GABRIEL, a Public Health Research Network: successes and lessons learned

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Fondation Mérieux

“Strengthen local capacities to fight the infectious diseases that affect vulnerable populations in developing countries, particularly mothers and children.”
Three family foundations

- Founded in 2001
- Under the aegis of the Institut de France
- Institut Mérieux’s main shareholder (30% of its capital)
- Receives all of Institut Mérieux’s dividends

- Founded in 1967 by Dr. Charles Mérieux in the memory of his father, Marcel Mérieux
- French foundation with official public interest status since 1976

MÉRIEUX FOUNDATION USA

- Founded in 2012
- Engaging partners in USA
Focus 1: Increase vulnerable populations’ access to diagnostics by strengthening clinical laboratories in national healthcare systems

Focus 2: Enhance local applied research capabilities by training researchers, developing collaborative programs and creating Rodolphe Mérieux Laboratories, transferred to local partners

Focus 3: Encourage knowledge-sharing and public health initiatives leveraging Les Pensières Center for Global Health

Focus 4: Improve conditions for mothers and children taking a global health approach
Enhancing local applied research capacities: Promote collaboration in the field of infectious diseases and support local responses to health challenge
Rodolphe Mérieux Laboratories


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Fondation Mérieux Laboratories

- In Lyon, France: Emerging Pathogens Laboratory
  - Team of 12 scientists
  - Part of the Centre International de Recherche en Infectiologie/INSERM: 300 researchers
  - BSL-2 and 3 labs; Access to the BSL-4 Jean Mérieux-Inserm Laboratory

- In Beijing, China (with the Chinese Academy of Medical Sciences): Christophe Mérieux Laboratory
  - Team of 30 scientists
  - Part of the Institute of Pathogen Biology/CAMS

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GABRIEL network

GABRIEL: Global Approach to Biological Research, Infectious diseases and Epidemics in Low-income countries

• Federating **20 research labs** from academic and private institutions improve laboratory- and hospital-based surveillance
• Virology, bacteriology, molecular epidemiology and immunology
Promote research collaboration on infectious diseases and support local responses to health challenges

- Collaborative research on acute respiratory infections, tuberculosis and antimicrobial resistance,
- Technology transfer of diagnostic testing tools to enable local laboratories to detect diseases,
- Training and knowledge sharing to empower local scientists so they can conduct autonomous research projects.
Governance and support

• A Steering Committee, chaired by Professor Jean-William Pape, Director of the GHESKIO Centers in Haiti, decides on new members integration and oversees the implementation of GABRIEL activities.

• Members meet every 18 months to share and compare results and experiences, and present new ideas for collaborative research projects.

• Supports member laboratories to meet the international accreditation requirements for the ISO 15189 standard.
Multicenter Pneumonia Study (2009-2012)

• Objectives:
  • Identifying pneumonia etiology in hospitalized children under 5 using a multiplex RT-PCR reagent (FastTrack Diagnostics) for 21 viral and bacterial pathogens
  • Identifying the serotypes of Streptococcus pneumoniae

• Sample size: 888 children with pneumonia in 9 countries

• Funding: Fondation Mérieux

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Objective: Case-control study of the etiology of acute respiratory infections in refugee camps

Sample size: 1,500 (750 cases + 750 controls); Syrian refugees (90%)

Location: Bekaa plain and Akkar (Tripoli)

Consortium: St Joseph University, Beirut, and Lebanese University of Tripoli, Al-Bashaer and Amel associations, Bioteck, Chtoura Hospital and University of Lyon, Nationwide Children’s Hospital, Ohio, Mérieux Foundation (PI)

Technology: BioFire FilmArray Pneumonia Panel (33 pathogens)

Funding: Bill and Melinda Gates Foundation and Fondation Mérieux

       PEARL Project (Lebanon; 2016-2018)

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**Objective:** Case-control study + randomized controlled trial (RCT) of the etiology of acute respiratory infections and impact of rapid on-site diagnostic test in Rohingya refugees

**Sample size:** 1,200 (600 cases - 600 controls); Rohingya refugees

**Location:** Ukhiya, Cox’s Bazar, Bangladesh

**Consortium:** GoB, IdeSHi, BITID, Friendship, MSF, Mérieux Foundation (PI)

**Technology:** BioFire FilmArray Pneumonia Panel (33 pathogens)

**Funding:** Fondation Mérieux
Why:
- Anti-tuberculosis treatment adherence: a challenge for limiting the emergence and spread of multidrug-resistant strains in LMICs
- Today: no biomarkers available to indicate treatment failure caused by resistance

Objective: develop and evaluate biomarkers for TB treatment efficacy in GABRIEL network countries. New IGRA antigens and proteomic biomarkers to improve diagnosis and monitor treatment

Sample size: 200 active TB patients (HINNT), 250 active TB patients and 2,550 household contacts (APRECIT)

Impact/deliverables
- Improve the diagnosis, monitoring and treatment of tuberculosis
- Reduce transmission of resistant strains

Funding: Fondation Mérieux, The Global Fund, Expertise-France and Qiagen
Study Sites

- **FRANCE**
  - Lyon

- **GEORGIA**
  - Tbilissi

- **LEBANON**
  - Tripoli & Beirut

- **CAMEROON**
  - Yaoundé

- **BANGLADESH**
  - Dacca

- **PARAGUAY**
  - Asuncion

- **MADAGASCAR**
  - Antananarivo
Objective: Develop a reliable indicator of resistance to evaluate the impact of future AMR interventions and improve surveillance

How:

• Samples from hospitals, communities, food chain, environment
• Prevalence of ESBL-producing E. coli = significant indicator
• WHO AGISAR protocol: increased deployment within the GABRIEL network

Partners: 7 laboratories participating in RESAMAD, Charles Mérieux Center for Infectious Disease in Antananarivo, Emerging Pathogens Laboratory in Lyon

23% of pregnant women and 49% of chickens from different marked have been tested positive for ESBL- E.coli
GABRIEL key achievements

• 20 member laboratories in 16 countries
• >70 scientists dedicated to GABRIEL research programs
• >160 scientists trained in new diagnostic tools
• Nearly 700 scientists trained in molecular biology, immunology, bioinformatics, epidemiology, biosafety, quality assurance, etc.
• 46 organized workshops
• 50 technical trainings by mentoring
• 10 e-learning modules on epidemiology, clinical research, molecular biology, Zika diagnosis, biobanks
• 459 publications since 2012
• 26 editions of the newsletter GABRIEL
• 9 international meetings of members

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Lessons learned

Strengths:
- Strong appropriation by GABRIEL members
- Strong integration in national health care systems: link with clinicians, patients, the civil society, governments
- Use of common tools: technologies, procedures, research protocols, training material
- North-South and South-South collaboration
- Good platform for workforce improvement
- Various epidemiological profiles, large sample size

Weaknesses:
- Lack of skilled personnel in some centers
- Grant writing capacities
- Integration of Francophone scientists into regional and international networks
- Financial support
“THANK YOU”