

Contribution of the LHUB-ULB to the missions of its University.

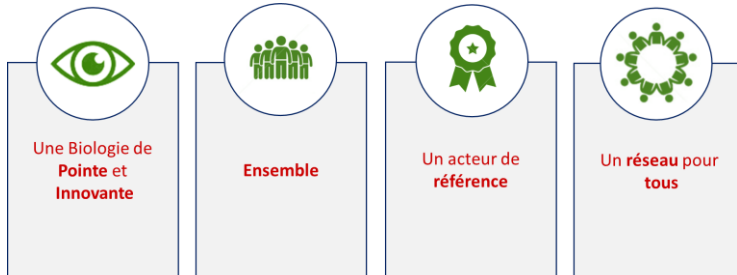
Current input and prospects for improvement

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Research, Technology & Innovation Unit
Brussels University laboratory, Brussels, Belgium

Outline of the lecture

- What do we discuss?
 - What are the main missions of the university?
 - What is the contribution of a consolidated academic laboratory to the missions of the university: the example of the LHUB-ULB?
 - What are the future prospects?
- What do we mean with “*Contribution of the LHUB-ULB to the missions of its University*”?
 - **Consolidated academic laboratory** defines large-scale diagnostic platforms allowing
 - high level of service to clinicians and patients.
 - the development and the evaluation of new diagnostic tools;
 - an opportunity for public health surveillance.
 - **University** define an institution of higher education and research which awards academic degrees in several academic disciplines.
 - Universities typically offer both undergraduate and postgraduate programs.
 - The word university is derived from the Latin universitas magistrorum et scholarium, which roughly means "community of teachers and scholars".

Background



• LHUB-ULB attractiveness:

- Salary 7,7/10
- Opportunity to teach 5,7/10
- Ability to do research 7,6/10
- Specialized and reference activities 8,6/10
- Comfort of life 7,7/10

• % of time spent on different activities:

- Clinical & Operational 75%-85%
- Teaching & R&D 15%-25%
- Others 1,5%-3%

What are the main missions of the university?

The mission of **Harvard College** is to educate the citizens and citizen-leaders for our society. We do this through our commitment to the transformative power of a liberal arts and sciences education.

University College London: a diverse intellectual community, engaged with the wider world and committed to changing it for the better; recognized for our radical and critical thinking and its widespread influence; with an outstanding ability to integrate our education, research, innovation and enterprise for the long-term benefit of humanity.

From its Christian view of the world and the human, **KU Leuven** endeavours to be a place for open discussion of social, philosophical and ethical issues and a critical centre of reflection in and for the Catholic community. KU Leuven offers its students an academic education based on high-level research, with the aim of preparing them to assume their social responsibilities. KU Leuven is a research-intensive, internationally oriented university that carries out both fundamental and applied research.



The 3 missions of our university

- First mission: pursuit of excellence
 - Research is at the foundation of ULB's activities.
 - The university aims to be a key hub for research on major topics that require a transdisciplinary approach, while pursuing excellence and sustainable development.
- Second mission: quality education open to all
- Third mission: strong social commitment
 - Healthcare & Education
 - A committed university: two Nobel Peace Prizes
 - Development cooperation with universities
 - ARES-CCD
 - Our NGO : ULB Cooperation
 - FOSFOM fund in collaboration with 13 medical faculties in the south
 - International collaborations at the heart of our teaching

LHUB-ULB commitment in the 3 missions of our university

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LHUB-ULB : Quality education open to all

- Training of at least 80 students/year excluding Post-Graduate students
- Immersion, observation or end-of-study work placements supervised by scientists and biologists:
 - Trainee technologists: Haute Ecole Francisco Ferrer, Institut P Lambin and Institut Meurice, Hoge School Erasmus (VUB), Condorcet, Haute Ecole du Hainaut
 - External laboratory executives (health executives, etc.)
 - Master's students in Pharmacy, Medicine, Medical Biology, etc.: end-of-study dissertations
 - Physician & pharmacist trainees
 - Doctoral students & Post-doctoral students

LHUB-ULB : Quality education open to all

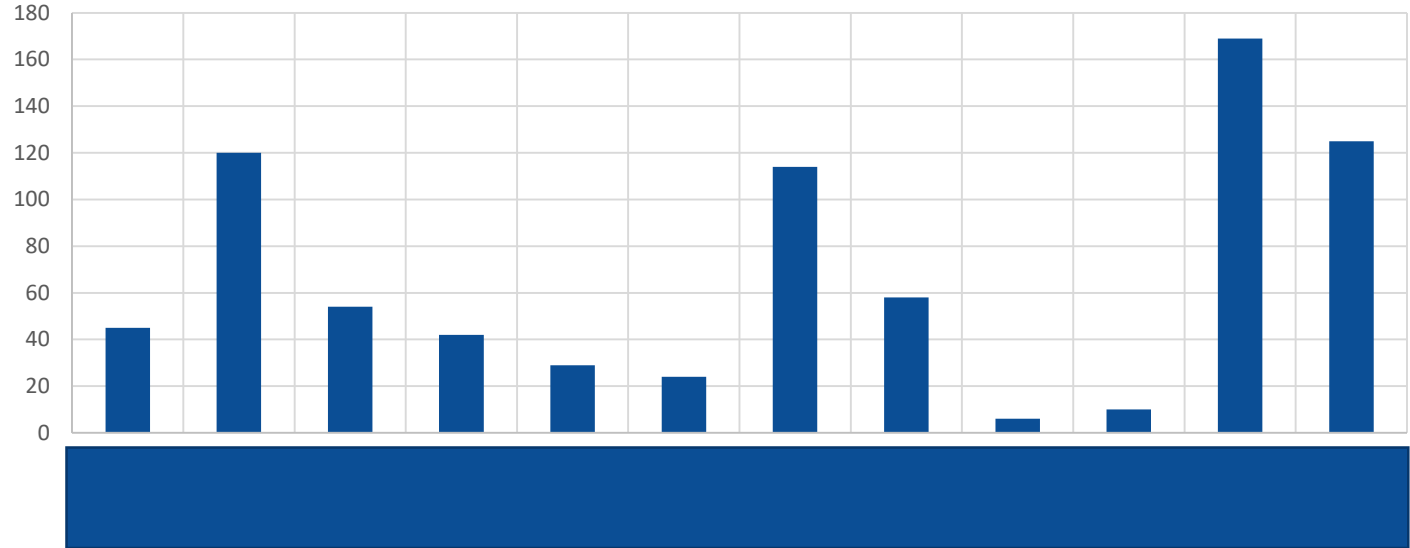
- 17 Post-Graduates in Laboratory Medicine at the LHUB / 20 total for ULB
- Courses of the Interuniversity Master in Lab Medicine with participation of biologists and scientific executives
 - At the beginning of specialization: basic notions and emergencies in medical chemistry, hematology, microbiology (± 70 h spread over ULB, UCL, ULiège)
 - During the year: basic notions in quality, management, evidence-based medicine (± 12 hours spread over the 3 universities)
- Supervision of internships
 - 5 internship hospitals in the ULB network
 - Exchanges with the VUB
- Training, supervision of publications, presentations at symposiums and end-of-specialization dissertations

Teaching loads

About 840 h/year of lessons including practical work



number of hours / year / teacher



KrobsPro : un projet inter-universitaire ULB-UNIL

KrobsPro est un site dédié à la microbiologie médicale, préparé pour les étudiants en médecine par des étudiants en médecine.

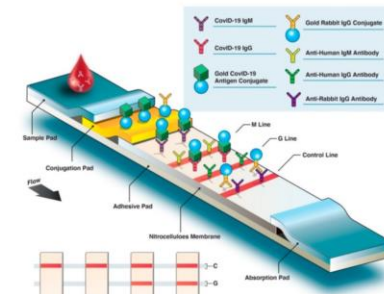
Les informations disponibles sur ce site ont un but didactique et pédagogique mais ne sont pas exhaustives et ne sont pas destinées au corps médical pour dicter la prise en charge diagnostique et thérapeutique.



Immunochromatographie = Tests rapides de diagnostic

Principe

On associe une méthode de séparation (chromatographie) et une méthode immunologique (formation d'un complexe immunitaire entre antigène et anticorps), qui se déroulent sur un support (type nitrocellulose). Sur ce dernier se passe la migration de l'antigène recherché, et qui est ensuite sensibilisé par des anticorps. Ainsi, le complexe antigène-anticorps (soluble) est révélé par un second anticorps (fixe) présent au départ sur la membrane et migrant pendant la réaction. Ce second anticorps est marqué à l'or colloïdal ou par des particules de latex colorées.



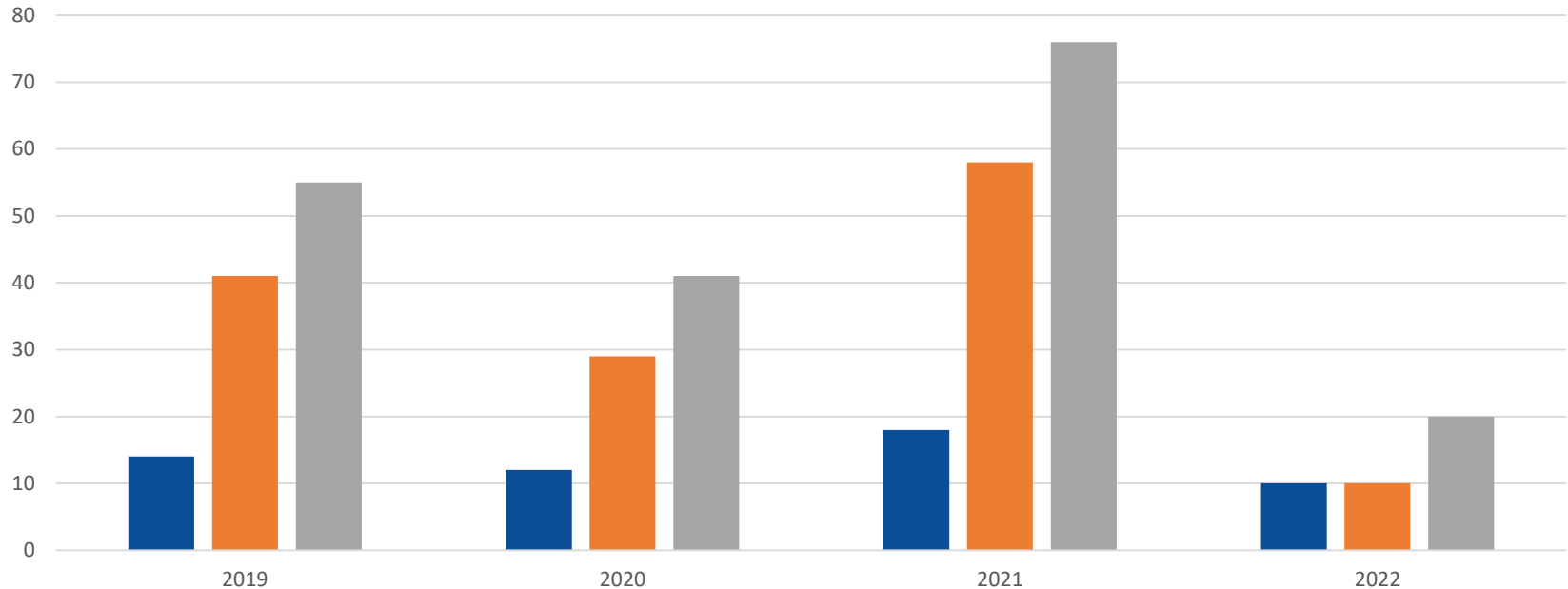


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Research is at the foundation of LHUB-ULB's activities

LHUB-ULB publications 2019 – May 2022



Ongoing PhD thesis

From 2018 to 2021, 11 thesis were achieved within the LHUB-ULB

ADAM Anne-Sophie

- Contribution au diagnostic différentiel et au suivi des anémies hémolytiques héréditaires
- Promotrice: **B. Gulbis** - co-promoteur : **F. Cotton**

BUSHA Emmanuel

- Quelles stratégies de bon usage des antibiotiques dans un pays à faibles ressources ? Application à la population pédiatrique de la ville de Goma
- Promoteur: B. Byl - co-promoteur: **O. Vandenberg**

DE VOS Nathalie

- Marqueurs pronostiques de la fibrose pulmonaire chez les patients COVID-19
- Promoteur: **F. Cotton**

FAGE David

- Etude pharmacocinétique/pharmacodynamique de différents anti-infectieux et de leur fraction libre
- Promoteur: **F. Cotton**

• MICHEL Charlotte

- Rôle du séquençage haut débit en microbiologie clinique
- Promoteur: **O. Vandenberg** - co-promoteur: M. Hallin

• NGUYEN THI BICH Thao

- Foodborne Zoonotic Trematode Infections and the Potential for Control in Human in North and Central Vietnam
- Promoteur: **O. Vandenberg** - co-promoteur: P. Dorny (IMT)

• SMET Julie

- Nouveaux outils diagnostiques dans les déficiences immunitaires primaires
- Promotrice: F. Mascart - co-promoteur **F. Corazza**

• Van Acker Tom

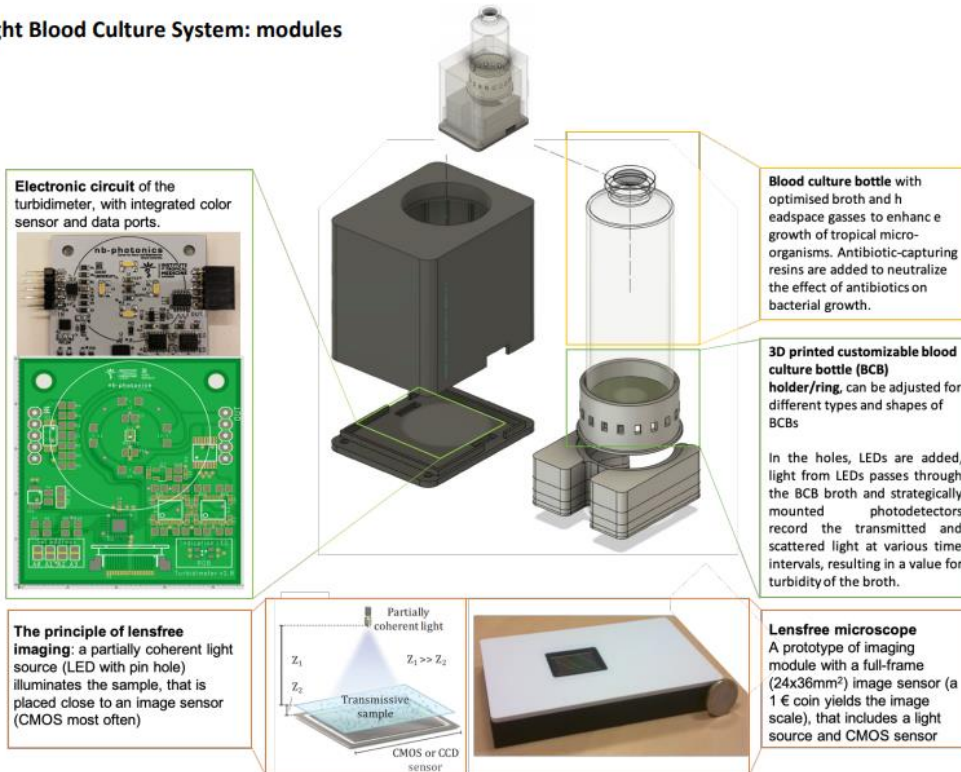
- Biologie Moléculaire dans les syndromes hyperéosinophiles à visée diagnostique et en vue d'identifier de potentielles cibles thérapeutiques
- Promoteur: **P. Heimann**

• YIN Nicolas

- Optimization of the use of diagnostic tests for viral respiratory infectious disease: from the individual diagnostic strategy to the local and national surveillance
- Promoteur: **O. Vandenberg** - co-promoteur: M. Hallin

Clinical diagnostic trial in Western Africa of a simplified blood culture system to improve healthcare in low resource settings

Bactinsight Blood Culture System: modules



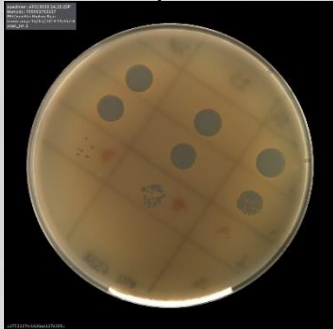
EDCTP Application Form - Research and Innovation Action (RIA)



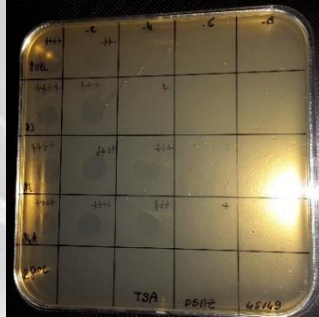
Research is at the foundation of LHUB-ULB's activities

PHAGEDIAG Project: How to support the development of a powerful therapy against antimicrobial resistance

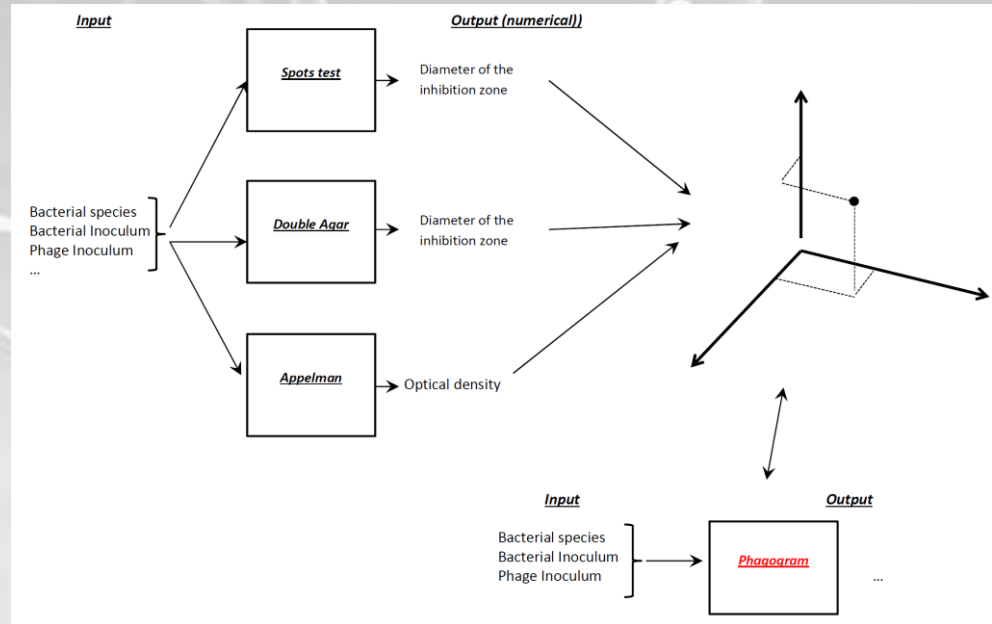
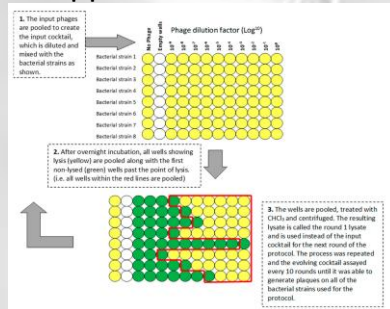
The Spot Test



Double agar overlay method



Appelman's method

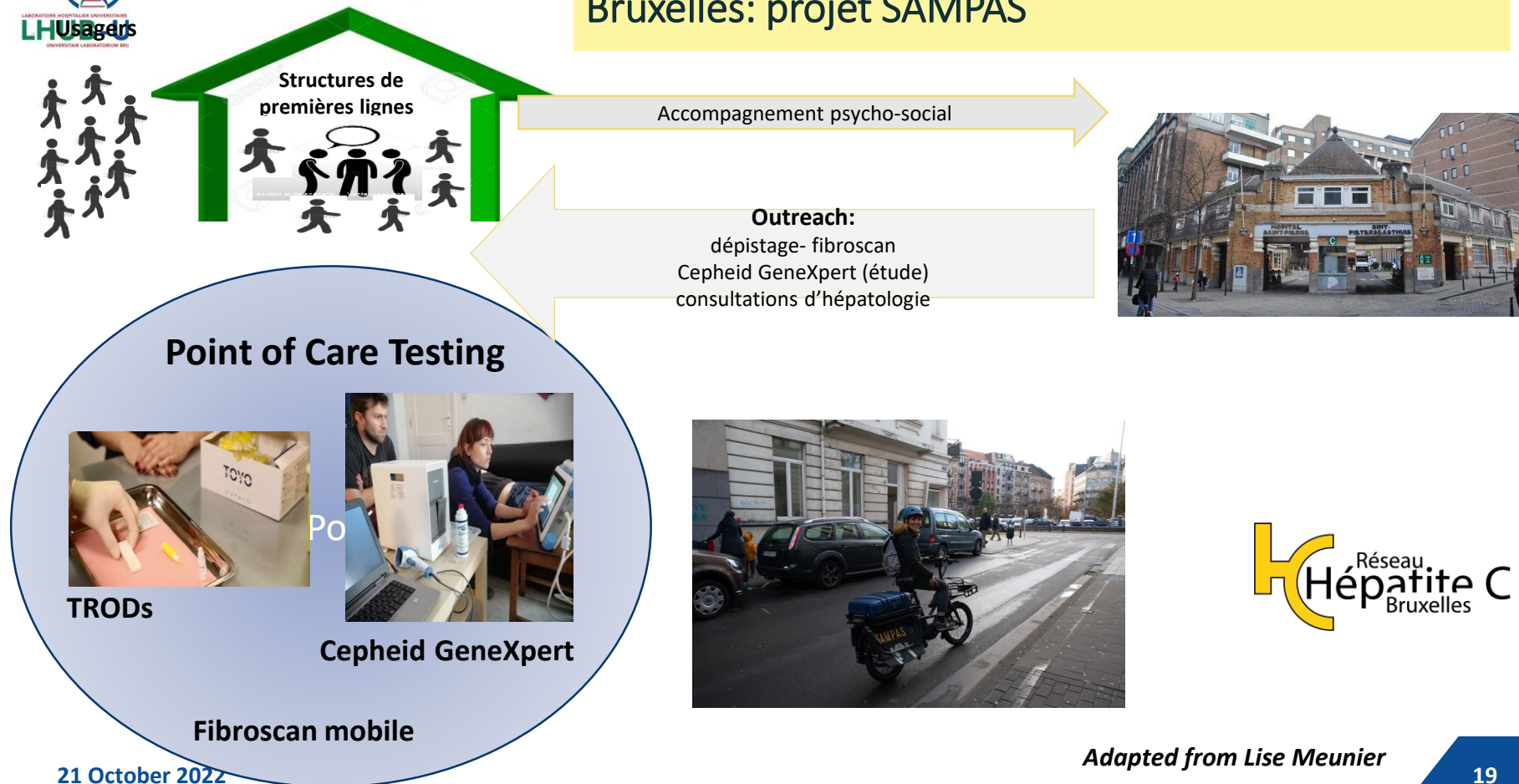




The 3 missions of our university in the LHUB-ULB perspective

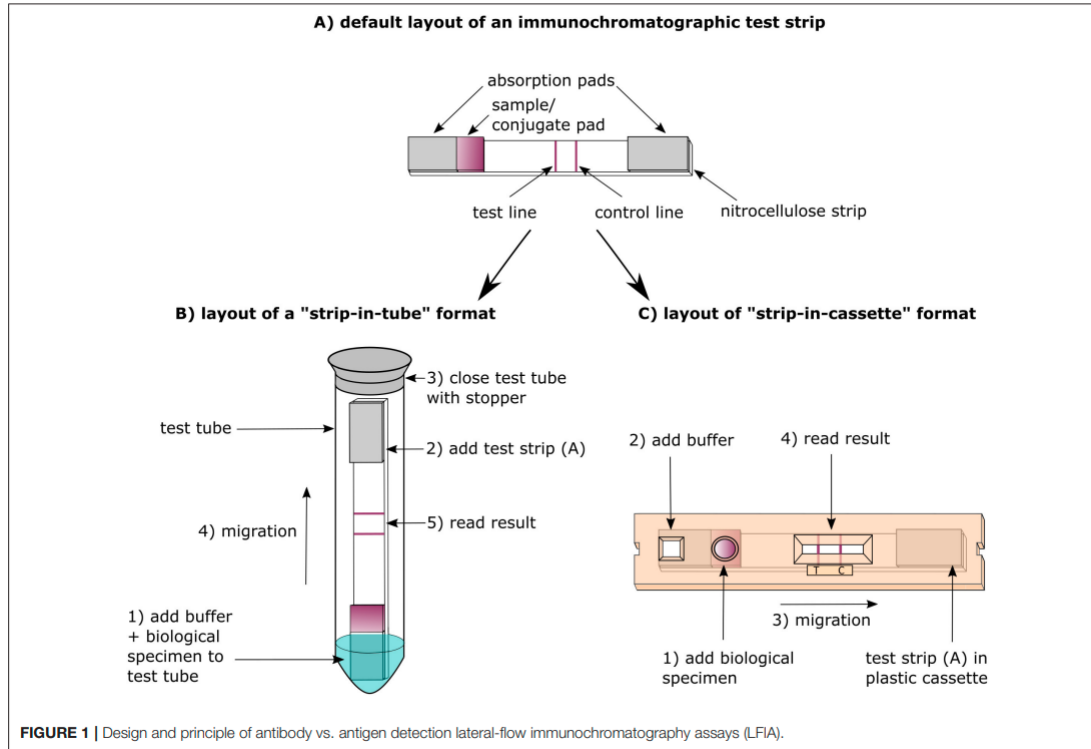
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Dispositifs proposés par le Réseau Hépatite C de Bruxelles: projet SAMPAS



Adapted from Lise Meunier

Appui du LHUB-UB dans le développement des tests de diagnostic rapide "SARS-CoV-2 Ag"

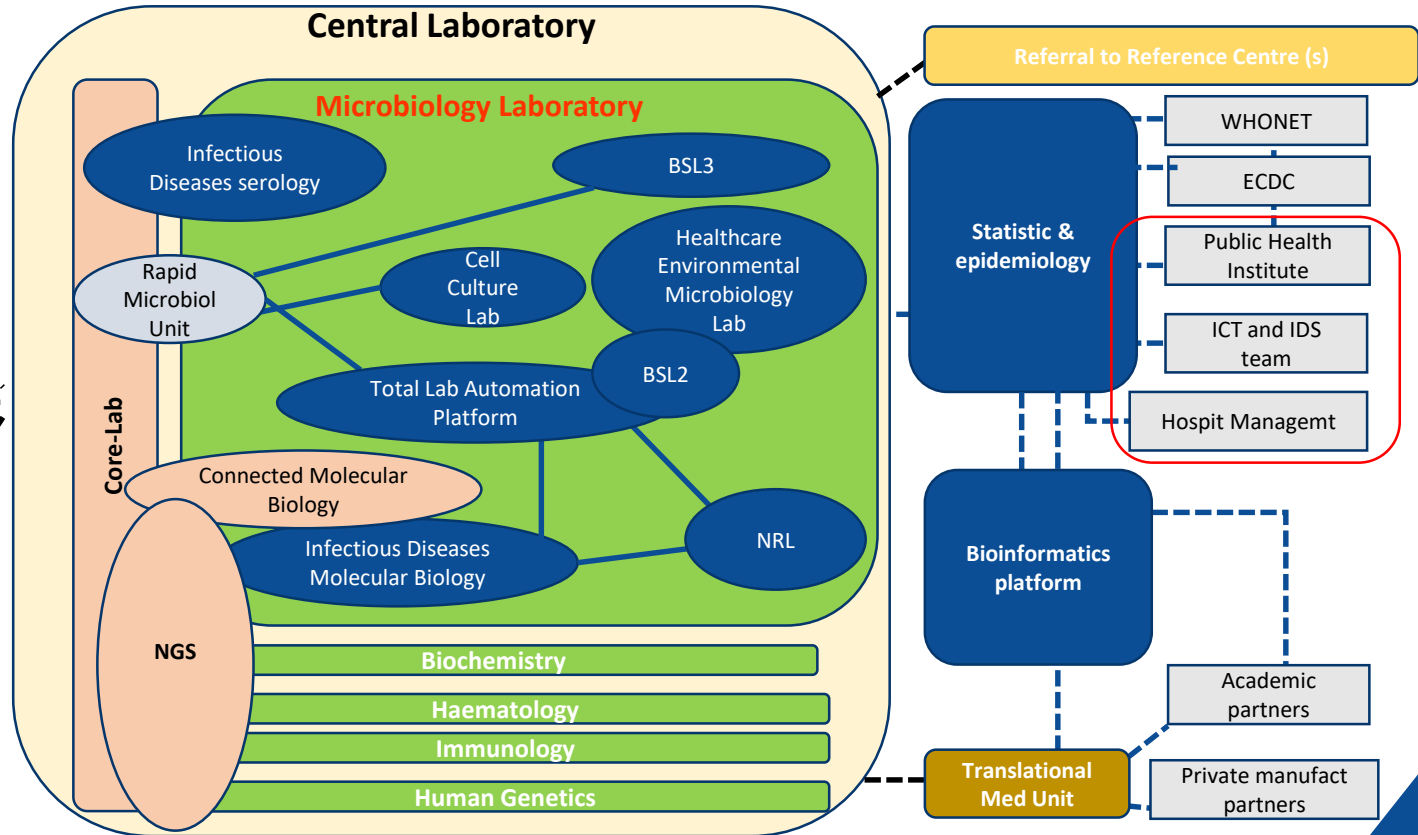
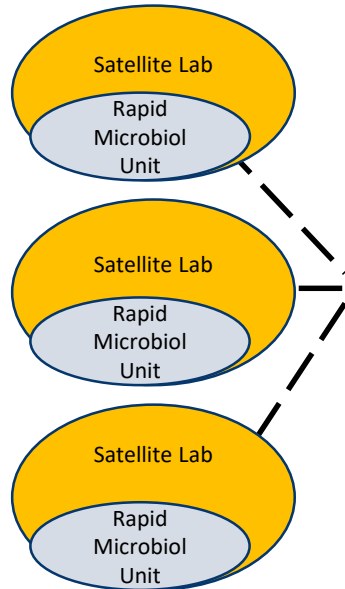


- « First gen. » VS « 2d gen. »
- With(out) automatic reader



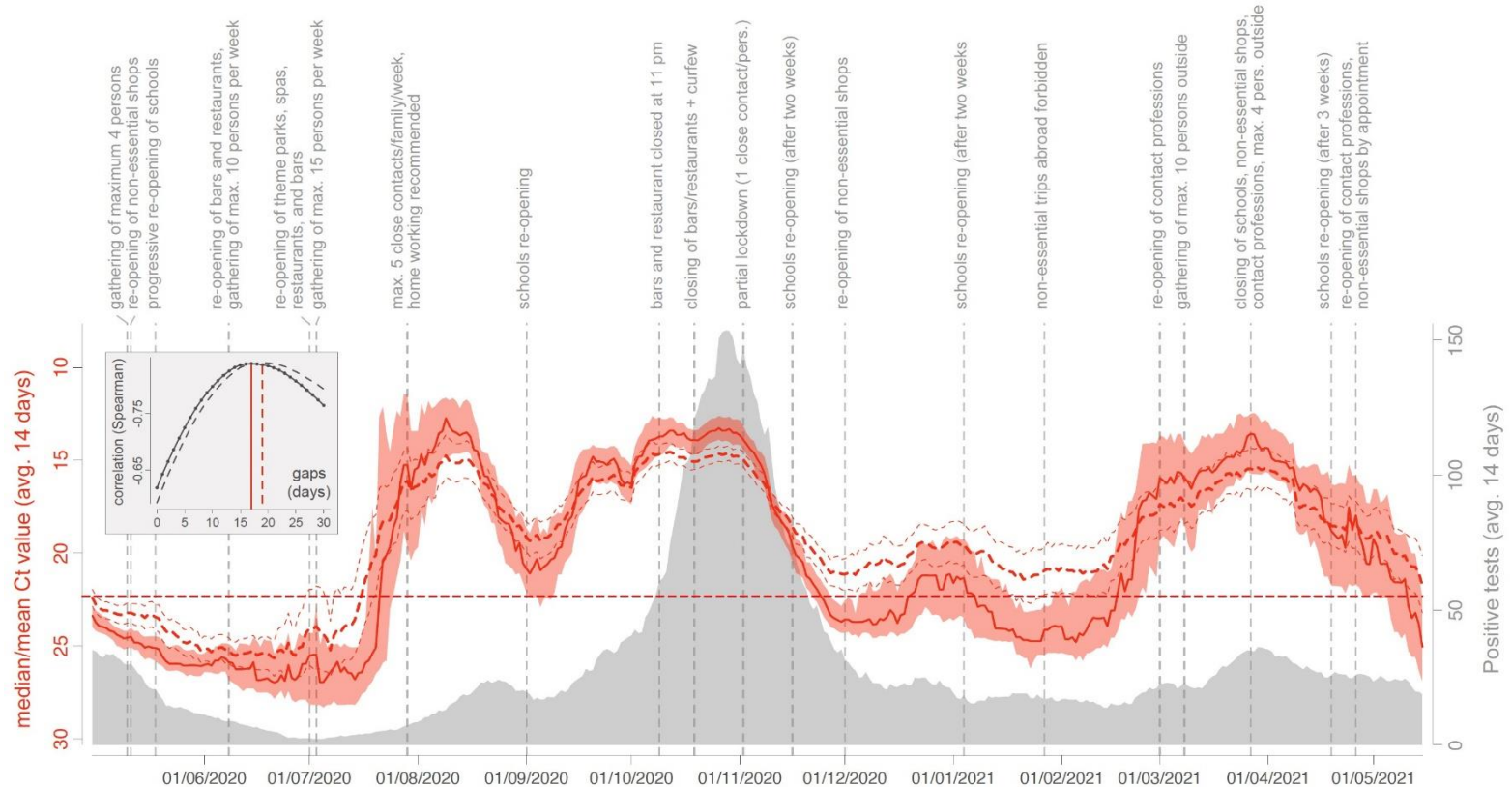
Background: The Changing Landscape of Clinical Laboratories in Industrialized countries

Clin Microbiol Rev. 2020



21 October 2022

Leveraging of SARS-CoV-2 PCR cycle thresholds values (Ct) to forecast COVID-19 trends

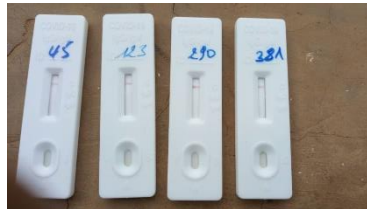


Development cooperation with other labs located in the Global South



**Panzi Hospital,
Bukavu, DRC**

21 October 2022



Strong social commitment: The Mini-Lab project

Concept

- Small-scale basic clinical bacteriology laboratory
- Designed for MSF fields where bacteriology is not yet available/possible (ex: district level hospitals)

MSF quality
standard

Simplified
logistics

Accessible to
non-expert

Transportable

Impact

- Improve patient treatment of population with high risks of sepsis
- Support clinical based surveillance and research

→ NEXT STEP: make it
available outside MSF
fields

- Other not profit organization
- Ministries of health
- Research institutions

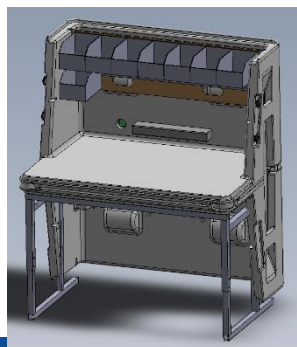
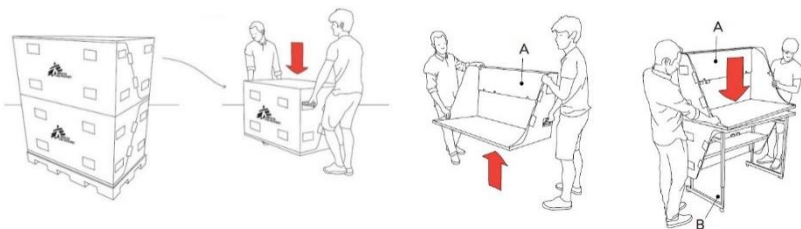


Partners

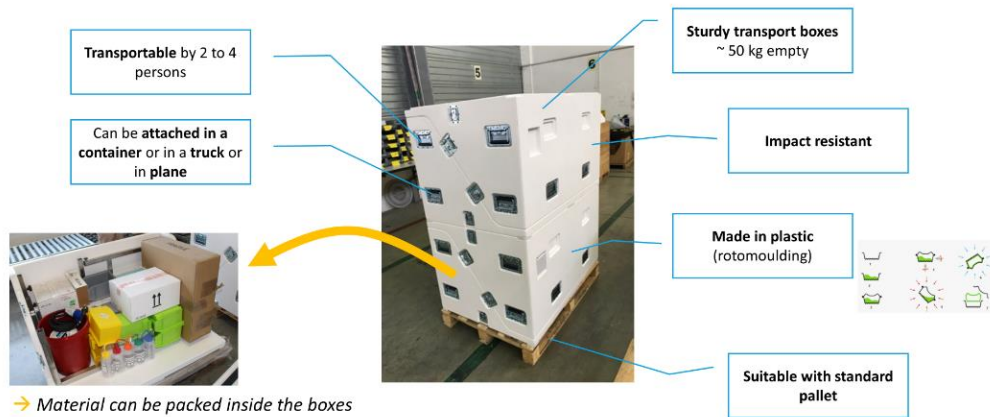


A. Box-Benches developed within MSF, designed for humanitarian fields

Box-bench platform to transport, protect and rapidly deploy



Mini-Lab presentation



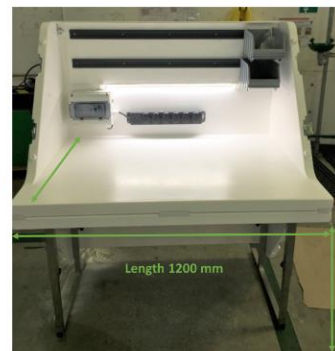
Transformable into standalone bench / table



- Corrosion, disinfection and heat resistant
- Washable surfaces (ISO Standard)

Depth 800 mm

- Integrated lighting
- Intensity adjustment



- Movable furniture equipped with leveling feature
- Vast work area surface
- Integrated shelf or spout box configuration

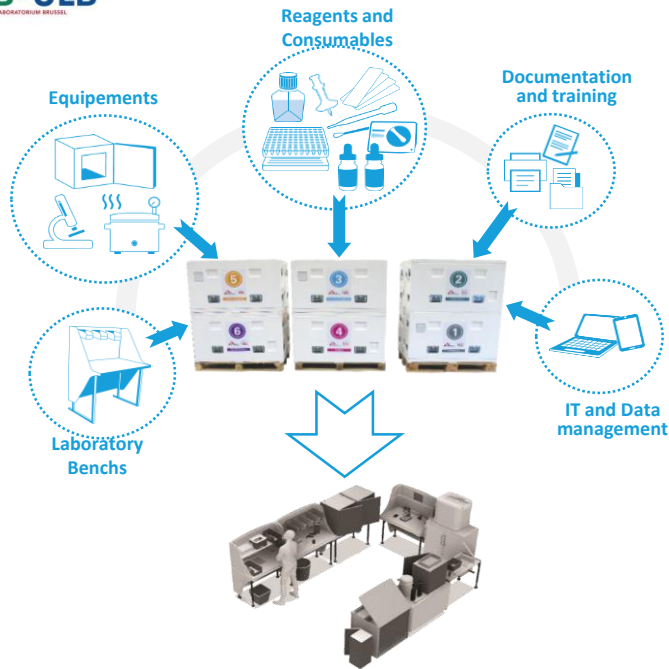
- Plug and play modules
- Power circuit protected
- IP 64 water protection



Height 700 mm

Adjustable: 740 to 920 mm (normal height) 45 mm steps

Mini-Lab is a quality-assured, cost efficient, all-in-one and transportable clinical bacteriology laboratory



Diagnostic and surveillance

- **Bloodstream infection**
- **Urinary tract infections** (integration in progress)
- addition: **Meningitis**

KEY FIGURES

15-20

m² to install the Mini-Lab (permanent structure, tent or container)

2

days to install or re-pack the Mini-Lab

2/3

Dedicated laboratory technicians of which one is the supervisor (can be the same of other lab services)

20

Days of on-site training for the lab techs to be able to run the Mini-Lab

4-6

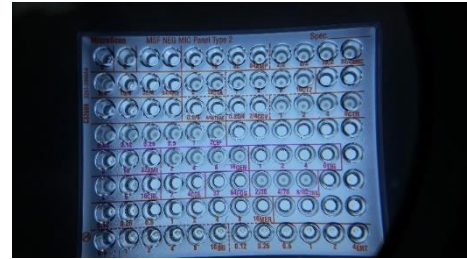
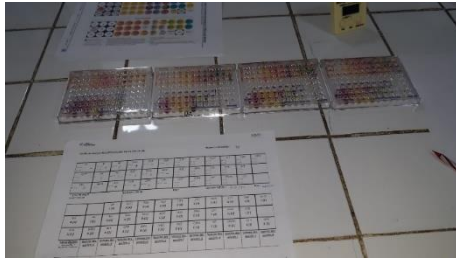
Months of initial onsite support and regular follow-up visits

10 - 20

BCB / Day (average & peak capacity until 30)



Test of some Mini-Lab components to detect ESBL e.coli



What are the future prospects?



What are the future prospects?



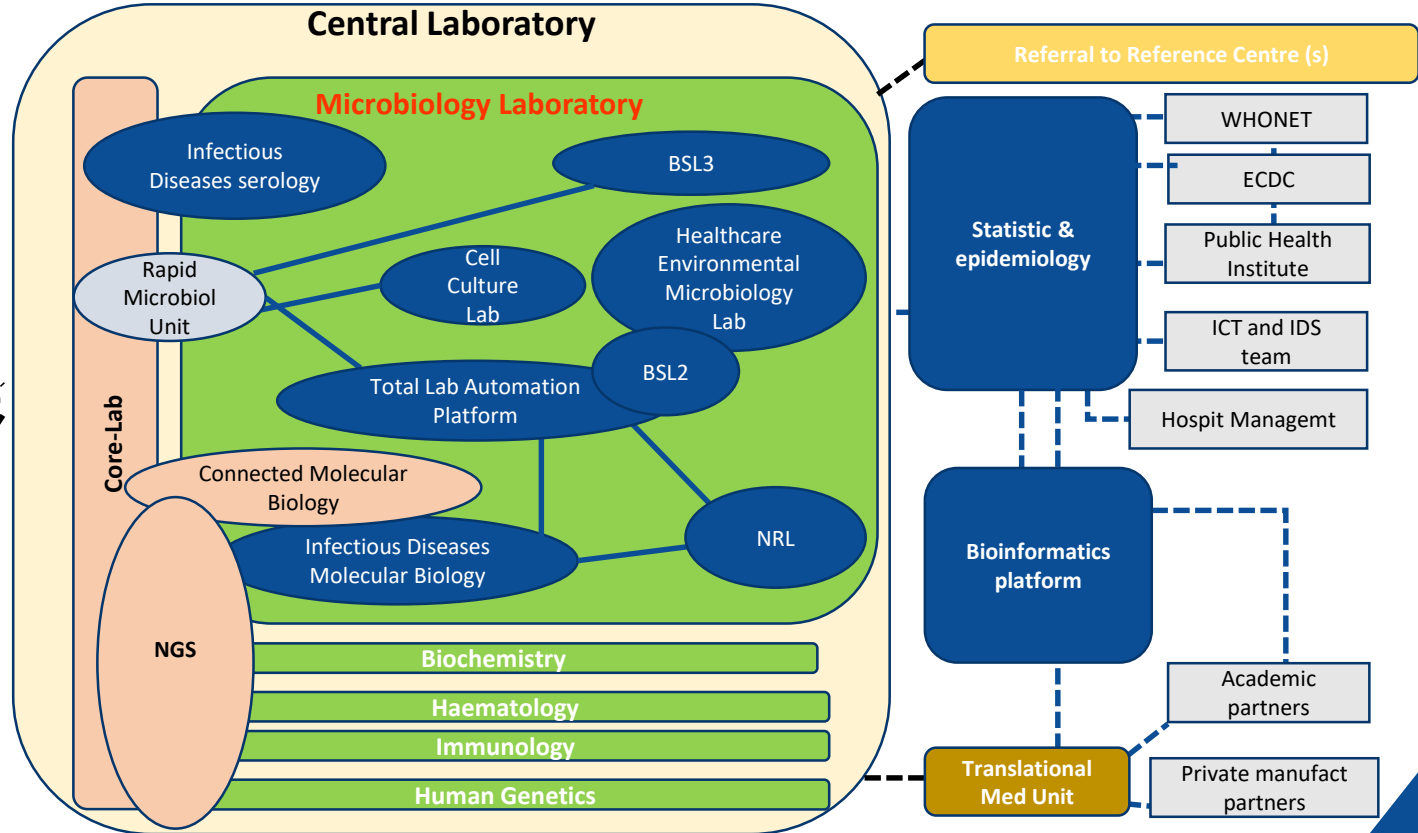
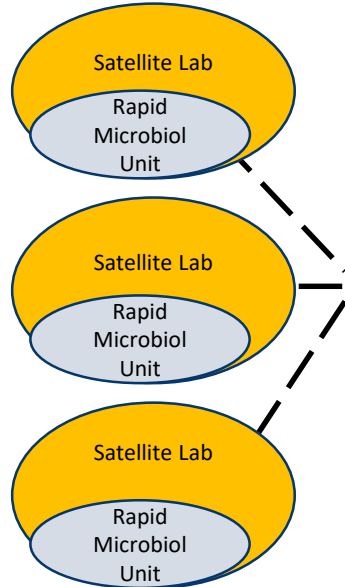
Site Porte de Hal



Site Horta

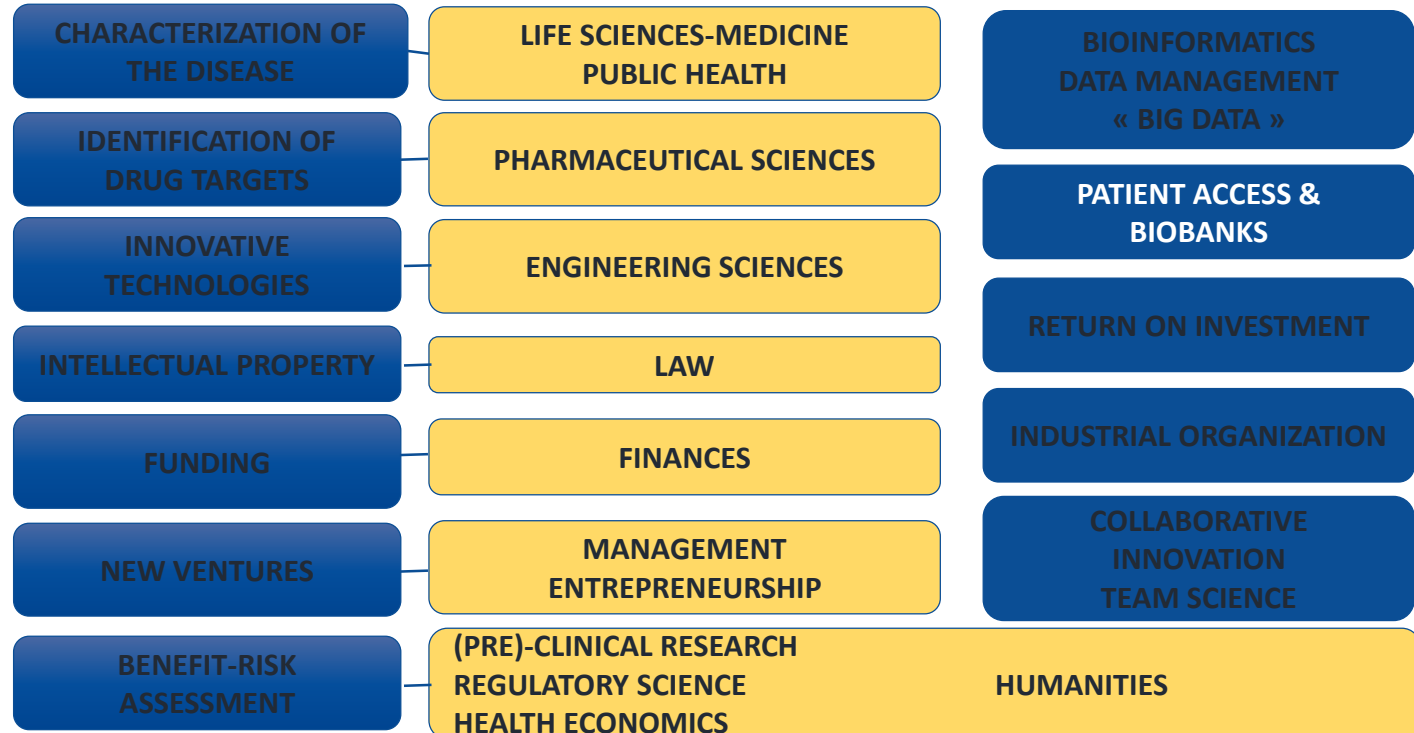
The Changing Landscape of Clinical Laboratories in Industrialized countries

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Moving Translational Medicine Forward in a Multidisciplinary Approach



What are the future prospects?

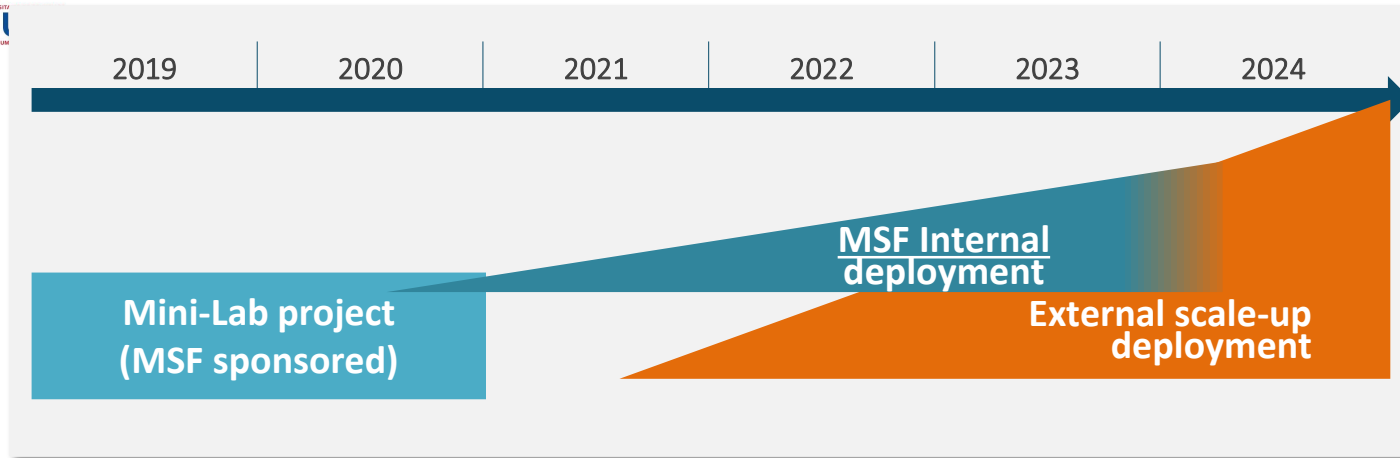


Support to the European Plotkin Institute for Vaccinology by providing the optimal diagnostic environment within the framework of their phase 1 clinical trial but also by contributing to the development of the diagnostic tools necessary for their clinical trial



Support for the analysis of toxic substances in the environment or the analysis of the immune response in patients taking forest baths as part of the treatment of their cancer

Mini-Lab: What is the next step?



For MSF

- For whom ?
- How many in 5 years ?
- What support structure?

External scale up

- For whom ?
- For what?
- What support system ?
- By who ?(partnerships)



Conclusions and perspectives

- The LHUB-ULB organization implemented since 2015 has made possible to contribute to the three missions of the Université Libre de Bruxelles (ULB).
- However, its mode of operation needs to be structured and reinforced in order to allow the LHUB-ULB to face the next challenges of laboratory medicine and the expectations of its university.
- In this context, close collaboration with the various academic partners such as those present today seems warranted.