. The NMS collects all hospital, laboratory and contact information, trial experience, site facilities and epidemiology data captured from baseline and trial feasibility questionnaires sent via the system. NMS optimizes site selection and facilitates communication with sites. Feasibility questionnaires can be prefilled with data from the NMS and previous questionnaires, which highly facilitates efficiency in the site selection process. The storage of clinical and lab data in one portal is also an advantage when selecting sites for clinical trials. Via the NMS it is also possible to send good clinical practice (GCP) training invitations. Several reports and overview screens allow the easy provision of the actual status of the organizations within COMBACTE. Users have role-based access to the platform, which prevents unauthorized data access. Data traffic over the internet is encrypted using secure data communication protocols and the database is backed up every night. By Q4 2020, more than 3400 laboratory questionnaires had been sent out via NMS and almost 50% of them were completed, with several study-specific questionnaires having high completion rates, in the range of 45–90%.

The questionnaires constitute an important tool for study site selection and have allowed LAB-Net to establish a surveillance infrastructure for AMR in Europe (LAB-Net objective three). The data gathered with the questionnaires allows an efficient preselection of sites based not only on their laboratory capacity, but also on the epidemiology of AMR (local prevalence of resistant pathogens). The data from the questionnaires are stored in the research data management system online, which allows for the centralized tracking and management of feasibility questionnaires and high-level site information. In addition, the site performance indicators of local laboratories in studies, including the results of participation in EQA sessions, were collected between 2016 and 2020 and will be available to other study teams for future site selection. This will allow even more transparent and rapid site selection process in future studies. Based on the collected questionnaire data, site performance indicators, input from national coordinators, EQA panel performance and relevant expertise, LAB-Net contributed to the selection of more than 400 sites across ten COMBACTE and non-COMBACTE studies in the past 8 years.

As an example, LAB-Net collected valuable data in the frame of the site selection process for EURECA [3] and REVISIT studies on the local prevalence of carbapenem-resistant Gram-negatives and on methods used for the detection of these pathogens, which were published in 2018 [4]. Medical microbiology laboratories play a crucial role in anti-infective clinical trials and these surveys were instrumental in demonstrating that the selected laboratories are capable of accurately identifying carbapenem-resistant pathogens, and that they are well trained to engage in a clinical trial.

## Quality assessment system

In order to ensure that LAB-Net laboratories provide the highest quality work, LAB-Net has established site performance indicators in order to assess the capability of the network laboratories to participate in clinical studies. During the study period, site performance indicators are measured and entered in NMS. LAB-Net has also established an EQA system to monitor the performance of the laboratories in the network (LAB-Net objective four), representing a panel for the detection of MDR Gram-negative pathogens, and more specifically aiming to detect resistance to carbapenems, a frequent target of antimicrobial drug development programs. LAB-Net's experience shows that introducing an EQA panel has not only been extremely useful as a performance measure, but also as an introduction to a potentially new diagnostic test and an opportunity to train sites on how to use it. To improve the quality of its activities, COMBACTE has established an evaluation scheme, which involves evaluation of the performance of LAB-Net and the central lab by the sites involved in clinical trials.

## Selection of diagnostic microbiological tests

One of the important contributions of LAB-Net in developing clinical studies is the selection of diagnostic microbiological tests that allow the optimal enrolment of study patients and provide accurate diagnostic information to guide therapy (LAB-Net objective five). Diagnostic test selection, sometimes requiring calls for tender for a specific study, is performed in a systematic manner in order to ensure that the most appropriate diagnostic test is chosen in a transparent and efficient way. To guide the identification of the most appropriate diagnostic test for a given clinical study, LAB-Net developed a procedure describing the different steps in the selection of the optimal diagnostic test: definition of the diagnostic specifications, call for tender, selection step and finalization of the selection step (Figure 7). In general, the market is screened based on the specifications necessary for the study. If a test is available, the bids are compared. However, if no test is available, a company with expertise in the necessary field is asked to develop a test that meet the specifications.

Since 2013, LAB-Net was involved in the selection of diagnostic tests for seven clinical studies, one of which was the selection of the Cepheid test to screen patients in the SAATELLITE study [5,6].

## Repository of clinical specimens & strains

LAB-Net has established a repository at the University of Antwerp that by Q4 2020 houses more than 86,000 unique samples and more than 11,000 isolates from 11 clinical studies that can be linked to anonymized clinical information. Eight thousand samples and 4000 isolates were collected in 2020 only. The goal of this repository is to serve as a biobank for future COMBACTE and other studies and as a core facility to study microbial and human biomarkers, as well as for the development of new antimicrobial agents and novel rapid diagnostic tests (LAB-Net objectives six and seven).

In 2018, Belgium implemented the Royal Decree on Biobanks (Belgium Official Gazette, 5 February 2018). This law includes strict regulations on biobanking human body substances, especially related to registration, traceability and documentation. All samples with human body material, including all derivatives need to be


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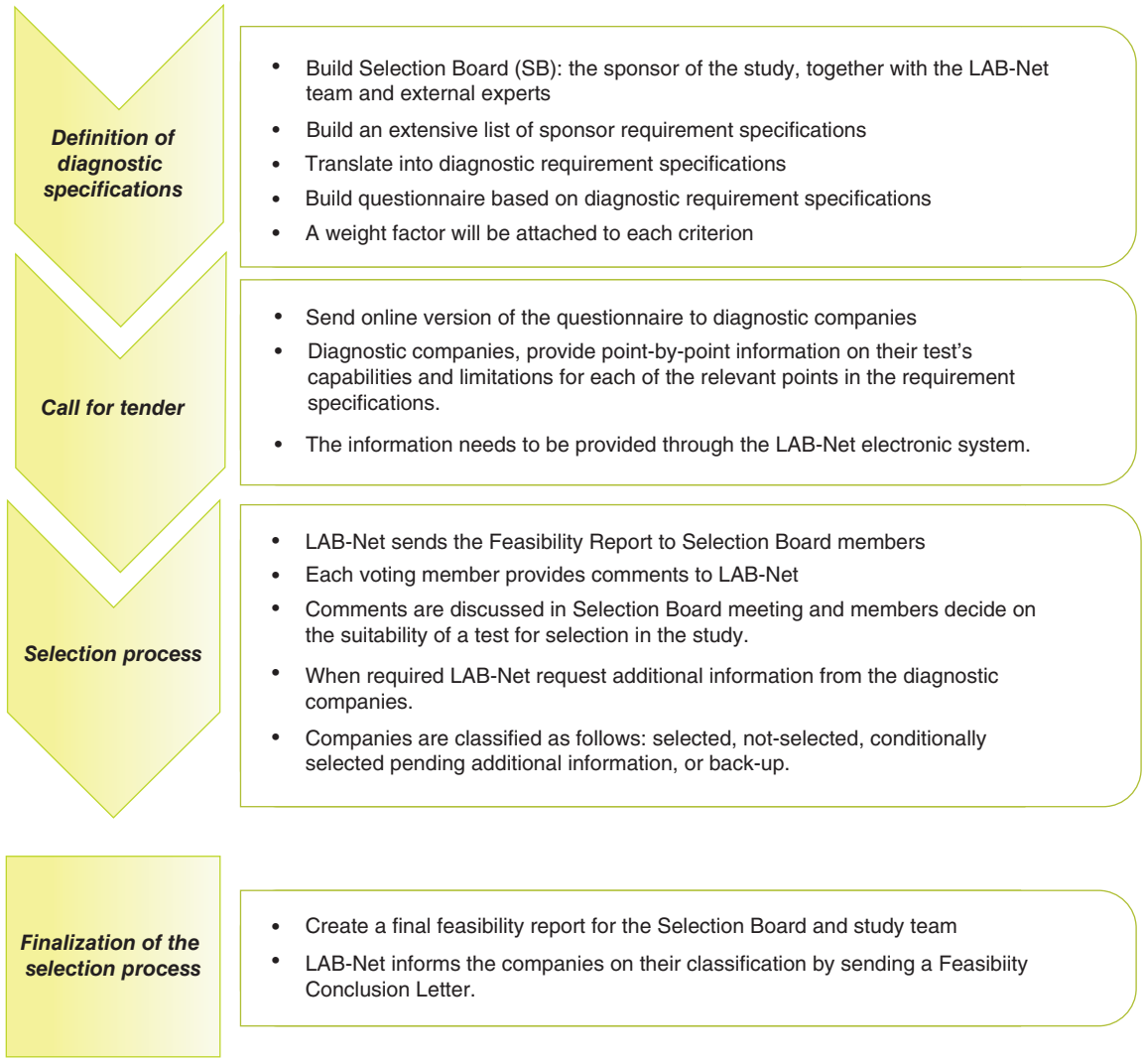


**Figure 7. Diagnostic test selection flow.**

registered in an official biobank (registered at the Belgian Federal Agency for Medicines and Health Products – FAGG; https://www.famhp.be/en). Accompanying patient data can be collected and can be accessed in compliance with the rules fixed by the General Data Protection Regulation and the informed consent form. Samples should be coded, the key remain with the principle investigator, but the manager of the biobank needs to ensure a full traceability chain in order to be able to guarantee destruction of the samples and derivatives thereof, upon withdrawal of patient consent or the communication of incidental findings to the patient and/or treating physician in case of a major potential health impact. To ensure this, all use of samples and derivatives needs to be documented in a contract with the biobank. In response to this law, the University of Antwerp and the University Hospital Antwerp teamed up and established the 'Biobank Antwerpen' (BB190007). The biobank capacity will be increased in the next years and a biobank hub of the biobank Antwerpen will be developed at LAB-Net's central laboratory at the Laboratory of Medical Microbiology (University of Antwerp) with full monitoring and a back-up system operated by local staff trained on the biobank protocols (Figure 8). Data management system, SLIMS from Agilent Technologies Inc. (CA, USA), a web-based laboratory information management system with electronic laboratory notebook, is now used to store clinical and laboratory data linked to the biobank samples and strains.

## Training laboratories to efficiently engage in clinical studies

As part of LAB-Net's mission to create an internationally recognized clinical laboratory network, numerous trainings have been conducted to continuously educate the participating laboratories on current microbiological procedures

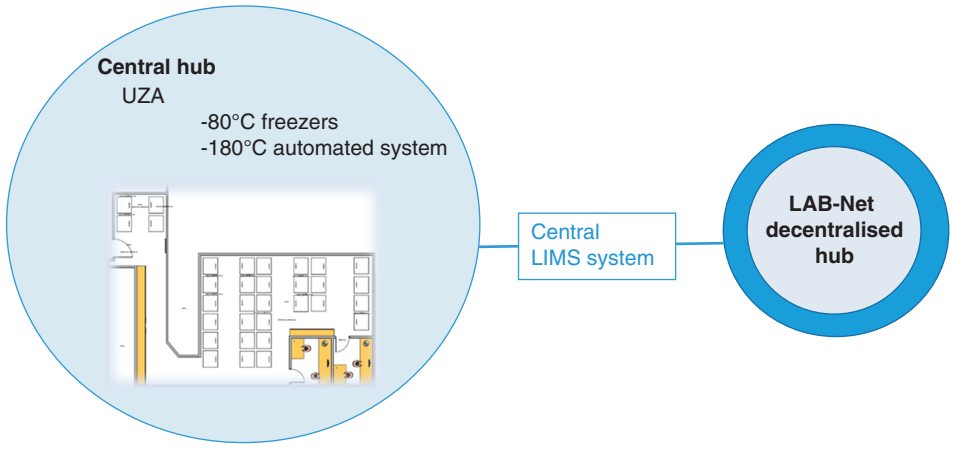


**Figure 8. LAB-Net biobanking infrastructure.** UZA, University Hospital Antwerp, Biobank Antwerp. LIMS: Laboratory information management system.

and techniques as well as operational matters for specific clinical studies (LAB-Net objective eight). To prepare the hospital and the laboratory staff for participation in these studies, site initiation presentations are given during which LAB-Net addresses the sample collection and management aspects of the study. Time points of sample collection, sample collection procedures, sample processing, transport and shipments are topics that are usually tackled during these trainings. It is of utmost importance for LAB-Net that all people involved in handling the study samples are present during these trainings, since a close and concerted interaction between the clinicians and the laboratory is essential for meeting the study requirements and for the success of the study. These types of training are given face-to-face as well as. The topics addressed in these trainings are also described in detail in a sample collection and management manual written by LAB-Net. By Q4 2020, more than 1300 individuals from nearly 500 sites have participated in a site initiation visit and were trained by LAB-Net.

Since 2013, LAB-Net has also organized four training workshops targeting detection of AMR mechanisms in four Balkan countries (Albania, Kosovo, North Macedonia and Serbia), an area with high rates of infection due to MDR micro-organisms. The countries in this region that were invited to participate were identified based on their need for additional training to increase their knowledge of AMR, and to prepare them for participation in future clinical COMBACTE studies. The workshop content covered different topics related to resistance mechanisms in Enterobacterales, *Staphylococcus aureus* and enterococci, infection control, antibiotic use and overview of the COMBACTE clinical trials. The workshops included practical sessions during which participants were trained to perform antimicrobial susceptibility testing with a particular focus on the detection of different MDR organisms. Special attention was also given to implementing EUCAST guidelines, quality control assessments and storage procedures for sample materials and strains. The training protocols and presentations were made available to the participants in paper format and on-line at the end of the workshop. These methods were not only meant for participation in clinical trials, but they were also integrated by several laboratories in their routine practice. By organizing these workshops in the Balkans, LAB-Net has established strong links in the region that still forms the backbone of a sustainable collaboration within several clinical trials while enhancing the capacity of the region to perform the required lab work for these studies. Such a continuous interaction with, and education of, local laboratories throughout Europe ensures that the LAB-Net sites have the capacity and preparation required to participate in multinational trials. The good results achieved by the participants from the Balkan region to the EQA for detection of carbapenem resistance can be attributed also to the attendance of the workshop training sessions. This training initiative directly benefitted studies such as EURECA, CREDIBLE-CR and NeoOBS, in which the EQA program was executed.

In order to strengthen the competence of LAB-Net's participants when conducting clinical trials in general, LAB-Net and CLIN-Net have joined forces in the face-to-face training on GCP. A total of 12 GCP trainings were organized between 2017 and 2019, during which more than 360 investigators were trained. Within each of these trainings, LAB-Net conducted a session for laboratory investigators, which focused on the laboratory procedures and

the quality aspects within a clinical trial, as well as the GCP principles applicable to the microbiology laboratories. GCP e-learning is also available for LAB-Net members through an online platform.

## Future perspective

The ultimate objective by the end of COMBACTE LAB-Net, scheduled for October 2023, is to establish a fully operational European laboratory network to support antibacterial drug development via various clinical trials on infectious diseases. We are confident that we will succeed in creating such a mature diagnostic network.

A sustainable transformation of the current clinical research practice, that is no longer fit for purpose, is urgently needed [7–11]. Clinical research studies are essential to generate robust evidence in support of the development of novel or improved diagnostics, therapeutics, vaccines and treatment strategies. Moreover, clinical research can provide valuable input to the design of public health measures as part of infectious diseases preparedness and response. Currently, clinical research on infectious diseases, including both industry and investigator-driven studies or combinations thereof, is fragmented and *ad hoc*, done on a project-by-project basis, with each project having to re-invent many wheels with each study [12,13]. Study design and site selection is mostly done from scratch for each individual new study, with little or no European, let alone international, coordination across studies. Studies are conducted in relative isolation, frequently struggling to reach the patient enrolment goals within the original timelines agreed. Study investigators lack single access to a European-wide, well-trained clinical research network, that can conduct critical aspects of clinical research studies tailored to their specific requirements. This cumbersome, *ad-hoc* style of research implementation is time consuming, expensive, wasteful and places an unnecessarily excessive burden on healthcare and patients. Worryingly, it also delays the availability of beneficial new treatment options for patients. A new model of a sustainable clinical trial infrastructure that should succeed the public–private partnership model [14–16] is urgently needed.

Therefore, the COMBACTE and PREPARE networks have joined forces to establish a sustainable infrastructure beyond the COMBACTE funding, named European Clinical Research Alliance for Infectious Diseases (ECRAID). The aim of this consortium, composed of 19 academic partners in ten European countries, is to enable clinical research on both the continuous threat of emerging infectious diseases and the growing problem of AMR by conducting perpetual (control) studies that can be easily implemented and expanded with new study arms evaluating novel diagnostic, prophylactic or therapeutic options and using an activated network, which allows the initiation of clinical studies within the timeframe needed to be able to respond to an outbreak. A team consisting of investigators from both parent projects is currently raising political awareness and funding, in a first phase to develop a business concept, but ultimately leading to the building of a coordination body that would become the legal entity and a single point of contact for clinical researchers, private sector companies, policy makers, public health agencies, regulators and other potential stakeholders. Together with CLIN-Net, we will provide not only European but also global leadership on antibacterial drug development.

ECRAID has been awarded an H2020 grant and kicked off in March 2021 as ECRAID-Base, which will lay the foundations of this sustainable project and will ensure a financial and infrastructural base for its clinical research network, that is solid for its initial 5 years. ECRAID-Base will continue to develop the clinical trial infrastructure and capabilities started under COMBACTE and PREPARE in order to ensure long-term sustainability and delivery of world class evidence to enhance health and protection of the citizens of Europe (and beyond) against infectious disease threats in the long run.

ECRAID-Base will support and run five perpetual observational studies that will be enrolling patients in ICU as well as in other specialized settings across Europe for: ventilator-associated pneumonia, complicated urinary tract infections, acute respiratory infections, severe unexplained febrile illness with unusual epidemiology and/or clinical presentation and of likely virus etiology (disease X), as well as patients with acute respiratory infections in primary care settings. In addition, an operational adaptive platform trial Randomized Embedded Multifactorial Adaptive Platform (REMAP)-CAP, developed in PREPARE, is planned to continue under ECRAID-Base. REMAP-CAP is a REMAP by design, a type of study that combines Point of Care Clinical Trials (POC-CTs) and platform trials. This creates a design that, like a POC-CT, embeds the trigger for patient recruitment in routine clinical care, but then enrolls these patients into an adaptive platform capable of addressing complex study questions regarding multiple therapies in multiple subsets of patients.

LAB-Net's central laboratory infrastructure and local laboratory network will constitute a key cornerstone for the setup and conduct of all clinical trials in ECRAID. The overall goal of the laboratory work package is to provide 'state-of-the-art' laboratory research services that offer extensive support to all clinical studies in the

'warm base' clinical research network of ECRAID. LAB-Net's key objectives and achievements will be used and adapted for the needs of ECRAID. They will include, among others: collection of local laboratory data for site selection, identification and selection of optimal rapid diagnostic microbiological tests for clinical trials, provision of laboratory training, development of EQA panels, performing central laboratory analysis, maintaining a repository of samples and strains, assessment of the clinical applicability of serological approaches for disease X preparedness, and development of a policy for laboratory support in case of outbreaks for which available diagnostic routine is needed.

Overall, ECRAID is an ambitious project playing an instrumental role in filling the numerous gaps in clinical research on infectious diseases by creating and maintaining a robust clinical trial infrastructure that has the potential to accelerate the development of antibiotics, diagnostics tests and vaccines.

In conclusion, LAB-Net has made an immense progress since its creation in 2013, and it continues to grow and evolve based on network and research needs. LAB-Net has invested tremendous amount of efforts in building and managing the laboratory network of COMBACTE and is now reaping the benefits of these actions, the main being the successful completion of a series of clinical trials in the network. Continuing its ultimate goal, to maintain a well-trained and experienced laboratory network for clinical trials, LAB-Net is and will be contributing to the acceleration of anti-infective clinical studies in the near future.

## Executive summary

- LAB-Net, the laboratory network of COMBACTE, has established itself as an indispensable network for clinical trials in infectious diseases that takes crucial part across 30 clinical studies not only within, but also outside the COMBACTE consortium.

**Building a geographically representative European laboratory network**

- Since 2013, LAB-Net has built and maintained a geographically representative European laboratory network including more than 800 routine clinical microbiology laboratories and 14 research laboratories across 41 European countries participating in 30 different clinical studies.

**Data collection**

- LAB-Net uses electronic questionnaires to collect information from laboratories in order to assess their capability to participate in clinical studies. By Q4 2020, more than 3400 laboratory questionnaires were sent out via network management system and almost 50% of them were completed with several study-specific questionnaires having high completion rates, in the range of 45–90%.

**Quality assessment system**

- In order to ensure that LAB-Net laboratories provide the highest quality work, LAB-Net has established site performance indicators in order to assess the capability of the network laboratories to participate in clinical studies. LAB-Net has also established an external quality assessment system to monitor the performance of the laboratories in the network.

**Selection of diagnostic microbiological tests**

- One of the important contributions of LAB-Net in developing clinical studies is the selection of diagnostic microbiological tests that allow the optimal enrolment of study patients and provide accurate diagnostic information to guide therapy. Since 2013, LAB-Net has played a leading role in the selection of diagnostic tests for seven clinical studies.

**Repository of clinical specimens & strains**

- LAB-Net has established a repository at the University of Antwerp that currently houses more than 86,000 unique samples and more than 11,000 isolates from eleven clinical studies that can be linked to anonymized clinical information. Eight thousand samples and 4000 isolates were collected in 2020 alone.

**Training laboratories to efficiently engage in clinical studies**

- By Q4 2020, more than 1300 individuals from nearly 500 sites have participated in a site initiation visit and were trained by LAB-Net. Since 2013, LAB-Net has also organized four training workshops targeting detection of antimicrobial resistance mechanisms in four Balkan countries (Albania, Kosovo, North Macedonia and Serbia). A total of 12 good clinical practice trainings were organized between 2017 and 2019, in which more than 360 investigators were trained.

**Future perspective**

- LAB-Net has made an immense progress since its creation in 2013, and it continues to grow and evolve based on network and research needs. LAB-Net has invested tremendous amount of efforts in building and managing the laboratory network of COMBACTE and is now seeing the benefits of these actions, the main being a successful completion of a series of clinical trials in the network. Continuing its ultimate goal, to maintain a well-trained and experienced laboratory network for clinical trials, LAB-Net is and will be contributing to the acceleration of anti-infective clinical studies in the near future.


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### Supplementary data

To view the supplementary data that accompany this paper please visit the journal website at: www.futuremedicine.com/doi/suppl/10.2217/fmb-2021-0096

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### Financial & competing interests disclosure

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