



19672012

ANNUAL REPORT

Taking action together for **45 years**





1967 **2012**  **45**
years

In tribute to Marcel Mérieux...



“ *Infectious diseases cause 13 million deaths each year around the world, predominantly in developing countries.*

For 45 years, Fondation Mérieux has been taking action to help ensure that every child, woman and man has fairer access to essential healthcare. ”

1967 Creation of Fondation Mérieux





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1962 **2012**



**45
years**

1972 Creation of the AMP
(Agency for Preventive Medicine)

amp
AGENCY FOR PREVENTIVE MEDICINE





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1974 Bamako (Mali)



► PRESIDENT'S MESSAGE



ALAIN MÉRIEUX ■ President

Doctor Charles Mérieux created Fondation Mérieux in 1967. By initiating a dialogue between North and South, his aim was to combat the infectious diseases that afflict developing countries, ignoring borders between continents and boundaries between human and veterinary medicine.

This led to an epic adventure in vaccinology and preventive medicine, punctuated by major advances in public health, such as the 1974 vaccination campaign in Brazil and the creation of Bioforce to provide logistical training for the coordinators of humanitarian initiatives. The Fondation later became involved in research into emerging pathogens with, in particular, the construction of the P4 Jean Mérieux Laboratory.

Gradually, at the impetus of Dr. Christophe Mérieux, we redirected our efforts towards the field, at the heart of disease outbreaks, in an area where we are recognized for our expertise: biological diagnostics. Without diagnostics, medicine is blind. We therefore decided to enhance diagnostic capabilities in developing countries, by creating laboratories of excellence in infectious disease - the Rodolphe Mérieux Laboratories - equipping them with high-performance tools, training healthcare personnel, and offering support through applied research programs. In addition to these central laboratories, we also renovate clinical laboratories within regional hospitals to give local populations access to improved diagnostic accuracy for better patient outcomes.

1967 **2012**  **45**
years

1974 Bamako (Mali)



45 years of dedication...

“For medicine that is innovative, plentiful and available throughout the world”

We now have a presence in Mali, Madagascar, Haiti, Cambodia, Laos, Myanmar, Lebanon and Tajikistan, and will soon be in Brazil and Bangladesh.

We have been able to foster such a network through close collaboration with local healthcare leaders. Today, the GABRIEL and RESAOLAB networks bring together biologists and healthcare professionals, working in our areas of focus.

We are making progress, shoulder to shoulder, with the researchers, doctors, biologists, universities, public healthcare organizations and government institutions who work in the field. We all share

the same long-term vision of an integrated approach to healthcare, combining medicine, nutrition, water quality and education.

In 2012, we celebrated 45 years of action in the fight against infectious diseases. This action was made possible thanks to the outstanding mobilization of participants hailing from very diverse backgrounds and the unwavering support of our partners, such as Sanofi Pasteur, who have worked with us for many years. I pay tribute to them all.

We all believe in one grand idea. That idea was born in 1897 and nurtured by Marcel Mérieux, who studied under

Louis Pasteur, and then carried on by Drs. Charles and Christophe Mérieux. We have developed this idea over the years to give it greater momentum, moving towards medicine that is innovative, plentiful, available throughout the world and accessible to the most underprivileged populations.

It is an idea that we must take even further, as there is still a very long way to go.

1974 Meningitis vaccination campaign (Brazil)





PROGRESS THROUGH PARTNERSHIP



BENOÎT MIRIBEL ■ Director General

How could we have created
Rodolphe Mérieux Laboratories
on 5 continents without the engagement of
local partners, dedicated to public health?...

1967 **2012**  **45**
years

1983 Creation of Bioforce
Développement





How could we have designed the GABRIEL network or the RESAOLAB program in West Africa without our partners to determine with us how to confront the challenges posed by infectious disease?

Since its creation in 1967, Fondation Mérieux approaches its mission through partnerships, bringing together public and private stakeholders, across borders, united around a common mission and drawing on synergies of expertise and resources to provide fairer access to healthcare for vulnerable populations.

From the very beginning, this partnership approach has been in the Fondation's "genes". We have reaffirmed it more

recently in developing innovative initiatives to address infectious disease challenges in developing countries.

New partnerships in 2012 took us to new territories such as Amazonia, Tajikistan and Bangladesh. They reinforce our integrated approach to healthcare, without boundaries between human and veterinarian medicine, in close alliance with local stakeholders.

Through the growing involvement of our partners, and backed by the confidence of the Mérieux family, the Fondation's teams strengthen, year by year, the impact of the projects we conduct locally in infectious hotbeds to help vulnerable populations.

Together, we want to strengthen local capacity and encourage the adoption of research and training programs to expand the means that are available to fight infectious diseases, which are a concern to us all.

1983 Les Pensières
conference center





FIGHTING INFECTIOUS DISEASES

AN ORIGINAL MODEL FOR ACTION

Fondation Mérieux offers an original model for action, based on an integrated approach to addressing public health issues and a long-standing expertise in clinical biology.

▶ **Its mission is to enhance local capacities in developing countries to reduce the impact of infectious diseases on vulnerable populations.**

70% of medical decisions are based on diagnostics, making them an essential part of healthcare at both individual and collective levels. By providing relevant and reliable results, biological diagnostics make it possible to identify pathogens, prescribe the right treatment for each patient, and monitor its effects.

On a wider scale, diagnostics are indispensable for epidemiological surveillance and establishing appropriate public health policies and prevention initiatives.

However, developing countries very often lack facilities for clinical analyses, high-quality diagnostic tools, qualified personnel and effective research resources.

Access to improved diagnostic accuracy for better patient outcomes is one of Fondation Mérieux's top priorities. To achieve this, Fondation Mérieux works closely with Fondation Christophe et Rodolphe Mérieux, an independent family foundation under the auspices of the *Institut de France*, for which it operates in the field.

1967 **2012**  **45 years**

1986 First "Cents Gardes" symposium on AIDS at Les Pensières



NETWORKING TO TAKE ACTION

To fulfill its mission in public health, the Fondation builds international networks and actively develops partnerships spanning all relevant disciplines. It works closely with developing countries' health authorities, public and private academic research bodies, international organizations, governments, development banks, foundations, NGOs and the healthcare industry.

FOCUSED ON 3 OBJECTIVES

1. ENHANCING LOCAL RESEARCH CAPABILITIES

through collaborative programs on the pathologies specific to underprivileged countries, providing training for researchers, and developing diagnostic tools for improved identification of infectious diseases.

2. INCREASING VULNERABLE POPULATIONS' ACCESS TO DIAGNOSTICS

by strengthening clinical biology capacities in regional public health centers.

3. ENCOURAGING DIALOGUE AND KNOWLEDGE-SHARING

within the public health community to contribute to the dissemination and development of expertise and innovative projects.

RESOURCES TO TAKE ACTION

- 100 people working in more than ten countries around the world
- An international network of 13 training and research centers
- Several hundred infectious disease experts involved in training and public health programs
- Several thousand healthcare professionals trained locally to provide better care for vulnerable populations
- Integrated research teams bringing together some 15 researchers at the Emerging Pathogens Laboratory in Lyon and the Christophe Mérieux Laboratory in Beijing
- The GABRIEL* network federating 15 research units in different countries
- An annual budget of close to €15 million
- A family foundation based in Lyon with a presence in the USA, China and close to a dozen developing countries

* Global Approach for Biological Research on Infectious Epidemics in Low-income countries

1999 Creation of
..... the P4 Jean Mérieux Laboratory



1.

ENHANCING RESEARCH CAPABILITIES

Fondation Mérieux has its own research teams, which are a key asset in fulfilling its mission and a foundation for its expertise.

Today, this applied research capability is structured around two units:

- the Emerging Pathogens Laboratory, part of the International Center for Infectiology Research at Gerland in Lyon (France),
- the Christophe Mérieux Laboratory in Beijing (China), part of the Institute of Pathogen Biology at the Chinese Academy of Medical Sciences (CAMS).

1962 **2012**  **45**
years

2000 First ADVAC
vaccinology course at Les Pensières





Researchers benefit from preferential access to the P4 Jean Mérieux Laboratory, a BSL4 maximum-security unit dedicated exclusively to emerging pathogen research, belonging to the Fondation and managed by Inserm, the French national institute for health and medical research. The Fondation research teams also have access to the CAMS technical platforms in Beijing.

The Fondation's teams are working on the development and validation of molecular diagnostic tools for use in infectious disease surveillance in the GABRIEL network laboratories, located in developing and emerging countries. In collaboration with its partners, Fondation Mérieux is contributing to building reliable epidemiological databases that will help to develop appropriate public health policies. It also runs research programs to identify and characterize new pathogens, biomarkers associated with certain diseases, and resistance to antibiotics.

In partnership with local healthcare authorities and stakeholders, the Fondation sets up laboratories of excellence, the Rodolphe Mérieux Laboratories, which have two objectives: applied research in infectious disease, and training. Since 2005, six Rodolphe Mérieux Laboratories have been created and contribute to building capacities in applied research, training and biological analysis in their surrounding regions. Two new projects, in Brazil and Bangladesh, are underway.

GABRIEL: A NETWORK IN ACTION

The Fondation takes a collaborative and multi-partner approach to research, in which the GABRIEL (Global Approach for Biological Research on Infectious Epidemics in Low-income countries)

network serves as a catalyst. Its goal is to foster the sharing of skills and knowledge, to facilitate the implementation of applied research programs and epidemiological studies with the goal of improving the diagnosis, prevention and treatment of infectious diseases.

This collaborative international scientific network was created by the Fondation and is supported by the Lyon and Beijing research laboratories. It brings together a variety of members, including the Rodolphe Mérieux Laboratories, local laboratories of excellence, academic research centers, hospitals, private companies, etc.

GABRIEL has met with considerable success and now connects members from 15 countries: Brazil, Cambodia, Cameroon, Canada, China, France, Georgia, Haiti, Laos, Lebanon, Luxembourg, Madagascar, Mali, Mongolia and Paraguay. A Ukrainian university is due to join GABRIEL in 2013. Partnerships



2001 Creation of
Fondation Rodolphe Mérieux

have also been established with Institut Pasteur, Inserm and the World Health Organization (WHO).

▶ GABRIEL HAS THREE OBJECTIVES:

- enhancing and harmonizing research capabilities in developing countries in the areas of pathogen detection, identification and surveillance,
- running multi-center studies on infectious diseases with significant impact on public health,
- harmonizing applied research methodologies by transferring technology and implementing quality assurance procedures.

STRUCTURING APPLIED RESEARCH WITH AFRICARAMI

The multi-center AFRICARAMI* project, launched in 2009, is an example of the collaborative approach developed by the Fondation to structure applied research in developing countries.

The AFRICARAMI scientific and technical network aims to reinforce research capabilities in four countries: Cameroon (Biotechnology Center at the University of Yaoundé), Mali (Charles Mérieux Infectiology Center in Bamako), Madagascar (Charles Mérieux Center of Infectiology in Antananarivo) and Haiti (GHESKIO Centers in Port-au-Prince). The project will receive 1 million in funding over three years from the ACP Science and Technology Programme and the European Commission.

AFRICARAMI facilitates the creation of independent and sustainable research programs aiming to:

- establish effective regional and national partnerships to enhance coordination and the exchange of research between laboratories,
- foster research policies aligned with local priorities,
- improve researchers' scientific skills through joint-training courses with each partner,
- increase the dissemination of results to improve the visibility of research activities within the scientific community.

SOLID PROGRESS:

- 63 participating institutions
- 3 research protocols accepted by ethics committees
- 8 protocols on tuberculosis and pneumonia underway
- 450 scientists trained on seven training modules
- 12 scientific presentations at international conferences
- 2 seminars organized



* African and Caribbean network to support the fight against infectious diseases



Tuberculosis is responsible for 1.7 million deaths each year.

Due to difficulties in diagnosis and the development of multi-drug-resistant strains, only 60% of cases are identified, making this disease a major public health issue.

Pneumonia is currently the #1 cause of death in children under 5.

Every minute, 4 children are lost to this disease.

FIGHTING RESPIRATORY INFECTIONS AND MULTIDRUG-RESISTANT TUBERCULOSIS

With its teams in Lyon and Beijing, as well as its GABRIEL network partners, Fondation Mérieux is coordinating collaborative applied research programs in two priority areas: respiratory infections and multidrug-resistant tuberculosis.

It is also working on other particularly severe infectious diseases and implementing local initiatives on issues specific to certain areas: diarrheal diseases, typhoid fever, malaria, fevers of unknown origin, neglected tropical diseases, HIV and hepatitis.



Prof. OGOBARA DOUMBO
Director of the Malaria Research
and Training Center, Mali

"With respect to malaria, there is hope. In addition to the anticipated vaccine, strategies have been developed that, applied on a large scale, could significantly reduce the number of deaths caused by malaria and meet the objectives set by the Millennium Development Goals. (...)

Today, infectious diseases - and indeed non-infectious diseases - know no borders. (...)

The true solution to these problems is solidarity and sharing. It is through solidarity and sharing that we will be able to harness the solutions made possible by technology and techniques. True democratization of healthcare - global health - is when public healthcare strategies include the largest pos-

sible number of people, and also when the most underprivileged populations have the access they need. (...) The challenge for the future of global health is to develop the capacities within our countries to enable communities to think and find solutions for themselves. Today, this goal is within reach. I have seen it for real during the GABRIEL network's working days, whereby 20 countries work together in the field of infectious diseases. A network is a horizontal organization where each hub contributes something extra.

In Mali, we are part of a hub conducting research on malaria, thus making our contribution to the fight against this disease. This is what global health is all about."



2005 Inauguration of
the Rodolphe Mérieux Laboratory
in Bamako (Mali)



UNDERSTANDING SEVERE RESPIRATORY INFECTIONS WITH ISARIC

In 2012, the GABRIEL network joined ISARIC (International Severe Acute Respiratory Infection Consortium), initiated by the Wellcome Trust and backed by the Medical Research Council, the Bill & Melinda Gates Foundation and Inserm. Based on multi-regional collaboration between research networks, ISARIC's objective is to run international clinical research activities during the intervals between flu pandemics. It provides a collaborative platform enabling clinical trials to be set up quickly in response to the emergence of a new respiratory pathogen or the advent of a new infectious epidemic.

IDENTIFYING THE CAUSES OF PNEUMONIA IN CHILDREN

A multi-center epidemiological pilot trial involving 2,200 children is underway to identify the viral or bacterial agents that cause severe pneumonia in children under five years of age. The study is being conducted by members of the GABRIEL network in ten countries and the molecular tests being used were developed by the Emerging Pathogens Laboratory in Lyon. Thanks to the support of Sanofi Pasteur, the trial was extended to include two sites in India.

The study, which is currently underway in China, Cambodia, Madagascar, Mali, Brazil, Paraguay, Lebanon, Haiti and Mongolia, was the subject of an initial scientific publication in 2012 and is due for completion in 2013. The data obtained is analyzed in collaboration with the Epidemiology and Public Health Group, UMR CNRS 5558, University Lyon I and Edouard Herriot Hospital.



PREVENTING RESISTANCE TO ANTIBIOTICS: GENOMIC SEQUENCING

As part of the fight against multidrug-resistant tuberculosis, Fondation Mérieux is coordinating a project aiming to identify the genomic markers for resistance to antibiotics. The methodology is based on sequencing the complete bacterial genome on a high-throughput platform using isolates chosen for the resistance of their phenotype. This collaborative project is founded upon a number of partnerships: the isolates analyzed in 2012 originated from Georgia (National Center for Tuberculosis and Lung Diseases) and Haiti (GHESKIO Centers), sequencing is carried out using the genomic platform at the University of Lyon (ProfileXpert), and secondary and tertiary analysis is carried out in partnership with Genostar. A database of clinical, biological and genomic information is currently being compiled.



IDENTIFYING THE VIRAL AGENTS BEHIND A FLU-LIKE SYNDROME

In 2012, staff at the Christophe Mérieux Laboratory documented the role and diversity of pathogens causing cases of flu-like syndrome observed in hospitals in Beijing. In order to improve patient care and determine the most appropriate treatment, it is important to identify the virus responsible for the infection. As a result of this research, the laboratory has published nine scientific papers on the flu virus, respiratory syncytial virus, metapneumovirus, bocavirus, enteroviruses and adenoviruses.



CHRISTOPHE MÉRIEUX PRIZE AWARDED TO DR. FIRDAUSI QADRI, MEDICAL RESEARCH DOCTOR IN BANGLADESH



The sixth Christophe Mérieux Prize was awarded to Dr. Firdausi Qadri, Director of the Centre for Vaccine Sciences at the International Centre for Diarrhoeal Disease and Research in Dhaka, Bangladesh, for her remarkable research work into infectious enteric diseases which have a devastating impact in developing countries.

This €500,000 prize is conferred by the *Institut de France* on behalf of Fondation Christophe et Rodolphe Mérieux to support research into infectious diseases in developing countries and to reward teams working in the field.

Dr. Qadri studies the immune responses triggered by various vaccines against enteric diseases, with a particular emphasis on three types of illness: *V. cholerae*, ETEC* and *Salmonella*

enterica. The challenge is to improve prevention and speed up the detection of these diseases. The results obtained highlight the need for an integrated approach to preventing these infections, taking into account a number of factors including immunity, nutrition, environment and water quality, and education.

Today, research objectives focus on new antigens that could stimulate protection, as well as new immunization strategies. This area of research is essential to public health in developing countries, where 200,000 to 300,000 children die as a result of ETEC and 100,000 from cholera each year.

* Enterotoxinogenic *Escherichia coli*

12 SCIENTIFIC PUBLICATIONS IN 2012

In 2012, Fondation Mérieux research teams submitted 12 papers that were published in scientific journals.

- Potential implication of new torque teno mini viruses in parapneumonic empyema in children. *Eur Respir J*.
- Influenza A/H1N1 2009 pandemic and respiratory virus infections, Beijing, 2009-2010. *PLoS One*.
- Viral and atypical bacterial etiology of acute respiratory infections in children under 5 years old living in a rural tropical area of Madagascar. *PLoS One*.
- Differential seroprevalence of human bocavirus species 1-4 in Beijing, China. *PLoS One*.
- Coxsackievirus A21, enterovirus 68, and acute respiratory tract infection, China. *Emerg Infect Dis*.
- Evolutionary dynamics analysis of human metapneumovirus subtype A2: genetic evidence for its dominant epidemic. *PLoS One*.
- Genetic diversity of human adenovirus in hospitalized children with severe acute lower respiratory infections in Paraguay. *J Clin Virol*.
- Nonstructural protein NS1 immunodominant epitope detected specifically in dengue virus infected material by a SELDI-TOF/MS based assay. *J Med Virol*.
- Crimean-Congo hemorrhagic fever virus-infected hepatocytes induce ER-stress and apoptosis crosstalk. *PLoS One*.
- Prevalence of human metapneumovirus in adults with acute respiratory tract infection in Beijing, China. *J Infect*.
- A toolbox for tuberculosis diagnosis: an Indian multicentric study (2006-2008): microbiological results. *PLoS One*.
- Multidrug-resistant tuberculosis in Port-au-Prince, Haiti. *Rev Panam Salud Publica*. 2012 Mar;31(3):221-4.

Since the launch of the GABRIEL network in 2008, its members have published more than 170 scientific papers.



2007 First Christophe Mérieux
Trends in Virology Conference
at Les Pensières



2.

INCREASING ACCESS TO DIAGNOSTICS

Fondation Mérieux possesses world-renowned expertise in the creation and renovation of clinical laboratories dedicated to infectious disease diagnostics.

1967 **2012**  **45 years**

2007 First Christophe Mérieux Prize
awarded by the *Institut de France*
to Professor Ogabara Doumbo (Mali)





Around the Rodolphe Mérieux Laboratories, Fondation Mérieux creates and renovates clinical laboratories within regional hospitals and healthcare organizations to give local populations access to accurate diagnoses and thus improve patient care. The Fondation helps these laboratories to get started by providing all the necessary equipment (laboratory benches, microscopes, diagnostic tools, etc.), in compliance with international quality and biosafety standards. In parallel, the Fondation offers training for laboratory staff in techniques appropriate for the diseases prevalent in developing countries. It fosters national and international laboratory networks to promote the sharing of experience and harmonization of practices, thus strengthening the healthcare systems of these countries.

In the last ten years, 15 hospital laboratories have been renovated in this way, bringing access to diagnostics to remote areas that are often poorly equipped in terms of healthcare facilities. The direct consequences for patients include less travel and an often crucial reduction in the time before receiving treatment or being monitored for certain diseases. In addition, the Fondation has initiated training courses leading to a diploma: in Haiti and Mali, there is the BAMS* course for senior laboratory technicians and, in Cambodia, the D.E.S. (diploma of specialist studies) in Medical Biology for doctors and pharmacists. (see page 22).

**Bachelor of Science in Biological and Applied Medical Sciences*

DIAGNOSTICS AND MOBILE TELEPHONY

The most recent information and communication technologies are harnessed to improve diagnostic capabilities. In addition, Fondation Mérieux participates in innovative projects using mobile telephony, such as VOICES*, to provide care for isolated populations and collect epidemiological data. Computer networks are being developed to enable biologists to work together and improve their working practices.

**VOIce-based Community-cEntric mobile Services for social development (see page 31)*

2008 Launch of RESOLAB





▶ AN INTERNATIONAL NETWORK

Working through multi-disciplinary networks is a common thread throughout all Fondation Mérieux activities and is a major factor in the long-term success and sustainability of its projects.

Programs such as RESAOLAB exemplify this approach.

The first phase of RESAOLAB, initiated in 2009 in West Africa thanks to co-funding from the *Agence Française de Développement* (French development agency), will come to a close in 2013.

Its goal is to reinforce the quality of clinical laboratory services and systems in Burkina Faso, Mali and Senegal through a regional and multi-disciplinary approach.

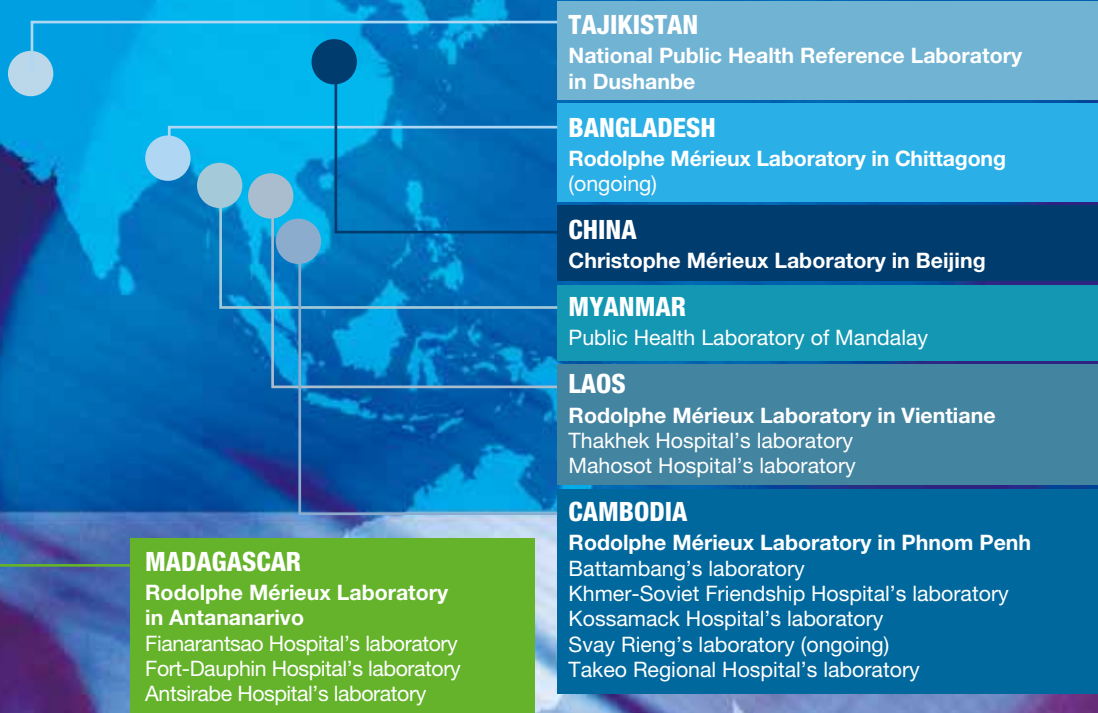
Three years after its launch, RESAOLAB has made it possible to run major continuing training programs, to equip training and quality assurance laboratories, to implement epidemiological surveillance programs and to create a particularly active network that should, during a second phase, RESAOLAB+, be extended to other countries in Africa. (see page 29)

RESAOLAB is part of a movement in participating countries to strengthen their laboratory systems. In particular, it has led to the creation of the National Laboratory Department in Senegal, promoted the drafting of a national laboratories policy in Mali, and provided support to the Laboratory Department in Burkina Faso.

1967 **2012**  **45 years**

2008 Inauguration of
the Emerging Pathogens Laboratory
(France)





Dr. DAOUDA MALLE
Director, Human Development Department,
Islamic Development Bank (IDB)

“Regarding Fondation Mérieux’s partnership with the IDB, two examples illustrate the relevance of the Fondation’s strategy.

Even today, some samples are sent abroad in order to confirm a diagnosis. Through its laboratory network, the Fondation helps countries to eliminate this need and become self-sufficient.

Secondly, in many African countries and not that long ago, patients arriving at a healthcare center with a fever were treated with quinine and typhomycin, on the basis that “if it’s not malaria, it might be typhoid fever”. This situation can be avoided today thanks to the laboratories. (...)

The Islamic Development Bank’s operations intersect with Fondation Mérieux’s priorities in the fight against disease in two areas of healthcare: strengthening healthcare systems and alternative funding for health insurance.”



2008 Inauguration of
..... the Antsirabe Hospital laboratory
(Madagascar)



3.

ENCOURAGING KNOWLEDGE-SHARING AND TRAINING

SPREADING SCIENTIFIC INNOVATION WORLDWIDE:

► LES PENSIÈRES

Les Pensières Conference Center is a venue for meetings and North-South and South-South dialogue, dedicated to scientific discussion and disseminating innovation. For more than 40 years, it has welcomed healthcare professionals (researchers, clinicians, biologists, pharmacists, veterinarians, representatives of healthcare and regulatory authorities, etc.) across disciplines and countries, to attend high-level conferences and institutional training courses.

Les Pensières was created with an initial focus on vaccinology, but now extends its activities to diagnostics and other issues with an impact on public health, such as nutrition, food safety and access to safe water

Through Les Pensières, the Fondation is able to share scientific expertise internationally and enhance knowledge in the fight against infectious diseases. It is at the origin of an outstanding multi-disciplinary network of specialists that is poised to advance public health on a global scale.

1967 **2012**  **45**
years

2008 Inauguration of
the Christophe Mérieux Laboratory
in Beijing (China)





In 2012, 85 conferences and training courses were held at Les Pensières, with internationally renowned speakers and over 3,500 participants from around the world.

THE CONFERENCE PROGRAM INCLUDED:

- **BETTER FOOD FOR BETTER HEALTH:** in the field of nutrition and health,
- **LES CENTS GARDES:** an international conference on HIV/AIDS vaccine research,
- **MATERNAL IMMUNIZATION:** a conference addressing challenges and opportunities for vaccination during pregnancy,
- **ENTERIC INFECTIONS:** on the issue of acute and chronic diarrheal diseases,
- **GLOBAL LABORATORY INITIATIVE MEETING:** organized in partnership with WHO and Stop TB, dedicated to the challenges of diagnosing tuberculosis as part of efforts to control the disease in developing countries,



- **MOVING FORWARD:** organized in collaboration with the London School of Hygiene and Tropical Medicine, to consider the latest needs and solutions in the diagnosis of infectious diseases in resource-limited countries.

Fondation Mérieux also organizes or supports scientific conferences in various countries around the world.

2012 INTERNATIONAL CONFERENCES INCLUDED:

- **INTERNATIONAL VACCINOLOGY WORKSHOP TOKYO** (Japan): fifth edition of the vaccinology workshop on the future of immunization,
- **SOUTH AMERICA VACCINOLOGY WORKSHOP** (Brazil): eighth edition, reviewing the latest knowledge and sharing recent experience on the subject of epidemiology and vaccination campaigns,
- **AGING AND IMMUNITY** (Italy): organized in collaboration with vaccine manufacturers and dedicated to issues specific to aging in the field of infectious disease.

2008 Christophe Mérieux Prize
awarded by the *Institut de France*
to Professor François Nosten (Thailand)





TRAINING HEALTHCARE PROFESSIONALS

There is little point in strengthening clinical testing structures in developing countries unless this is underpinned by initiatives to train local healthcare professionals, both laboratory technicians and the leading doctors and scientists of the future. The Fondation has honed its expertise in this area, establishing links with universities and training organizations such as the ESTBB*, the University of Geneva and the London School of Hygiene and Tropical Medicine. In this way, it has implemented a number of training and knowledge-sharing programs intended to reinforce biological expertise in the field and to raise awareness among opinion leaders regarding major public health issues (including vaccinology, diagnostics, emerging pathogens and neglected diseases).

It also contributes to building teaching curriculums in pharmacy and biology at the university level. The Universities of Health Sciences in Phnom Penh and Antananarivo are examples of this commitment.

The Fondation places emphasis on training in the field so that students are working in their own countries and encouraged to remain there to become the healthcare professionals of tomorrow.

These local training courses are delivered in Charles and Christophe Mérieux Infectiology Centers such as those in Bamako and Vientiane.

A Bachelor of Science in Biological and Applied Medical Sciences (BAMS) has been established in Haiti, with the support of the French AnBer Foundation, and in Mali, thanks to funding from the Islamic Development Bank. Since its launch in 2007, about one hundred laboratory technicians have completed the program, delivered in partnership with the ESTBB.

Other training courses leading to qualifications have also been set up, including a diploma of specialist studies in medical biology at the University of Health Sciences in Cambodia.

* School of Biology, Biochemistry and Biotechnology at the Catholic University of Lyon

RAISING AWARENESS AMONG OPINION LEADERS

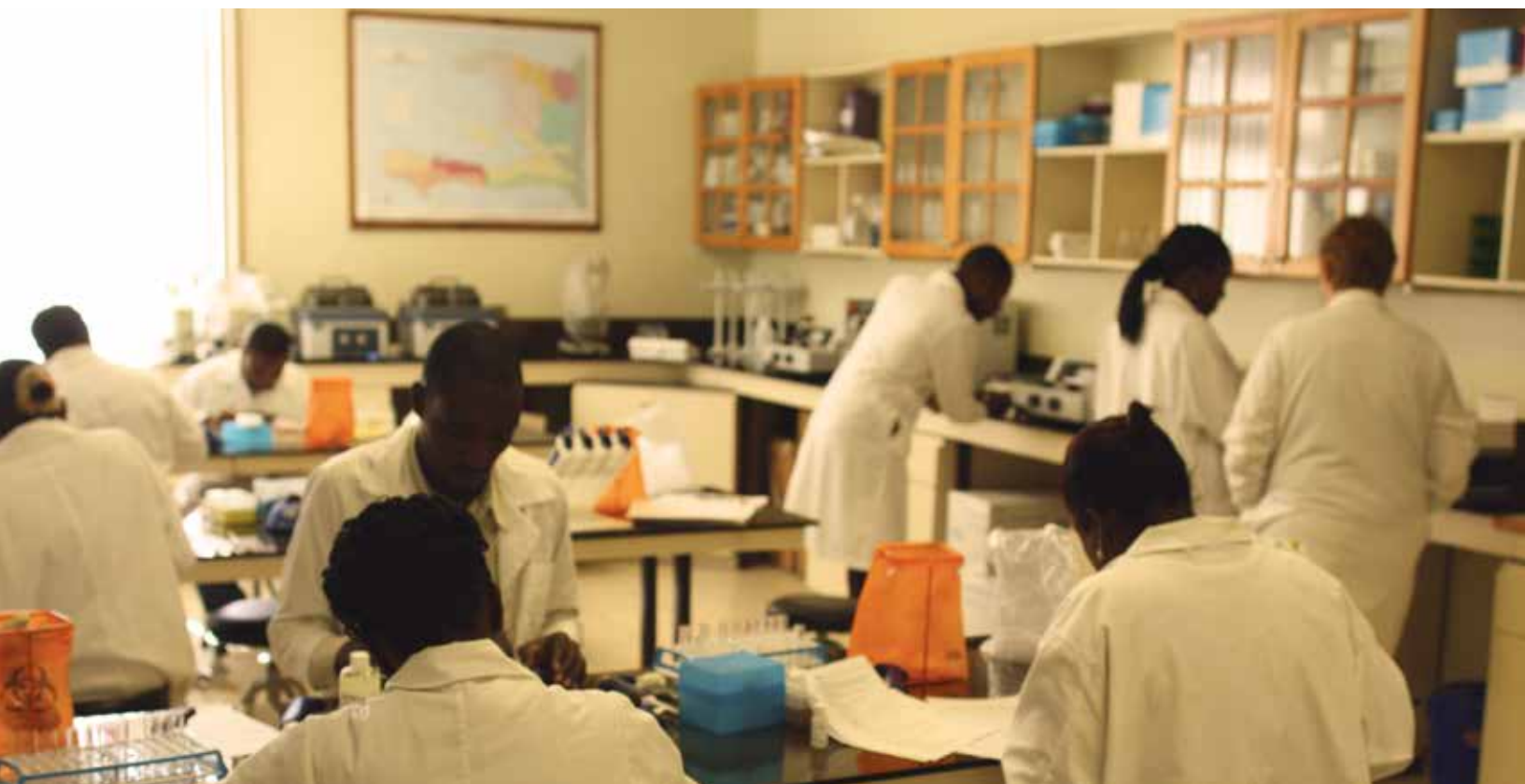
Institutional training courses are offered at Les Pensières conference center for members of the public health community in developing countries. The aim is that doctors, biologists and the representatives of regulatory bodies and health authorities from these countries subsequently pass on these skills and improve practices at a local level.

IN 2012, THESE TRAINING COURSES INCLUDED:

■ **ADVANCED VACCINOLOGY COURSE (ADVAC):** thirteenth edition of this vaccinology training course, organized with the University of Geneva,

■ **ADVANCED COURSE ON DIAGNOSTICS (ACDX):** third edition of a training course organized in partnership with the London School of Hygiene and Tropical Medicine, dedicated to the diagnosis of infectious disease.





GLOBE

REMOTE TRAINING WITH GLOBE

GLOBE (Global Link for Online Bio-medical Expertise) is an online network for healthcare professionals and scientists in developing countries. This electronic portal is intended to strengthen expertise and knowledge-sharing about infectious diseases, by making a range of tools, information and training modules available to members. Four years after its launch, GLOBE has approximately 20,000 visitors per year and more than 700 members originating from 179 countries.



Prof. FRANÇOISE BARRÉ-SINOUSSE
Ph.D, Nobel Laureate for Medicine or Physiology
Professor, Institut Pasteur
and Research Director, INSERM
President, International AIDS Society (IAS)

"It is clear that we must improve patient care in developing countries and create networks of healthcare facilities. This applies for HIV/AIDS and for other diseases. This implies not only the need to strengthen infrastructure to establish efficient reference healthcare centers, but also to reinforce training capabilities for all healthcare workers: from caregivers to doctors, they all have an important role to play.

This training aspect is essential. We must train the instructors who will train, step by step, the teams staffing the healthcare centers in these networks.

We must also educate the local communities, so that they can be relied upon for the crucial first step, diagnosis, and also to work with them to gain easier access to the population."

2009 Inauguration of
the Thakhek Hospital laboratory
(Laos)





...IN THE FIELD

1967 **2012**  **45 years**

2009 Christophe Mérieux Prize
awarded by the *Institut de France*
to Doctor Eric Leroy (Gabon)





THE CARIBBEAN ▶ P.26

HAITI



AFRICA ▶ P.28

BURKINA FASO
ETHIOPIA
MALI
SENEGAL



INDIAN OCEAN ▶ P.32

MADAGASCAR



ASIA ▶ P.34

BANGLADESH
CAMBODIA
CHINA
LAOS
MYANMAR
TAJIKISTAN
LEBANON

2009 Inauguration of
the Rodolphe Mérieux Laboratory
in Vientiane (Laos)



IN THE FIELD...

HAITI

**Rodolphe Mérieux Laboratory
in Port-au-Prince**
Laboratory of the State University
Hospital




HAITI

Engaged in Haiti since 2002, Fondation Mérieux's commitment is unwavering, with the Rodolphe Mérieux Laboratory in the GHESKIO Centers, the BAMS degree course, and several projects aimed at helping the country's women and children.

PARTNERSHIP WITH GHESKIO

In 2012, the Fondation intensified its support for its long-standing partner, GHESKIO (Haitian Group for the Study of Kaposi's Sarcoma and Opportunistic Infections), taking action to strengthen Haiti's medical diagnostic capabilities, particularly through technical support to the microbiology laboratory. Today, 70 people work at the Rodolphe Mérieux Laboratory, created by the Fondation as part of GHESKIO's Institute of Infectious Diseases and Reproductive Health (IMIS). Every day, this team works to diagnose multi-resistant tuberculosis, cholera and HIV, playing a key role in the fight against infectious diseases and the prevention of epidemics.

1967 **2012**  **45 years**

2009 Inauguration of
the Rodolphe Mérieux Laboratory
in Vientiane (Laos)



BAMS TRAINING

Building on the success of the training course established in Mali in 2007, Fondation Mérieux has implemented a Bachelor of Science in Biological and Applied Medical Sciences (BAMS) in Haiti. The course, which leads to a qualification, is organized in collaboration with the ESTBB (School of Biology, Biochemistry and Biotechnology) at the Catholic University of Lyon, the National Public Health Laboratory in Port-au-Prince, and Haiti's Ministry of Public Health and Population. Its aim is to improve laboratory technicians' biomedical analysis skills and knowledge of quality assurance regulations.

The second BAMS class, comprising 18 new trainees, started the course in September 2012.

SUPPORTING HAITIAN WOMEN LIVING WITH HIV

The program of micro-credit loans for women living with HIV was continued throughout 2012, in partnership with the ACME (Haitian cooperative association for micro-enterprises) and the GHESKIO Centers. The women participating in this project, who all live in Port-au-Prince, receive training in setting up a profit-making activity, managing a loan and running their micro-enterprise.

In 2012, more than 500 women were granted micro-credit loans through this program.

Despite the difficulties that Haiti has encountered since the earthquake of January 2010, this program is an ongoing success, achieving a reimbursement rate of nearly 85% in 2012 and the reintegration of a number of women. This social initiative has a significant impact on living conditions and continues to be necessary for a population that is still facing great difficulties: more than 2,800 people have benefited from this program since its launch in 2005.

SUPPORTING ASSOCIATIONS AND HUMANITARIAN INITIATIVES IN 2012

■ Support for the French AAIP association (firefighters' international aid actions)

Construction of three "Kayiti" houses for a dispensary in Jacmel.

■ A new children's center for the *Communauté de l'Incarnation*

Fondation Mérieux, the religious community, *Communauté de l'Incarnation* (led by Brother Franklin Armand), the French association Kayiti, and the CROSE (association for the coordination of regional organizations in Southeast Haiti) work together to implement this project.

It has resulted in the construction of 15 "Kayiti" houses and two multi-purpose halls. The site is being equipped to accommodate around 60 children and ten supervisors as of summer 2013.

■ Extending the Our Lady of the Miraculous Medal children's home in Cap-Haïtien

During 2012, Fondation Mérieux continued works to increase the capacity and improve living conditions in this institution, which is managed by Sister Godelive. 500 children attend the renovated school and the orphanage is home to nearly 100. In 2012, five new "Kayiti" houses were built to accommodate the members of the religious community, freeing up additional premises for the children.



Prof. JEAN-WILLIAM PAPE
Founder and Director of the GHESKIO Centers

"For us, global health is built upon a number of pillars: healthcare of course, and education (...), but also the possibility of access to employment. (...)

This is the first time that we have received help from a foundation that asks for nothing in return, other than that we look after our patients. (...)

This assistance is extremely important to us, not only for our patients, but also in terms of diagnostics. We have a high-performance laboratory and, at present, we are able to diagnose HIV and tuberculosis using all the molecular biology techniques available, here in Haiti. (...)

We are perhaps one of few centers in the world where a patient can come for an HIV test and also be screened for tuberculosis. If we diagnose tuberculosis, the patient is treated that very same day. That is the great benefit of these laboratories."

2009 Inauguration of the Rodolphe Mérieux Laboratory in Port-au-Prince (Haiti)



IN THE FIELD...



▶ AFRICA

▶ RESAOLAB WEST AFRICAN LABORATORY NETWORK

Created through close collaboration between the Fondation and the ministries of health in Burkina Faso, Mali and Senegal, the RESAOLAB project aims to improve the health of populations by strengthening the clinical laboratory system and harmonizing diagnostic practices in the three countries.

Fondation Mérieux is leading this project, which began in 2009. Its first phase is scheduled to come to an end in 2013. RESAOLAB is co-financed by *Agence Française de Développement* (AFD). The International Cooperation of Monaco, The French Ministry of Foreign Affairs, WHO, and the West African Health Organisation (OOAS) also collaborate.

RESAOLAB's activities are based on three priority areas:

- continuing training of laboratory staff,
- quality management for the tests carried out in the laboratories,
- epidemiological surveillance.

1962 **2012**  **45 years**

2010 Action in Haiti
following the earthquake





FIGHTING NEGLECTED TROPICAL DISEASES IN AFRICA

Since 2008, Fondation Mérieux has taken part in the European Foundation Initiative for African Research into Neglected Tropical Diseases. To date, this initiative, which brings together five European foundations (Cariplo, Gulbenkian, Nuffield, Volkswagen and Mérieux) has made it possible to train 25 young African researchers, thanks to postdoctoral grants. These foundations also organize additional training for the researchers, as well as conferences fostering active South-South and North-South networks. Thus far, the resulting research projects have given rise to 15 publications in internationally recognized journals.

ACHIEVEMENTS SINCE 2009

- 53 instructors trained
- 111 training sessions given to 2,500 participants in the three countries
- A distance learning platform developed (<http://www.globe-network.org/>)
- 12 decentralized training and quality control centers renovated and equipped
- A Laboratory Information Management software system developed and 21 instructors trained
- 15 laboratories in each country provided with equipment to facilitate electronic data transmission for communicable disease surveillance

EXTENDING THE PROJECT: RESAOLAB+

At the request of Benin, Guinea-Conakry, Niger and Togo, the RESAOLAB project will be extended.

The aim of the RESAOLAB+ project is to develop the current network to include these four new countries, thus extending the scope of the project to seven West African countries.

RESAOLAB+ should be launched during 2013.

► BURKINA FASO

A NEW CENTER FOR TRAINING AND QUALITY

As part of the RESAOLAB project, Fondation Mérieux backed the construction of a Continuing Training Center and External Quality Control Unit within the General Directorate of Pharmacy, Drugs and Laboratories at the Burkina Faso Ministry of Health.

The new center will make it possible to provide training for laboratory technicians and improve the quality of medical ana-

2010 Christophe Mérieux Prize
awarded by the *Institut de France*
to Professor Jean-William Pape (Haiti)



lyses. The center has facilities for around 30 people, including a microscopy room, a computer lab for distance learning sessions, and the External Quality Control Unit, which monitors the activities and carries out quality control for all the laboratories in the country.

Three other training centers have undergone renovations, at the regional health departments in Bobo-Dioulasso and Ouahigouya, as well as at Fada N'gourma Regional Hospital.

▶ ETHIOPIA

IMPROVING TUBERCULOSIS DIAGNOSIS

A program to fight tuberculosis has been implemented by the Inter Aide association with the support of Fondation Mérieux and the European Union. It has three objectives: raising awareness of infection, facilitating access to high-quality diagnostics and mobilizing healthcare professionals in the fight against this disease.

Several laboratories have been equipped in the Wolayta and Dawro regions in southern Ethiopia, with the primary objective of substantially increasing the number of cases detected. In parallel, training was provided for health center staff.

▶ MALI

SIXTH BAMS CLASS

Managed by the Charles Mérieux Infectiology Center in Bamako, the Bachelor of Science in Biological and Applied Medical Sciences (BAMS) has been offered since 2007, in partnership with the Faculty of Medicine and Pharmacy of Bamako and the ESTBB (School of Biology, Biochemistry and Biotechnology at the Catholic University of Lyon). This 9-month course results in a formal qualification and is intended to reinforce senior laboratory technicians' biomedical analysis skills and compliance with laboratory quality assurance regulations.

In October 2012, Mali's sixth class, comprising 27 new participants, began its training.

SUPPORTING SAMUSOCIAL

Since 2005, Fondation Mérieux has been working with the Samusocial association in Mali to provide care for street children. Funding and logistical support are provided for the medical testing of young people monitored on a daily basis.

Samusocial provides:

- treatment in the streets during night-time patrols,
- medical monitoring of children in order to provide appropriate treatment and refer them to specialized facilities,
- health education initiatives to raise awareness of issues such as daily hygiene, prevention and vaccination.

The Fondation also supports Samusocial in Senegal.

REINTEGRATING HIV+ WOMEN

This program, managed in partnership with AFAS (women's association to support AIDS widows and orphans), aims to achieve socio-economic reintegration for women living with HIV in Mali, by developing their ability to manage a profitable commercial activity.

Launched in 2010, the project entails the bulk purchase of bales of fabric in Burkina Faso, for subsequent distribution in batches to women living with HIV. The women sell the fabric at markets, reimburse the project for the batch, and then keep the profits. In 2012, this initiative enabled 50 women to increase their revenue to support themselves and their families.





JÉRÔME FROISSART

Director, Department of International
Cooperation of Monaco*

"The partnership between the International Cooperation of Monaco and Fondation Mérieux goes back a long way as we have been working together now for five years. We collaborated for the first time on the RESAOLAB project and, more specifically, the International Cooperation of Monaco is involved in setting up laboratories at the community level in Mali, so that local populations have direct access to healthcare services. Through this partnership, we will create nine laboratories in rural areas.

We value our collaboration with Fondation Mérieux very highly. (...)

We appreciate this approach based on strengthening human capital (through the GABRIEL network) and fostering partnerships (through the creation of networks like RESAOLAB), bringing together public institutions, national centers and financial backers. It is a real opportunity."

** As of April 2013, Secretary General of the World Association of Children's Friends (AMADE)*

CHARLES MÉRIEUX INFECTIOLOGY CENTER

Despite the difficult political context in Mali during 2012, the Charles Mérieux Infectiology Center maintained its usual level of activity. The medical biology laboratory continued to receive students for practical training courses and the center maintained its involvement in international partnerships.

▶ SENEGAL

VOICES AND "MOBILE HEALTH"

Effectively sharing information between national structures and regional laboratories is a major challenge for infectious disease surveillance. A "mobile health" experiment in Dakar since 2011 aims to improve epidemiological surveillance and continuing training for laboratory professionals, through the use of voice technology via mobile phones.

The VOICES (VOIce-based Community-centric mobile Services for social development) project is funded by the European Commission. It brings together Senegal's National Network of Laboratories, the Multinational Higher School of Telecommunications (ESMT) in Dakar, the telecommunications group, Orange, the Dutch Organization for Applied Scientific Research (TNO), the South African Council for Scientific and Industrial Research, the Worldwide Web Foundation, and Fondation Mérieux.

The VOICES project in Senegal enables information on infectious epidemics to be shared more quickly and reliably, via three mechanisms:

- the collection of epidemiological information from regional laboratories,
- continuing training for laboratory staff,
- a web-based interface to display and monitor epidemiological data and for educational applications.

This preliminary trial in the field, during which daily reports are generated for three diseases (cholera, shigellosis and meningitis) has shown very encouraging initial results.

The VOICES project is now ready to be deployed in other regions.



2010 First ACDx course
at Les Pensières



IN THE FIELD...

MADAGASCAR

Rodolphe Mérieux Laboratory
in Antananarivo

Fianarantsoa Hospital's laboratory
Fort-Dauphin Hospital's laboratory
Antsirabe Hospital's laboratory



▶ MADAGASCAR

Fondation Mérieux has reaffirmed its commitment to enhancing clinical biology capabilities in Madagascar, through Charles Mérieux Infectiology Center initiatives launched in 2011 and the continuation of several projects run by the Rodolphe Mérieux Laboratory.

1967 **2012**  **45 years**

2011 Christophe Mérieux Prize
awarded by the *Institut de France* to
Doctor Hector Garcia (Peru)





TRAINING PHARMACY STUDENTS

Since 2006, Fondation Mérieux has worked to improve the training received by pharmacy students at the University of Antananarivo, in partnership with the Pierre Fabre Foundation, the French International Cooperation department and the schools of pharmacy at the universities of Grenoble and Toulouse.

Rooms for teaching and practical work have been renovated, following the introduction of hospital pharmacy courses and practical training programs.

The Faculty of Pharmacy's second class of students graduated in 2012.

MARKERS TO DIFFERENTIATE PNEUMONIA AND MALARIA IN FEVERISH CHILDREN

The aim of this study, which was launched in 2011, is to identify host markers of diagnostic significance that could be used to differentiate between malaria and pneumonia in children aged 2 to 59 months with a fever over 38°C.

The project is funded by the National Institutes of Health (NIH) and Institut Mérieux. It is run in partnership with the Ampasimanjeva Medical Foundation on the east coast of Madagascar, near Manakara. The markers will be identified by the Canadian biotechnology company, Caprion, based on samples taken from Madagascar patients.

A rapid diagnostic test for malaria is carried out in order to distinguish lower respiratory tract infections from malaria.

The initial results obtained confirm that malaria is endemic in this region, as half of the fevers observed in young children are attributable to the disease. These results, which need to be confirmed, enable the speed at which pathogens spread through the region to be tracked.

SOUTH-SOUTH COOPERATION TO TRAIN TECHNICIANS

At the request of the Madagascan Ministry of Health, Fondation Mérieux organized a training course for laboratory technicians. The training was part of an initiative to create an infectious disease surveillance network comprising seven regional hospital laboratories. The course was implemented in collaboration with the Ministry of Health and delivered by Malian instructors, who are familiar with constraints similar to those in Madagascar.

2011 Inauguration of
the Rodolphe Mérieux Laboratory
in Beirut (Lebanon)



IN THE FIELD...

LEBANON

Rodolphe Mérieux Laboratory in Beirut

TAJIKISTAN

National Public Health Reference Laboratory in Dushanbe

BANGLADESH

Rodolphe Mérieux Laboratory in Chittagong (ongoing)

CHINA

Christophe Mérieux Laboratory in Beijing

MYANMAR

Public Health Laboratory of Mandalay

LAOS

Rodolphe Mérieux Laboratory in Vientiane
Thakhek Hospital's laboratory
Mahosot Hospital's laboratory

CAMBODIA

Rodolphe Mérieux Laboratory in Phnom Penh
Battambang's laboratory
Khmer-Soviet Friendship Hospital's laboratory
Kossamack Hospital's laboratory
Svay Rieng's laboratory (ongoing)
Takeo Regional Hospital's laboratory

▶ ASIA

▶ BANGLADESH

A NEW RODOLPHE MÉRIEUX LABORATORY IN CHITTAGONG

In the spring of 2012, a Memorandum of Understanding (MOU) was signed for the construction of the future Rodolphe Mérieux Laboratory at the Bangladesh Institute of Tropical and Infectious Diseases (BITID) in Chittagong. Fondation Mérieux is responsible for building and equipping the laboratory and training the staff.

This laboratory of excellence, which should be operational by the end of 2013, will be dedicated to training biologists and applied research on the specific pathologies prevalent in Bangladesh, where the threat of infection is particularly high.

1967 **2012**  **45 years**

2012 Christophe Mérieux Prize
awarded by the *Institut de France* to
Doctor Firdausi Qadri (Bangladesh)





Dr. FIRDAUSI QADRI

Director of the Centre for Vaccine Sciences
at the International Centre for Diarrhoeal
Disease Research, Bangladesh

“Diarrheal diseases are extremely widespread, but not widely discussed. They continue to cause deaths around the world, in children and adults alike. I would like to mention one particularly severe example, namely cholera. Many people have forgotten the devastating effects of this disease. It is a disease that we have neglected and whose impact is immeasurable. Thanks to various efforts throughout the world, it is now possible to treat and prevent cholera. Approximately 3 million people are infected with cholera in over

20 countries, including Bangladesh and Haiti, and about 150,000 people, children and adults alike, die from the disease every year. However, thanks to the efforts of foundations such as Fondation Mérieux, people are beginning to talk about the disease and to make use of the vaccines available. (...)

Bangladesh is a poor country, but its people are receptive. When you come to their aid with diagnostic tools, treatments and vaccines, they place their belief in the support being offered and embrace it. We can make this happen around the world. (...)

If we work together on global health, we can achieve great things.”

DETECTING SALMONELLA STRAINS THAT CAUSE TYPHOID

An applied research program is currently being run by Fondation Mérieux to develop a sensitive molecular diagnostic test to detect the salmonella strains responsible for typhoid fever.

WHO currently estimates that between 17 and 22 million people suffer from typhoid fever each year, with up to 600,000 fatalities. The disease is transmitted in contaminated water or food. Current diagnostic techniques lack sensitivity and are not well-suited to the conditions encountered in the field.

The program is funded by the Bill & Melinda Gates Foundation and involves five partners: the Pasteur Institute, the West Scotland Specialist Virology Center, Fast-track Diagnostics, Kemri-CDC, and the Child Health Foundation in Bangladesh.

2012 Creation of the Dr. Christophe Mérieux Center
in Phnom Penh with French association *Les Enfants du Mékong*
(Cambodia)





▶ CAMBODIA

RENOVATING THE SVAY RIENG HOSPITAL LABORATORY

Fondation Mérieux funded the renovation of a 175 m² medical biology laboratory and the installation of a microbiology unit at the hospital in the city of Svay Rieng, located in the province of the same name. Also involved in the project were the Cambodian Ministry of Health, the World Health Organization for equipment, and the Diagnostic Microbiology Development Program (DMDP), an American NGO specializing in practical microbiology training.

This successful renovation has led to the implementation of a high-quality laboratory network in Cambodia, with a view to enhancing the effectiveness and quality of monitoring of infectious diseases.

TRAINING AND RESEARCH IN PHNOM PENH

In 2012, training and research programs at the Rodolphe Mérieux Laboratory were focused on three major projects, each with an international partner:

- **Clinical pharmacology**, with a study on the metabolism of therapeutic molecules among Cambodian populations,
- **Descriptive epidemiology**, focusing on children with severe respiratory infections and acute diarrhea requiring hospitalization,
- **Interaction between pathogens and the environment**, monitoring the presence of human pathogens in the environment (primarily water and rodents).

1967 2012  45 years

2013 Celebration of
Fondation Mérieux's 45th anniversary
(Lyon, France)





PHARMACOLOGY: STUDYING ANTIRETROVIRAL AND ANTIMALARIAL DRUGS

The Rodolphe Mérieux Laboratory has an analytic platform, in particular for denaturing high-performance liquid chromatography (dHPLC), which is used to measure plasmatic drug concentrations of antiretroviral and anti-tuberculosis drugs. Following the work carried out by Prof. Monidarin Chou for his thesis on pharmacogenetics in 2012, this platform was opened up for measuring the concentration of other molecules present in antimalarial drugs (Mefloquine).

The platform, which is the only one of its kind in Cambodia, makes it possible to accelerate the country's progress towards self-sufficiency in the fight against malaria.

10TH ANNIVERSARY OF THE D.E.S. IN MEDICAL BIOLOGY

Supported by the Fondation since 2003, the Diploma of Specialist Studies (D.E.S.) in Medical Biology is a doctorate-level postgraduate degree awarded by Cambodia's University of Health Sciences, open to doctors and pharmacists.

This three-year course combines theoretical classes, practical work, hospital placements and research at Cambodia's Rodolphe Mérieux Laboratory. Its aim is to provide medical biologists with training enabling them to carry out quality assurance of medical analyses, supervise the activities of a medical biology laboratory, and establish operational links between clinical departments and the laboratory. Teaching covers a wide range of subjects relating to biological diagnostics in humans, including biochemistry, hematology, parasitology, immunology, virology and bacteriology.

In 2012, ten Cambodian professors were nominated to coordinate each training module, in collaboration with professors from the French universities participating in the course.

"Aviesan is the French National Alliance for Life Sciences and Health, created three years ago to bring together the main research bodies in this field. Fondation Mérieux is a very important partner of the Aviesan-South group, both through the GABRIEL network and its participation in designing research projects.

A research project looking at encephalitis in South-East Asia and a regional platform for transmissible diseases in Asia are examples of the initiatives implemented. Both involve significant commitment in terms of training and enhancement of capabilities. The aim is to pool the resources of the various organizations present at each site."

.....
Dr. BERNADETTE MURGUE
Deputy Director of IMMI/Aviesan

DIARRHEAL DISEASE RESEARCH IN TAKEO

In developing countries, diarrhea-related diseases remain the second most frequent cause of death in children under five. The infectious agents that cause diarrhea may be bacterial (for example, *Salmonella* spp, *Vibrio cholera*, *Escherichia coli*, *Enterobacteria*, *Shigella* spp), viral (hepatitis A, norovirus, rotavirus and enterovirus) or parasitic (*Giardia*, *Taenia saginata*).

A research program was launched in March 2010 by the Rodolphe Mérieux Laboratory in Cambodia, jointly funded by Singapore's national laboratories (DSO) and Fondation Mérieux. The primary objective is to monitor the pathogens responsible for acute diarrhea in the children admitted to the Takeo

hospital, by developing a well-adapted molecular diagnostic system and making optimal use of the tools available at the Rodolphe Mérieux Laboratory.

Until April 2012, 400 samples were taken, included in the protocol and tested using kits developed by Fast-track Diagnostics to identify the bacteria and viruses. A PCR test developed by DSO was also used to identify *Vibrio cholera*. Parasites were identified by microscopy.

This research will be continued in 2013 and the results will be published in the scientific literature.





▶ CHINA

DECENTRALIZING RESISTANT TUBERCULOSIS DIAGNOSIS

Since 2009, Fondation Mérieux has worked with the Chinese Ministry of Health and the National Tuberculosis Reference Laboratory at the Center for Disease Control (CDC) to increase diagnostic capabilities in the Zhe Jiang and Heilong Jiang provinces for patients whose tuberculosis treatment is not proving effective.

The first phase of this partnership was completed in 2012 and demonstrated the importance of decentralizing resources to detect tuberculosis and resistance to treatment in China:

■ **Equipment** provided for the National Tuberculosis Reference Laboratory in Beijing; two tuberculosis reference centers for the Chinese CDC in Harbin (Heilong Jiang province) and Hangzhou

(Zhe Jiang province); eight tuberculosis treatment centers in the cantons of these two provinces;

■ **Training** for 132 laboratory professionals at national, provincial and local levels;

■ **Assessment** of new tools to diagnose pulmonary tuberculosis and detect resistance to antituberculosis drugs, among 1,400 people thought to be infected.

MONITORING RESPIRATORY INFECTIONS IN BEIJING

A new agreement was signed in 2012 with the Chinese Academy of Medical Sciences (CAMS) in Beijing, extending the activities of the Christophe Mérieux Laboratory for a further five years. This unit is dedicated to assessing and developing new diagnostic techniques and biomarkers, as well as identifying and characterizing new pathogens.

As part of measures to monitor respiratory infections in Beijing and the surrounding area, the Christophe Mérieux Laboratory continued, throughout 2012, to document the role and variety of pathogens responsible for respiratory infections observed in three of the city's main hospitals.



▶ LAOS

MONITORING HIV PATIENTS' TREATMENT

In 2009, the Christophe Mérieux Infectiology Center of Laos (CICML) introduced viral load measurement to monitor treatment for patients living with HIV, in order to improve their care.

By the end of 2012, more than 2,300 patients, of whom 48% were women, had had their viral load measured at the Center.

In addition, in May 2010, the Christophe Mérieux Infectiology Center of Laos implemented an HBV and HCV viral load quantification technique to assess the efficacy of treatments administered.

“INFECTIOLOGY AND LABORATORY DAYS”

In October 2012, the second edition of the “Infectiology and Laboratory Days” took place at Thakhek Hospital, organized in partnership with the Rhône-Alpes regional council, Hospices Civils de Lyon, and Claude Bernard University Lyon 1.

Some 50 participants convened at this event, focused on issues relating to infectiology training for clinicians, the role and use of medical biology laboratories, and the importance of laboratory networking.

SUPPORTING ASSOCIATIONS

In 2012, Fondation Mérieux provided support for LaoPHA (Lao Positive Health Association), which offers assistance to people living with HIV/AIDS, organizes preventive initiatives, and provides treatment and care for communities in the nine provinces of Laos.

CoPanFlu STUDY ON INFLUENZA A

This epidemiological study, which was carried out between February 2010 and May 2012, was launched following the advent of the H1N1 flu virus in March 2009. The aim of the study was to quantify the incidence of flu infection and to identify the sociological and epidemiological factors determining the risk of infection.

This research was coordinated by the CICML, the EHESP (French School of Public Health) and Fondation Mérieux. The project involved a prospective cohort of more than 800 households, i.e. approximately 4,000 people in a district of Vientiane, for serological and virological monitoring. The determining factors and age distribution for sero-conversion in a vaccine-naïve population were shown to be similar to those found

in developed countries. The study, which took place between February 2010 and May 2012, may result in a second scientific publication in 2013.

Following on from this protocol, an additional study (Lalris) was launched with a view to determining the pathogens involved in the symptomatic cases identified during recruitment for CoPanFlu, with no relation to the H1N1 virus. The data already available in this context shows a strong *Streptococcus pneumoniae* prevalence. Also thanks to this project, the Fast-track Diagnostics test has been introduced at the CICML for respiratory diseases, with the support of the GABRIEL network.

EPIDEMIOLOGY OF MULTI-RESISTANT TUBERCULOSIS STRAINS

Since opening in 2009, the Christophe Mérieux Infectiology Center of Vientiane in Laos (a national organization under the Ministry of Health) has carried out various research projects on the diagnosis of tuberculosis and detection of resistance. The Center's role is to analyze resistance to antituberculosis drugs using molecular tests to identify strains other than *Mycobacterium tuberculosis*, as well as resistance to first-line antituberculosis drugs. The results of this study, which was completed in early 2012, have been published.

In 2013, Fondation Mérieux will launch a new study on the molecular epidemiology of the strains found in Laos,

based on MIRU*-typing, thanks to a transfer of technology from the Fondation's Emerging Pathogens Laboratory in France. This study will be conducted using the cohort compiled from the 2012 national prevalence study, as part of the agreement between the National Tuberculosis Control Program Center and the Christophe Mérieux Infectiology Center of Laos.

* *Mycobacterial Interspersed Repetitive Units*





▶ MYANMAR

NEW MOLECULAR BIOLOGY PLATFORM IN MANDALAY

In 2011, Fondation Mérieux began renovation work at the Mandalay Public Health Laboratory (PHL) in Myanmar. The new molecular biology technical platform has been operational since the spring of 2012.

MONITORING ANTIRETROVIRAL TREATMENT

Following the renovation of the molecular platform, a technology transfer and multiple-stage training course were carried out in preparation for the launch of viral load monitoring at the Public Health Laboratory in Mandalay. Staff received training at the Christophe Mérieux Infectiology Center of Laos, followed by on-site training and external quality control prior to deploying testing on a large scale.

This test is now available for the 15,000 patients monitored by the NGO, The Union Against Tuberculosis, with support from the Global Fund.

Given the increasing number of patients receiving treatment, the challenge is to limit the number of cases where the virus "escapes" treatment and thus limit the number of patients under second-line treatments.

▶ TAJIKISTAN

NEW NATIONAL REFERENCE LABORATORY

Construction of the national reference laboratory for public health, located in Dushanbe, was completed in the fall of 2012, in partnership with the United Nations Development Program and the Tajik Ministry of Health. The new laboratory, with a total surface area of 425 m², comprises two BSL2 and BSL3 units. This new structure should bring about improvements in the diagnosis of tuberculosis, which is particularly rife in this country, due to a number of multi-resistant strains, as well as other pathogens such as hepatitis, hemorrhagic fevers and respiratory infections.

Financed by the Global Fund to Fight AIDS, Tuberculosis and Malaria, the laboratory is the property of the Ministry of Health. Its inauguration is scheduled for the summer of 2013.

1967 **2012**  **45 years**

2013 Celebration of
Fondation Mérieux's 45th anniversary
(Lyon, France)





▶ LEBANON

EQUIPPING THE RODOLPHE MÉRIEUX LABORATORY IN BEIRUT

The Rodolphe Mérieux Laboratory, which was inaugurated in 2011, is located within the technology and health center at Saint-Joseph University in Beirut. The installation of the laboratory and enhancement of the technical platform continued into 2012.

SUPPORTING ASSOCIATIONS

Fondation Mérieux supported the *P'tits Soleils* association, which helps underprivileged children living in Lebanon, regardless of their nationality or ethnic origins. *P'tits Soleils* covers the costs of medical care (hospitalization, paraclinical examinations and specialized medical consultations) and also provides medications, prostheses and vaccines.



Prof. DOLLA KARAM SARKIS
Dean of the Faculty of Pharmacy and
Director of the EPL, Saint-Joseph University,
Beirut

"We have a brand new Rodolphe Mérieux Laboratory, built at the heart of the technology and health center at the University. This laboratory is one-of-a-kind, and to see it become part of the GABRIEL network represents a great opportunity for the entire Middle East. We are currently working on all the infections studied by the network, including respiratory infections, emerging viruses, tuberculosis and AIDS, and on most of the diseases that afflict today's society."



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Prof. Arnold S. MONTO
University of Michigan (USA)

Prof. Johan NEYTS
Faculté de Médecine de l'Université de Louvain (Belgium)

Prof. Albert OSTERHAUS
ERASMUS MC, University of Rotterdam (The Netherlands)

Prof. Fabien ZOULIM
Inserm - Lyon (France)

- ▶ Abbott
- ▶ AdvaMed
- ▶ Agence Française de Développement (AFD)
- ▶ Agence de Médecine Préventive (AMP)
- ▶ Agence Universitaire de la Francophonie (AUF)
- ▶ American Society for Microbiology (ASM)
- ▶ Agence nationale de la recherche (ANR)
- ▶ Bill & Melinda Gates Foundation
- ▶ Biokit
- ▶ bioMérieux
- ▶ Centre national de recherche scientifique (CNRS)
- ▶ Centers for Disease Control and Prevention (CDC)
- ▶ CDC Foundation
- ▶ Crucell
- ▶ Direction de la Coopération Internationale (DCI) de la Principauté de Monaco
- ▶ European Centre for Disease Prevention and Control (ECDC)
- ▶ European Diagnostic Manufacturers Association (EDMA)
- ▶ European Society for Paediatrics Infectious Diseases (ESPID)
- ▶ European Union
- ▶ Fogarty International Center
- ▶ Fondation AnBer
- ▶ Fondation Calouste Gulbenkian
- ▶ Fondation Cariplo
- ▶ Fondation Christophe et Rodolphe Mérieux
- ▶ Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ)
- ▶ Genostar
- ▶ GlaxoSmithKline Biologicals
- ▶ Global Fund to Fight AIDS, Tuberculosis and Malaria
- ▶ IMACCESS
- ▶ Institut Mérieux
- ▶ Institut Pasteur
- ▶ Institut de recherche biomédicale des armées (IRBA)
- ▶ Islamic Development Bank (IDB)
- ▶ Johns Hopkins Bloomberg School of Public Health
- ▶ London School of Hygiene and Tropical Medicine (LSHTM)
- ▶ Merck
- ▶ Ministère des Affaires étrangères / France Expertise Internationale (FEI)
- ▶ National Foundation for Infectious Diseases (NFID)
- ▶ National Institute of Allergy and Infectious Diseases (NIAID) / National Institutes of Health (NIH)
- ▶ National Vaccine Program Office (NVPO)
- ▶ Novartis Vaccines
- ▶ Nuffield Foundation
- ▶ Pfizer
- ▶ Qiagen
- ▶ Région Rhône-Alpes
- ▶ Sanofi Pasteur
- ▶ Sanofi Pasteur MSD
- ▶ Serum Institute of India
- ▶ Stavros Niarchos Foundation
- ▶ United Nations Development Programme (UNDP)
- ▶ Université de Genève
- ▶ VolkswagenStiftung
- ▶ Wellcome Trust
- ▶ World Health Organization (WHO)

► BALANCE SHEET

ASSETS (K€)	NET DEC. 31, 2012	NET DEC. 31, 2011
FIXED ASSETS		
Intangible fixed assets	20	14
Property, plant and equipment	3,182	3,693
Investments and other financial assets	17,521	17,507
Total	20,723	21,213
CURRENT ASSETS		
Inventories	6	7
Payments on account	103	104
Accounts receivable	1,117	1,005
Other receivables	3,000	2,662
Marketable securities	61,838	68,753
Cash and cash equivalents	7,656	3,073
Prepaid expenses	658	415
Unrealized exchange losses	0	2
Total	74,378	76,021
TOTAL ASSETS	95,100	97,234
LIABILITIES AND FUND BALANCE (K€)		
FUND BALANCE		
Dotation	64,916	64,916
Reserves	884	884
Retained earnings	24,433	28,099
Net income / loss for the period	(824)	(3,665)
Total	89,410	90,234
Allowances for contingencies	241	243
Funds reserved for future engagements	1,396	1,403
LIABILITIES		
Loans	84	72
Accounts payable	1,284	1,819
Investment payable	0	0
Other payable	1,479	955
Deferred income	1,204	2,470
Unrealized exchange gains	2	38
Total	4,053	5,355
TOTAL LIABILITIES AND FUND BALANCE	95,100	97,234

► INCOME STATEMENT

(K€)	ACTUAL 2012	ACTUAL 2011
INCOME		
Services revenue	280	277
Grants	118	672
Reverse on operating allowances	7,522	7,210
Expenses refund	436	238
Other operating income	27	17
Total income	8,383	8,414
EXPENSES		
External purchases and expenses	5,680	5,223
Taxes and duties	874	674
Salaries	2,112	1,909
Social contributions	982	892
Depreciations	634	626
Donations and subsidies received	4,666	3,921
Grants awarded	19	35
Net book value of sold assets	-	-
Other operating expenses	7	-
Total expenses	14,973	13,280
CURRENT INCOME	-6,589	-4,866
FINANCIAL INCOME		
Dividends	1,097	814
Other financial income	1,342	25
Reverse on financial allowances	399	63
Net income from marketable securities	4,281	1,554
Total financial income	7,119	2,456
FINANCIAL EXPENSES		
Financial allowances	299	913
Other financial expenses	1,071	23
Total of financial expenses	1,370	935
FINANCIAL RESULT	5,749	1,520
EXCEPTIONAL INCOME		
Exceptional income	9	2
Exceptional reverse on allowances	-	-
Total exceptional income	9	2
EXCEPTIONAL COSTS		
Exceptional expenses	-	57
Exceptional allowances for contingencies	-	-
Total exceptional expenses	-	57
EXCEPTIONAL RESULT	-	-55
Income tax	-1	-2
TOTAL INCOME	15,512	10,871
TOTAL EXPENSES	16,342	14,271
INTERMEDIATE BALANCE	-831	-3,400
Prior funds carried forward	1,403	1,137
Funds reserved for future engagements	1,396	1,403
NET INCOME / LOSS FOR THE PERIOD	-824	-3,665

► USE OF FUNDS STATEMENT

EXPENSES (USES) (€)	ACTUAL 2012
MISSIONS	11,102,330
Clinical biology laboratories	1,048,387
Collaborative research programmes	3,799,348
Training and knowledge sharing	4,331,443
Support for local initiatives	866,721
Support for local structures	229,079
International offices	810,755
Specific projects and exploratory missions	16,596
FUND-RAISING EXPENSES	1,357,577
OPERATING EXPENSES	1,923,863

TOTAL EXPENSES FOR THE PERIOD	14,383,770
ALLOWANCES	309,215
DEPRECIATION	623,286
FUNDS RESERVED FOR FUTURE ENGAGEMENTS	1,395,984
ACCOUNTING RESULTS (PROFIT)	-
GRAND TOTAL	16,712,254
Evaluation of in-kind patronage	11,107

INCOME (FUNDS) (€)	ACTUAL 2012
DONATIONS AND LEGACIES	128,657
Donations	117,772
Legacies	10,885
OTHER PRIVATE FUNDS	6,546,339
Sponsorship/ Patronage	2,911,800
Grants from Fondation Christophe et Rodolphe Mérieux	1,325,000
Other grants	2,309,539
GRANTS AND OTHER PUBLIC FUNDING	984,903
OTHER INCOME	6,426,874
Services revenues	280,389
Refund of expenses	435,912
Other financial income	4,599,972
Dividends	1,110,601

TOTAL INCOME FOR THE PERIOD	14,086,773
REVERSE ON ALLOWANCES	398,982
PRIOR FUNDS CARRIED FORWARD	1,402,815
ACCOUNTING RESULTS (DEFICIT)	823,684
GRAND TOTAL	16,712,254
Evaluation of in-kind patronage	11,107

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FONDATION MERIEUX

Foundation recognized as being of public utility

17 rue Bourgalat
 69002 LYON

**Statutory auditors' report
 on the financial statements**

Year ended December 31, 2012

This is a free translation into English of the statutory auditors' report issued in French and is provided solely for the convenience of English speaking users. The statutory auditors' report includes information specifically required by French law in such reports, whether mandated or not. This information is presented below the opinion on the Foundation's financial statements and includes an explanatory paragraph discussing the auditors' assessments of certain significant accounting and auditing matters. These assessments were considered for the purpose of issuing an audit opinion on the Foundation's financial statements and are not intended to be used in isolation to provide separate assurance on individual account options or on representations taken outside of the Foundation's financial statements. This report should be read in conjunction with and construed in accordance with French law and professional auditing standards applicable in France.

To the Directors,

In accordance with our appointment as statutory auditor by your Committee, we hereby report to you for the year ended December 31, 2012 on:

- the audit of the accompanying financial statements of FONDATION MERIEUX;
- the justification of our assessments;
- the specific verifications and disclosures required by law.

These financial statements have been approved by the Committee. Our role is to express an opinion on these financial statements, based on our audit.

I. OPINION ON THE FINANCIAL STATEMENTS

We conducted our audit in accordance with professional practice standards applicable in France. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, using sample testing techniques or other selection methods, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made, as well as evaluating the overall financial statement presentation. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a reasonable basis for our opinion.

Député enregistré au répertoire de l'Etat sous le n° 122 489 1
 Société d'expertise comptable créée au profit de l'Etat et soumise à l'impôt sur le revenu
 Société au capital de 100 000 000 euros - Siège social : 17 rue Bourgalat - 69002 Lyon
 SIREN 331 120 120
 Code APE 7420 Z
 Directeur de l'activité : Nathalie LORENZO CASQUET

Deloitte.

FONDATION MERIEUX

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In our opinion, the financial statements give a true and fair view of the financial position and the assets and liabilities of the Foundation as of December 31, 2012 and the results of its operations for the year then ended in accordance with accounting principles generally accepted in France.

II. JUSTIFICATION OF OUR ASSESSMENTS

In accordance with the requirements of article L.823-9 of the French Commercial Code (code de commerce) relating to the justification of our assessments, we hereby inform you that our assessments covered the appropriateness of the accounting policies adopted.

These assessments were performed as part of our audit approach for the financial statements taken as a whole and contributed to the expression of our opinion in the first part of this report.

III. SPECIFIC VERIFICATIONS AND DISCLOSURES

We have also performed the specific verifications provided for by law, in accordance with the professional practice standards applicable in France.

We have no comment to make as to the fair presentation and consistency with the financial statements of the information given in the financial report and in the documents addressed to the Directors with respect to the financial position and the financial statements.

Villeneuve, June 7, 2013

The Statutory Auditor

DELOITTE & ASSOCIÉS

French original signed by Nathalie LORENZO CASQUET

As statutory auditors of FONDATION MERIEUX, we hereby confirm that the above translation of our auditors' report on the financial statements of FONDATION MERIEUX for the year ended December 31, 2012 appropriately reflects the content and opinion of our original report issued in French language.

For identification purposes, we also confirm that the financial statements of FONDATION MERIEUX for the year ended December 31, 2012 show:

- revenues of 8,265,662 euros;
- operating income of 4,648,170 euros;
- net income of 423,684 euros;
- shareholders' equity of 89,416,038 euros;
- total assets and liabilities of 95,100,890 euros.

Continued on next page

Deloitte.

FONDATION MERIEUX

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This is a free translation into English of the statutory auditors' report on the financial statements issued in the French language and is provided solely for the convenience of English speaking users.

The statutory auditors' report includes information specifically required by French law in such reports, whether mandated or not. This information is presented below the opinion on the financial statements and includes an explanatory paragraph discussing the auditors' assessments of certain significant accounting and auditing matters. These assessments were considered for the purpose of issuing an audit opinion on the financial statements taken as a whole and not to provide separate assurance on individual account options or on information taken outside of the financial statements.

This report should be read in conjunction with, and is construed in accordance with, French law and professional auditing standards applicable in France.

Villeneuve, June 7, 2013

The Statutory Auditor

DELOITTE & ASSOCIÉS

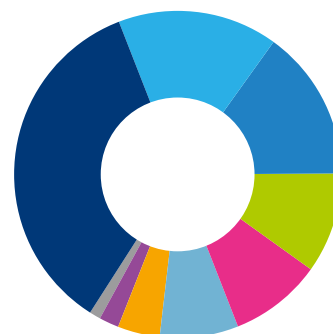

Nathalie LORENZO CASQUET

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► BREAKDOWN OF 2012 INCOME

(excluding provisions and non-recurring items)

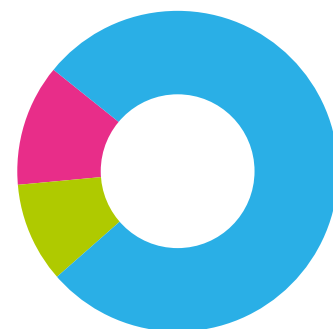
ENDOWMENT INCOME & INVESTMENT	35%
SANOFI PASTEUR SPONSORSHIP AND PARTNERSHIP	16%
PRIVATE PARTNERSHIPS	15%
FONDATION CHRISTOPHE ET RODOLPHE MÉRIEUX	10%
PUBLIC PARTNERSHIPS	9%
REAL ESTATE INCOME	8%
OTHER SPONSORSHIPS	4%
OTHER INCOME	2%
DONATIONS AND LEGACIES	1%



► BREAKDOWN OF 2012 EXPENSES

(excluding provisions and exceptional expenses)

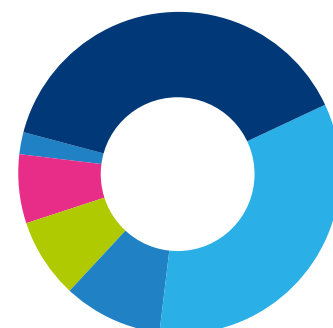
MISSIONS	78%
ADMINISTRATION	12%
FUNDRAISING EXPENSES	10%



► BREAKDOWN OF EXPENSES BY ACTIVITY

(excluding provisions and exceptional expenses)

TRAINING AND KNOWLEDGE-SHARING	39%
COLLABORATIVE RESEARCH PROGRAMS	34%
CLINICAL BIOLOGY LABORATORIES	10%
SUPPORT FOR LOCAL INITIATIVES	8%
INTERNATIONAL EXPERTS	7%
SUPPORT FOR LOCAL STRUCTURES	2%



► GEOGRAPHICAL SEGMENTATION OF ACTIVITIES

EUROPE	40%
<i>(excluding scientific and medical coordination, and international development)</i>	
AFRICA	22%
ASIA	21%
THE CARIBBEAN	8%
INDIAN OCEAN	6%
SOUTH AMERICA	3%



► GEOGRAPHICAL SEGMENTATION OF EMPLOYEES

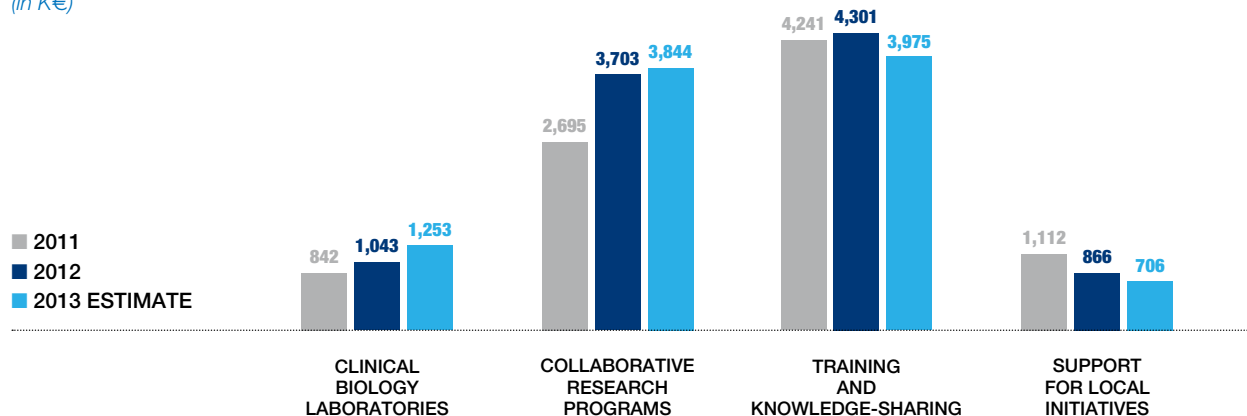
120 employees worldwide

EUROPE	44%
AFRICA	24%
ASIA	18%
INDIAN OCEAN	8%
THE CARIBBEAN	6%



► EVOLUTIONS IN EXPENSES BY FIELD OF ACTIVITY

(in K€)





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