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PRESENTATION OF THE FOUNDATION

CHRISTOPHE & RODOLPHE MÉRIEUX

The world is undergoing profound changes, leading to crises, which impact and multiply in all regions. Whether political, demographic, economic or even climatic in nature, all crises contribute to worsening the health conditions of affected populations, creating an ideal breeding ground for epidemics. Here again, developing countries are the hardest-hit, with mothers and children at the forefront.

This is why the Mérieux Foundation, an **independent family foundation with public interest status**, has been fighting infectious diseases affecting vulnerable populations in developing countries for over 50 years.

Taking a **global health approach**, the Mérieux Foundation looks beyond medical care to address the health and socio-economic issues that compromise the well-being of populations in countries where it operates.

The foundation works side-by-side with **local partners and builds networks** to mobilize the skills and energies necessary to implement effective and sustainable actions.

The foundation works closely with **Fondation Christophe et Rodolphe Mérieux**, an independent family foundation under the aegis of the Institut de France, to sustainably improve the quality of life and health of mothers and children.



Increasing vulnerable populations' access to diagnostics by **strengthening clinical laboratories** in national healthcare systems;

Enhancing local applied research capabilities by creating **Rodolphe Mérieux Laboratories transferred to local partners**, training researchers and developing collaborative programs;

Encouraging knowledge-sharing and public health initiatives working with Les Pensières Center for Global Health;

Improving conditions for mothers and children taking a global health approach.

60% OF CHILD DEATHS IN DEVELOPING COUNTRIES ARE DUE TO INFECTIOUS DISEASE.

>> THE MÉRIEUX FOUNDATION'S PHILOSOPHY OF ACTION

A collaborative dynamic driven by partnerships with local healthcare stakeholders, international organizations, academic research, companies and NGOs; A long-term vision with sustained support leading to autonomy and local ownership of infrastructures and programs; Building networks for international cooperation to share experience and pool skills; A global health approach from humans to animals, taking into account healthcare, but also nutrition, environmental safety, education and socio-economic support for patients.

THE MÉRIEUX FOUNDATION WORLDWIDE

FRANCE

LYON · Headquarters ANNECY • Les Pensières Center for Global Health

TUNISIA

Rodolphe Mérieux Laboratory in Tunis*









Rodolphe Mérieux Laboratory in Bobo-Dioulasso*



MALI

 Rodolphe Mérieux Laboratory in Charles Mérieux Center for Infectious Disease · Mérieux Foundation office: 1 expatriate and 6 Malian employees

> **BURKINA FASO: 2 Burkinabe employees BENIN:** 1 Beninese employee **GUINEA: 16 Guinean employees NIGER:** 3 Nigerian employees **SENEGAL:** 2 expatriates and 4 Senegalese employees TOGO: 3 Togolese employees

One of the main pillars of the Mérieux Foundation lies in its capacity for direct intervention in the field, from the network of 17 laboratories of excellence built at the source of outbreak-prone regions, to the presence of local teams in 14 countries. To carry out its mission, the Mérieux Foundation can rely on its expertise. its great experience in the field and its local partnerships built up over more than 15 years of international development.







Mérieux Foundation offices

TAJIKISTAN

LEBANON

Rodolphe Mérieux Laboratory of Beirut

Mérieux Foundation office: 1 expatriate and 1 Lebanese employee

Mother & Child global health center in Duris

Rodolphe Mérieux Laboratory in Mosul*

BANGLADESH

Rodolphe Mérieux Laboratory in Chittagong

REPUBLIC OF CONGO

DRC

Christophe Mérieux Infectious Disease Research Center

Rodolphe Mérieux Laboratory in Goma

National Public Health Reference Laboratory (NPHRL) in Dushanbe

- Public Health Laboratory in Mandalay
- · Mérieux Foundation office: 15 Burmese employees

CHINA

- Christophe Mérieux Laboratory in Beijing Mérieux Foundation office:
- 1 Chinese employee

LAOS

- Rodolphe Mérieux Laboratory in Charles Mérieux Center for Infectious Disease in Vientiane
- Mérieux Foundation office: 1 expatriate and 6 Lao employees

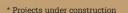
CAMBODIA

- Rodolphe Mérieux Laboratory of Phnom Penh
- · Mérieux Foundation office: 1 expatriate, 1 volunteer, 3 Cambodian employees
- Centre du Docteur Christophe Mérieux Enfants du Mékong



MADAGASCAR

- Rodolphe Mérieux Laboratory in Charles Mérieux Center for Infectious Disease in Antananarivo
- · Mérieux Foundation office: 8 Malagasy employees



BRAZIL · Rodolphe Mérieux Laboratory in Charles Mérieux Center for Infectious Disease in Rio Branco

MÉRIEUX

1 expatriate

HAITI

of Port-au-Prince

FOUNDATION USA

· Rodolphe Mérieux Laboratory

· Mérieux Foundation office: 1 volunteer





4 PRESIDENT'S MESSAGE



Alain Mérieux, President

"The outbreak of an unprecedented pandemic in 2020 serves as a reminder of the persistent threat of infection and the fragility of our world in the face of pathogens that know no borders between countries or species."

his year, the spotlight was on the crucial importance of preventive medicine associating diagnostics and vaccination in the fight against epidemics. The role of our Foundation in supporting biological diagnosis in countries with limited resources was firmly established. This was the vision that Dr. Christophe Mérieux first introduced for our Foundation in 2003. He wanted to set up a network of high-level biological diagnosis laboratories to act as early warning systems for infectious diseases in the field, in the heart of the regions where epidemics emerge.

His vision is now demonstrating its full relevance and effectiveness. In 2020, the Mérieux Foundation proved itself in a particularly difficult context and took an important step forward. The Rodolphe Mérieux Laboratories have been fully operational throughout the pandemic and have been recognized by the World Health Organization and international health authorities for their strategic contribution in many places around the world, including Beirut in Lebanon, Rio Branco in Brazil, Goma in the Democratic Republic of the Congo and Vientiane in Laos.

At the same time, while the crisis was causing havoc to people's health and the economy, we continued our campaigns to help the most vulnerable groups, mothers and their children, in the countries where we operate laboratories. This included setting up a health center in the plains of the Bekaa Valley in Lebanon, as well as a new maternity unit in Mali and a nutritional program for children in Madagascar.

Thanks to the exceptional donation from bioMérieux, which held back half its dividends during the COVID-19 crisis so that it could devote them to public-interest campaigns, the Foundation has been able to consolidate its network and extend it to new countries. This will allow us to open new laboratories in Iraq, Burkina Faso,

Morocco and the Republic of the Congo. We also plan to help our partner Bioforce set up a new training center for humanitarian work in the Middle East.

By 2022, our network will include 17 Rodolphe Mérieux Laboratories in Asia, Africa, the Middle East, Latin America, and Haiti. These laboratories work in association with the international Instituts Pasteur to ensure epidemiological surveillance and better access to healthcare worldwide.

This will allow us to save precious time and to accelerate the implementation of projects that make a crucial contribution to the fight against infectious diseases.

These developments are managed by Jean-Pierre Bosser, who joined the Mérieux Foundation as Director General in October 2019 and has since made a remarkable contribution.

Thanks to his local knowledge and with the help of his team, he has been able to respond to the health emergency by realigning our priorities in a complex crisis situation. He has also consolidated the Foundation's operational structures to allow it to overcome the challenges it has set itself for the years to come. Our Foundation is now in a good position to set up facilities in new territories in order to respond to the healthcare requirements of vulnerable people in an uncertain global environment.

The battle against infectious diseases is never over. We must fight with a long-term global vision in mind and learn all the lessons we can from the current crisis. This crisis has humbled us in the face of a formidable enemy and encouraged us to join forces in a fractured global environment, without losing sight of our ambition to construct the public health system of the future.







Jean Pierre Bosse Director General

"2020, the year of the Mérieux Foundation's operational challenge"

ere we are, more than a year after the start of the COVID-19 epidemic, which violently and suddenly struck the world. In turn, the countries where we operate, both in the field and the headquarters, have been impacted and severely hit. Without any warning, the crisis has imposed many constraints and restrictions on us, although the needs of the countries where we work kept growing.

Faced with this unprecedented situation, the Foundation had to experience many challenges in 2020. It was able to respond to the COVID-19 emergency, while continuing its ongoing programs related to public health issues.

To do so, our teams mobilized actively to pursue the Foundation's mission. They have acted in a context that combined slowdowns and strong accelerations, with no interruption.

This global upheaval has allowed us to put into practice and reaffirm the Foundation's priorities and strategy, in particular providing access to quality diagnosis to the greatest number of people. The importance of diagnosis, the core of our activities in the field, has taken on its full meaning: without it, it is impossible to identify, monitor and therefore control an epidemic.

The ambition to build laboratories at the heart of infectious sites was naturally reinforced by the key role that these structures played "nationally" in the face of the epidemic. On each continent, a Rodolphe Mérieux Laboratory mobilized to provide SARS-CoV-2 diagnosis, but also training for other public health structures. All the Rodolphe Mérieux Laboratories are managed by local scientists and are fully integrated into their national ecosystem to meet health challenges.

To support each of our partner countries in the fight against COVID-19, and to be able to provide an adjusted response, the Foundation has been able to rely on its long-lasting onsite presence, marked by trust and a field-oriented culture (further strengthened in 2020) and its links with local actors. The teams on the ground were thus able to continue the actions initiated before COVID-19, despite severe travel restrictions.

This year also illustrated the bonds of trust and complementarity that the Foundation maintains with its partners, both financial and operational. This support has enabled us to quickly coordinate and strengthen our activities and programs in response to the COVID-19 emergency.

Thanks to our international presence, our partners, our infrastructure networks, the significant mobilization, and versatility of our teams in France and abroad, and the exceptional donation from bioMérieux's shareholders, 2020 has been a year of confirmation and reinforcement of the Mérieux Foundation's international action.

COVID-19: ADDITIONAL RESOURCES AND COMMITMENT IN THE FIELD TO SATISFY LOCAL REQUIREMENTS

The Mérieux Foundation's activities have not been spared by the COVID-19 pandemic, which has played havoc with schedules and led to the reorganization of some projects so that the most urgent needs could be addressed.

This unprecedented health crisis has highlighted the absolute necessity of creating an infrastructure of reliable testing systems in the field, since these are essential requirements for slowing the spread of epidemics. The crisis has also proved the ability of the Foundation's teams to adapt. Their strong local presence alongside our partners has enabled them to react rapidly to the crisis.

The networks of laboratories affiliated to the Foundation in many countries have contributed, sometimes in a highly significant way, to national efforts to diagnose COVID-19.

AN EXCEPTIONAL DONATION GRANTED BY BIOMÉRIEUX **SHAREHOLDERS**

In 2020, the bioMérieux board of directors decided to cut its dividend payments for the year in favor of public interest campaigns, with €12 million being paid out to the Mérieux Foundation. A total of 30 projects in 19 countries with limited resources were initiated thanks to this support, with the dual objective of fighting COVID-19 and strengthening health systems in general. These actions cover the construction and renovation of facilities, the supply of laboratory equipment, training, knowledge sharing, and research.

The initiatives include:

- The construction of a BSL3 Rodolphe Mérieux laboratory dedicated to tuberculosis at the Institut Pasteur in Morocco;
- The expansion of the Charles Mérieux Center for Infectious Disease in Madagascar;
- The purchase of equipment for laboratories in the GABRIEL network;
- Plans to construct a new Bioforce center in the Middle East:
- The allocation of grants to two Bengali students following a training course at the Erasmus University Rotterdam in the Netherlands.

BOOSTING LOCAL TESTING CAPACITIES

As early as January 2020, the Foundation mobilized its resources to support its partner laboratories with limited testing facilities. In total, almost 90,000 testing kits have been sent out in thirteen countries, accompanied by a program for transferring skills.

THE RODOLPHE MÉRIEUX LABORATORIES AT THE HEART OF THE FIGHT AGAINST COVID-19

Designated as national reference laboratories or support laboratories for SARS-CoV-2 testing, several Rodolphe Mérieux Laboratories have played a key role in monitoring the epidemic. In Mali and Madagascar, teams were mobilized as soon as the first warning signs of an epidemic appeared. In Haiti, the Rodolphe Mérieux Laboratory within the GHESKIO centers was guickly requested by the Haitian Ministry of Health to support the National Response Plan and received financial support from the Agence Française de Développement (AFD). Today, it remains one of the most active laboratories in the in the country for the diagnosis of COVID-19. The laboratory in Beirut was commissioned by the Lebanese Ministry of Health to carry out COVID-19 screening alongside the Rafik Hariri University Hospital laboratory. Testing began on 7 March 2020 and the laboratory is now one of five reference facilities appointed by the Ministry of Health.

In Brazil, the Rodolphe Mérieux Laboratory in Rio Branco was the first facility in the state of Acre responsible for COVID-19 testing. The laboratory receives test confirmations for the entire country, as well as tests from border towns in Peru and Bolivia. It now carries out more than 70% of the COVID-19 tests in the state of Acre. In Cambodia, the Rodolphe Mérieux Laboratory has been authorized by the Ministry of Health and the WHO to carry out COVID-19 testing.

In the Democratic Republic of the Congo, the Rodolphe Mérieux Laboratory in Goma has also played a central role in the fight against the COVID-19 epidemic. More than 200 tests are carried out every day as part of surveillance operations for both the local population and travelers (national and international flights).

2020 ANNUAL REPORT FIGHTING COV



SUPPORTING HEALTH PROFESSIONALS

Despite travel restrictions imposed by the health situation, experts at the Foundation have been able to maintain regular contact with laboratory networks, healthcare managers and partners in the field. A webinar dedicated to COVID-19 diagnosis was organized on 15 September 2020. Led by a professor from the London School of Hygiene & Tropical Medicine, the live webinar had 400 participants (see p.38).

The Foundation has also adapted a MOOC (Massive Open Online Course) on COVID-19 diagnosis and translated it into French. This project was managed in collaboration with FIND (Foundation for Innovative New Diagnostics), the ASLM (African Society for Laboratory Medicine), and the London School of Hygiene and Tropical Medicine to help improve the skills of laboratory technicians in molecular screening techniques.

In 2020, there were more people working for the Foundation in the field than at head office. This strong local presence has played a key role, allowing the Foundation to provide emergency support to tackle the crisis, as well as pursuing the development of ongoing projects.

ADAPTING CURRENT PROJECTS

Several projects already initiated have benefited from additional top-up payments or budget reallocation to respond to the COVID-19 emergency. This adaptability owes a great deal to the mutual trust between the Foundation and its funding partners.

It has meant that the RESAOLAB project (see p.25) in West Africa and the LABOGUI project (see p.23) in Guinea have benefited from additional funding from the Agence Française de Développement (AFD), which was used to set up new molecular biology platforms and to improve biosafety. The APRECIT (see p.34) (Cameroon and Madagascar) and EVAMAD (see p.21) (Madagascar) projects have also benefited from additional support from Expertise France, allowing the Foundation to supply protective equipment, reagents and consumables, and training. In Haiti and Myanmar, issues involving access to molecular diagnosis, improving the resilience of laboratory systems, and decentralizing diagnostic capacities have also led to the initiation of new projects.

INITIATING RESEARCH PROGRAMS

Several collaborative research programs targeting COVID-19 were launched in 2020, at the forefront of which is a multicentric study aiming to assess the risk of nosocomial transmission of SARS-CoV-2. Initiated in partnership with the Hospices Civils de Lyon, the NOSO-COR study (see p.32) is being carried out in seven countries on four continents (Mali, Senegal, Ivory Coast, Guinea, Madagascar, Burkina Faso, Bangladesh, Brazil, and Lebanon) and benefits from the financial support of the Bill & Melinda Gates Foundation. The Fondation AnBer supports the element of the study being carried out in the Hospices Civils de Lyon.

Two other COVID-19 research programs were launched in 2020: a study targeting migrants in refugee camps in Bangladesh and Kenya, and a serological study on the immunity status of carers exposed to COVID-19 in Madagascar.

MAINTAINING SUPPORT FOR VULNERABLE POPULATIONS

As well as undermining even the most robust health systems, the health crisis has also rapidly aggravated the difficulties in accessing healthcare for the most vulnerable groups of people. The Foundation has therefore reinforced its commitment to these groups by adapting its support during the COVID-19 crisis. This includes:

- In Madagascar, having supported the Akamasoa association and OSCAPE in the production and distribution of washable masks, the Foundation has also donated personal protective equipment, small equipment, and consumables to partner associations, to support vulnerable and often deprived groups of people.
- In Iraq, the beneficiaries of the Shekan health and social center for Yazidi women and children (see p. 46) have made 20,000 masks, which were then distributed to hospitals, refugee camps and police stations in the region. The profitmaking activities at the center, which are usually devoted to making tahini, were converted to the production of soap, allowing hygiene measures to be respected.
- In Lebanon, the health center in the Beqaa Valley (see p.44), which opened its doors at the beginning of the year, has provided the isolated local population, mainly refugees, with access to testing.



→ ACTIVITIES WITHIN THE GLOPID-R NETWORK

A global initiative aiming to accelerate research activities in response to the threat of epidemics, the GloPID-R program (Global Research Collaboration for Infectious Disease Preparedness, see p.41) has of course been extremely active since January 2020.

Its achievements include the joint organization, with the WHO, of the Global Research and Innovation Forum in February, the identification of research priorities for COVID-19 in nine areas, and the implementation of a project focusing on low-income countries.

OUR PUBLIC HEALTH PRIORITIES IN 2020

FIGHTING TUBERCULOSIS



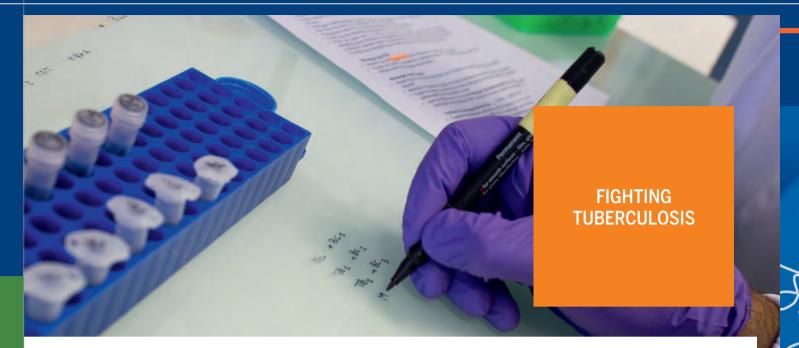
ACTION PLAN ON ANTIMICROBIAL RESISTANCE (AMR)



ACCESS TO TESTS AND SUPPORT FOR PEOPLE **LIVING WITH HIV**



Despite the difficulties caused by the health crisis. important progress was made in 2020 in the priority areas supported by the foundation: antimicrobial resistance, tuberculosis, acute respiratory infections, and the human immunodeficiency virus (HIV). These public health priorities carry a particularly heavy burden in countries with limited resources, and the Mérieux Foundation has reasserted its implementation of a transdisciplinary approach to address them. In the field of acute respiratory infections, this year's programs were mainly aimed at fighting COVID-19 (see p.8).



REINFORCING THE LABORATORIES IN THE GABRIEL NETWORK

The Foundation supports TB diagnosis centers in many different countries: Lebanon, Haiti, Laos, Mali, Georgia, Tajikistan, Ukraine, Bangladesh and Tunisia, all members of the GABRIEL network. The Rodolphe Mérieux Laboratory in Beirut was recognized in 2019 as the National Reference Laboratory for tuberculosis and in 2016 the Charles Mérieux Center for Infectious Disease in Madagascar was recognized as the National Reference Laboratory for leprosy (a disease caused by a bacterium related to the one that causes TB).

RODOLPHE MÉRIEUX LABORATORY IN LEBANON AT THE FOREFRONT

The Rodolphe Mérieux Laboratory, the National Reference Laboratory for tuberculosis in Lebanon, is responsible for the diagnosis and study of resistant forms of the disease. After the explosion in the port of Beirut on 4 August 2020. which destroyed the building housing the National TB Program, the laboratory ensured service continuity by providing primary diagnosis facilities.

The Foundation's actions in the field of tuberculosis aim to improve access to diagnosis and to strengthen research capacity, with two key objectives: to promote access to high-quality diagnosis and technological innovations adapted to the needs of countries with limited resources, and to assess the medical impact of community intervention programs. These actions support the WHO's "End TB" initiative, which aims to reduce the number of deaths related to tuberculosis by 95% and the number of new cases by 90% between 2015 and 2035.

The Mérieux Foundation supports operational research projects involving clinicians, biologists, scientists, community agents and government representatives, with the aim of maximizing the impact of projects to benefit vulnerable populations. Significant resources are devoted to the diagnosis of resistant and multi-resistant forms of the disease, which requires level 3 biosafety installations (BSL3 laboratory). In 2020, the SPHaïtiLAB (see p.27) program published the results of a national epidemiological study on the circulation of resistant strains, based on a collaborative study carried out by 15 peripheral laboratories.

IMPROVING ACCESS TO DIAGNOSIS AND RESEARCH CAPACITY

The HINTT project (see p.33), which was also completed in 2020, led to the identification of a new diagnostic test, which will be subjected to further studies to confirm its benefits in the control of pediatric TB. In Madagascar and Cameroon, the APRECIT project (see p.34) closely combines research activities with a strategy of community intervention, with the aim of improving prevention and care for latent tuberculosis in high-risk groups.

The Mérieux Foundation is committed to combating antimicrobial resistance, initially targeting TB and HIV, as well as responding to the alert issued by the WHO in 2015 (Global action plan on antimicrobial resistance). Its initiatives aim to strengthen surveillance by setting up medical biology laboratories capable of carrying out blood culture and antibiotic susceptibility testing.

Today, the Mérieux Foundation takes an integrated approach, which goes a step further than simply reinforcing microbiological capacity and surveillance systems and includes all aspects of the fight against AMR: a "One Health" strategy dealing with the interdependence of human, veterinary and environmental aspects, an operational approach linked to improvements in the prescription of antibiotics, as well as campaigns to raise awareness of hygiene practices. The projects carried out in Madagascar are representative of this multi-sector commitment, covering the reinforcement of diagnostic capacity, the rationalization of antibiotic prescription, and prevention campaigns amongst the poorest communities.



The Foundation supports the RESAMAD network in Madagascar, which collects the majority of the island's AMR data via the WHO's Global Antimicrobial Resistance Surveillance System (the GLASS platform). Thanks to financing from the Fleming Fund (a UK Aid program to fight AMR), the Foundation also supports nine laboratories in Laos and Myanmar. In Senegal, the Fellowship Scheme will enable surveillance to be improved thanks to the implementation of a mentoring program (involving experts from the Foundation, the APHP and VetAgro Sup). Another educational project supported by the Fleming Fund is the OWArS program, which aims to develop the ongoing training of laboratory staff and epidemiologists involved in AMR surveillance in 17 countries in Africa and Asia.

ONE HEALTH APPROACH

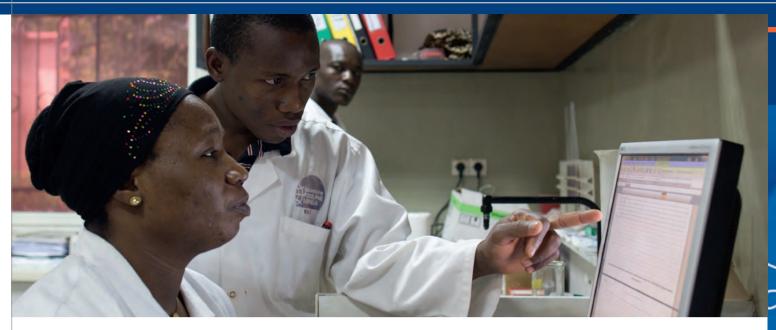
The Foundation is involved in the TRICYCLE study (see p.35), a WHO surveillance program to determine the prevalence of a key resistance indicator (Enterobacteriaceae-producing extendedspectrum beta-lactamases) in the human population, the food chain and the environment. The study began in Madagascar with start-up funding from the Foundation and benefits from the microbiological expertise of the Rodolphe Mérieux Laboratory in Antananarivo. It will be extended to several other countries thanks to European funding (JPI-AMR) obtained in 2020 through the TRIuMPH project.

REASONABLE USE OF **ANTIBIOTICS**

In 2020, the Foundation launched the TSARA project (see p.35) in five hospitals in Madagascar. The project aims to use laboratory data to adapt the prescription of antibiotics by clinicians. TSARA has a dual objective: to improve patient care by administrating the appropriate antibiotics, thereby preventing the appearance of new types of resistance. This is an innovative project with a concept that will be rolled out to other countries in which the Foundation operates.

EDUCATIONAL DIMENSION

The Mérieux Foundation takes part in several initiatives to raise awareness of hygiene rules with an impact on antibiotic resistance: campaigns in association with authorities and local networks supporting children and their families with health issues relating to everyday life, such as the distribution of educational kits in Madagascar (see p.45), or the "La main à la pâte" project in Mali (a hands-on project to design self-teaching tools for teachers in the member countries of the GABRIEL network, see p.46).



ACCESS TO TESTS AND SUPPORT FOR PEOPLE LIVING WITH HIV

The Mérieux Foundation is committed to the field of HIV viral load guantification, which not only allows patients to be monitored and to have their treatment adapted, but also contributes towards reducing the risk of resistance to antiretroviral treatments and slowing the transmission of the virus. In Laos, Madagascar and Myanmar, the Foundation's support for programs to improve access to HIV viral load testing contributes towards achieving the UNAIDS 95-95-95 objectives by 2030, particularly the objective of having an undetectable viral load for 95% of people on antiretroviral therapy.

IMPROVING ACCESS TO VIRAL LOAD TESTING

In Madagascar, the Foundation has been active in this field since 2015 and launched the EVAMAD project in 2020 (see p.21). Supported by Expertise France, the project aims to increase the coverage of HIV viral load testing, whilst rationalizing the use of the diagnostic tools available in the country. Additional funding has been supplied to help treatment centers ensure continuity of care despite the COVID-19 epidemic, and a study on HIV/COVID-19 co-infection has been set up. In Laos, the Center of Infectiology Lao Christophe Mérieux in Vientiane is the national reference center for HIV screening. Between 2011 and 2020, it provided viral

load tests and screening for sensitivity to antiretroviral drugs for all people living with HIV in the country, thanks to a partnership with the National HIV Program and the support of the Global Fund. These tests will be decentralized from 2021.

HIV PREVENTION AND SCREENING

At the same time, the Foundation supports projects to improve the diagnosis of infectious diseases in people living with HIV, who are particularly susceptible to opportunistic infections, as well as prevention campaigns and programs offering assistance to those living with HIV. In Madagascar, the Foundation works with

the local Akamasoa association (see p.45) and helps to raise awareness of HIV screening (1,800 women tested by the association in 2020) and to introduce educational campaigns on reproductive health and the prevention of sexually transmitted diseases. In Haiti, the Foundation is involved in an initiative supporting the economic integration of women living with HIV (see p.47), alongside ACME, the Association for Cooperation with Micro-Companies, and GHESKIO, one of the Foundation's longterm partners. The project is based on the granting of microcredit and support for setting up profitable businesses. In 2020, 576 people benefited from a loan.

USING LABORATORY SYSTEMS TO REINFORCE DIAGNOSIS CAPACITY FOR THE LONG TERM

LABORATORY
SYSTEMS FOR THE
RATIONALIZATION AND
COORDINATION OF
ANALYSIS SERVICES

- Even distribution to serve populations throughout the territory;
- Shared organization and centralized management;
- A network with several levels offering all the essential diagnosis services, the transfer of samples and capacity for surveillance and research:
- A strategy for setting up diagnosis platforms to suit the requirements and situation of each country, in order to respond to the issues they face.

Working on infrastructure and staff skills is an essential part of the process when it comes to reinforcing laboratory capacity in countries with limited resources. But it is not enough.

To ensure that financial and human efforts bear fruit in the long term, laboratory services need to be well-organized, with defined roles for each level of the healthcare system. The objective is to optimize the available resources in each geographical area.

Drawing on more than 20 years of experience in supporting laboratories, the Mérieux Foundation now systematically supports the governance and structuring of reliable and durable laboratory systems.

The Mérieux Foundation works towards the setting up of reference laboratories of excellence, Rodolphe Mérieux Laboratories, and the development of a network of peripheral laboratories in contact with patients. Rodolphe Mérieux Laboratories offer biological diagnostics and epidemiological surveillance. As expert laboratories, they have technology platforms for molecular biology and are capable of handling the most complex analyses.

In both cases, the Foundation works closely with local health authorities to fulfil requirements in the best possible way and to make decision-makers aware of the importance of structuring laboratory activities and setting up a directorate in charge of laboratory services, since they represent a key component of national healthcare systems.

SUPPORTING NATIONAL POLICIES FOR LABORATORIES

In West Africa, with the RESAOLAB program (see p.25), for example, the Foundation has initiated a regional network for sharing practices and data, key elements when it comes to effective epidemiological surveillance. As part of the third phase of the project launched in 2020, having already reinforced the regional and national governance of laboratory systems by supporting the creation of Laboratory Directorates, the Foundation has set itself the objective of strengthening its advocacy of the importance of countries allocating an adequate operational budget to these management teams, in order to ensure their autonomy.

A new regional surveillance project, SEALAB (see p.20), was launched in South-East Asia (Laos, Cambodia and Myanmar) in 2020 with the aim of supporting national laboratory policies and coordinating their regional structuring. In Guinea, the Foundation has been supporting the Ministry of Health since 2017 in defining and implementing a National Medical Biology Policy (financed by the Agence Française de Développement). The project relies on the National Laboratory Department and its 34 regional laboratories.

In Madagascar, support for the RESAMAD laboratory network, set up in 2006, was widened in 2020 to include a separate element devoted entirely to developing a network for the surveillance of infectious diseases. Financed by USAID, this involves drawing up a strategic development plan for laboratories, working closely with the Ministry of Public Health.

COORDINATING SKILLS AND RESOURCES

In Laos, the Foundation has supported the creation of a network of laboratories in the province of Bolikhamxay. The BOLi-LAB project covers six district laboratories overseen by a provincial laboratory, itself part of the national network managed by the National Center for Laboratory and Epidemiology, which is heavily involved in the definition of requirements. This level of coordination provides each entity with visibility and offers better capacity for surveillance, planning and response. Its success led in 2020, to the extension of this project by 12 months.

In the Democratic Republic of the Congo, the Rodolphe Mérieux Laboratory in Goma started operating in 2020. Initially opened as an emergency measure to prevent the spread of the Ebola epidemic, it also helps with the diagnosis of SARS-CoV-2 in the east of the country and fulfils its role as an outpost laboratory under the supervision of the National Institute of Biomedical Research in Kinshasa.

There are many more examples, and the projects supported by the Foundation reflect various levels of maturity. They all share the ambition of positioning the laboratory as an essential link in the healthcare chain, which is mobilized and recognized as such.



Biological diagnosis is the first stage in providing efficient patient care, as well as playing a key role in the surveillance and control of epidemics, as the health crisis of 2020 so brutally reminded us. By reinforcing capacity for biological diagnosis, the Mérieux Foundation provides material, human and structural support, with the aim of guaranteeing a strong network of laboratories in countries with limited resources.

Since the beginning of the 21st century, the Mérieux Foundation has been committed to improving access to biological diagnosis, firstly in Mali and Cambodia and then in Madagascar, Laos, and, today in more than 20 countries. This area of work is the Foundation's main activity and helps to establish high-quality laboratories, involved in diagnostic testing, surveillance for infectious diseases and the fight against antimicrobial resistance. In 2020, these laboratories proved capable of dealing with the crisis and absorbing the increase in diagnosis capacity required to deal with COVID-19.

OPERATIONAL EXPERTISE IN LABORATORY DESIGN AND RENOVATION

The Mérieux Foundation has developed solid expertise in strengthening laboratory infrastructure and is involved in many construction or renovation projects in collaboration with local authorities, associations, and national and international institutions.

As well as creating the environments needed for biological testing (infrastructure, equipment, IT systems, waste management, etc.), the Foundation focuses on developing the skills of laboratory personnel to optimize the potential of these facilities. It also supports the management and efficiency of laboratories to guarantee their autonomy and their key role in healthcare systems. The Foundation also works alongside national health authorities to contribute towards the consolidation of laboratory systems in order to maximize the impact of laboratory activities on public health (see article on p.16).

2020, A YEAR OF ACCELERATION

The year 2020 highlighted the key role played by biological diagnosis, as illustrated by the WHO director general's "test, test, test" slogan at a time when the COVID-19 pandemic was disrupting treatment facilities even in countries whose healthcare systems are among the most robust in the world. It was also a year in which the term PCR* test became widely used and these tests became democratized in developing countries, where their introduction was still in its infancy.

In this way, several of our projects supporting diagnostics found themselves at the heart of the fight against COVID-19 in 2020, and benefited from additional funding granted by our partners (see the article on p.8). This significant effort in the name of COVID-19 also led to a general strengthening of laboratory capacity. At the same time, the Foundation's teams made every effort to ensure the continuity of ongoing projects, including access to laboratory services to monitor people living with HIV and for tuberculosis treatment.

SEALAB SOUTH-EAST ASIA





CONSTRUCTION OF A NETWORK OF LABORATORIES

Launched in 2020 with the financial support of the Australian government (Department of Foreign Affairs and Trade's Indo-Pacific Centre for Health Security), SEALAB is a regional health surveillance project carried out in three South-East Asian countries: Laos, Cambodia and Myanmar. The objective of this project is to reinforce laboratory systems so that they can participate effectively in preventing and responding to emerging infectious diseases, particularly zoonotic diseases with the potential to cause epidemics.

SEALAB is based on the principle that laboratories are the cornerstones of healthcare systems and that it is vital to go beyond the material aspects and encourage the building of networks and the interlinking of the various structures. Working in close collaboration with the designated ministries and institutions in each country, SEALAB therefore helps to support the laboratories' national policies (supervision, mentoring, practical training, data management etc.) as part of a global healthcare process, since the project targets both human and animal healthcare laboratory networks.

In 2020, missions to evaluate laboratory systems were finalized in Cambodia and in Laos. Personal protective equipment was supplied, in order to support the countries' efforts in confronting the COVID-19 pandemic. SEALAB is a joint project with the IQLS (Integrated Quality Laboratory Services) agency and the NRL Science of Quality laboratory in Australia.







The objective of the EVAMAD project is to improve the management of HIV for people living with the virus in Madagascar, by expanding access to HIV viral load testing. Introduced for a period of three years, the project contributes towards achieving the 95-95-95 targets set by UNAIDS, and in particular the objective of 95% of people receiving antiretroviral treatment having an undetectable viral load by 2030. Before the project was set up, the capacity for viral load testing covered 39% of requirements.

EVAMAD helps to reinforce viral load sampling circuits and create new circuits in order to ensure efficient coverage of the island. It also relies on the national tuberculosis program to carry out urgent viral load tests (pooling of GeneExpert equipment), particularly for pregnant women and newborn babies. Continuous training/information is also provided for prescribing practitioners, biologists and associations by organising meetings, distributing treatment guidelines and monitoring viral load testing at each diffe-

Funded by the Expertise France Initiative, EVAMAD operates in collaboration with the Ministry of Public Health, the Charles Mérieux Center for Infectious Disease in Antananarivo, the National AIDS Committee, the NGO MAD'AIDS, UNAIDS and the RESAMAD network of laboratories.

In 2020, sampling kits were distributed by the Mérieux Foundation. To support the authorities' efforts in dealing with the COVID-19 pandemic, the EVAMAD project benefited from an additional grant from Expertise France. Healthcare staff and patients were provided with personal protective equipment (4,000 FFP1 masks, 3,000 FFP2 masks and 20,000 bottles of hydroalcoholic gel). A study has also begun into HIV/COVID-19 co-in-

Finally, in December 2020, the first meeting of the EVAMAD project's International Steering Committee was held at the office of the national AIDS committee (SE-CNLS or Secrétariat Exécutif du Comité National de Lutte contre le Sida).



According to UNAIDS estimates, the number of people living with HIV in Madagascar in 2019 was 39,000.

Of these, only 5,700 knew their serological status, with 5,200 benefiting from antiretroviral therapy and around 2,000 already having had access to at least one viral load test.



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CONTAINER LABSDRC



LAUNCH OF LABORATORY ACTIVITIES IN GOMA

As part of the response to the Ebola epidemic, three prefabricated container laboratories were shipped to Goma in 2019 at the request of the health authorities. They were set up in response to the health risk that the Ebola epidemic posed to the third largest city in the Democratic Republic of the Congo. These laboratories can supply diagnostics and biological monitoring for patients with the help of a secure, high-speed platform. They also give the National Institute of Biomedical Research (INRB) in Kinshasa, a benchmark facility in the country, the benefit of an operational base located 1,500 km (932 miles) from the capital.

In 2020, teams from the INRB Rodolphe Mérieux Laboratory in Goma and several members of the INRB in Kinshasa were trained by teams from the Mérieux Foundation to support biological diagnosis activities, including molecular diagnosis tests for COVID-19. The laboratory has since remained fully operational and the health crisis has underlined its strategic importance when it comes to responding to emergencies: during the second half of the year, around 7,000 COVID-19 tests were carried out at this laboratory. The project was financed as part of a partnership involving USAID (United States Agency for International Development), the French government via CDCS (Crisis and Support Centre), Institut Mérieux, bioMérieux, Fondation Christophe et Rodolphe Mérieux, the Mérieux Foundation and the Mérieux Foundation USA.







IMPLEMENTATION OF A NATIONAL MEDICAL BIOLOGY POLICY

Since 2017, the Agence Française de Développement (AFD) has entrusted the implementation of a project to support the Guinean Ministry of Health in defining a National Medical Biology Policy to the Mérieux Foundation and the Institut Pasteur in Guinea. The LABOGUI project covers 39 district and regional laboratories and is based on two areas of progress: the renovation of installations and the harmonization of professional laboratory practices. These activities are deployed in collaboration with the National Laboratory Directorate and the project coordination unit at the Ministry of Health.

Renovation work and training continued in 2020, in accordance with the improvement plans drawn up in 2018. The progress made includes a laboratory extension, the installation of automatic biochemistry and hematology machines, coaching for national technical assistants, training on bench techniques, adoption of LabBook (free laboratory data management software), etc. Teacher training was also provided for staff at the École Nationale de Santé (National Health School) in Kindia in partnership with the NGO Biologie Sans Frontières.

As part of the fight against COVID-19, emergency assistance was provided in 2020 with funding granted by the Agence Française de Développement:

- Extension of PCR diagnostics for COVID-19 in three healthcare regions of Guinea (Labé, Kankan and Nzérékoré);
- Organization of training in taking samples;
- \blacksquare Supply of protective equipment, reagents and laboratory consumables;
- Acquisition of motorbikes for transporting samples.



AMR SURVEILLANCE MYANMAR



FLEMING FUND PROJECT

Working alongside the government in Myanmar, the objective of the Fleming Fund project is to reinforce local capacity in the fight against antimicrobial resistance. The project was launched in January 2020 for a period of 24 months in collaboration with the National Health Laboratory (NHL) in Myanmar and the British engineering firm Mott McDonald.

The aim of the project is to support the NHL in its role as the main laboratory combating antimicrobial resistance (AMR), in line with the AMR surveillance strategy and national protocols, and to reinforce bacteriology capacity at six major hospital laboratories in order to improve patient care. These activities will then lead on to the development of the network of laboratories around the NHL.

In 2020, experts at the Foundation assessed the current situation of the National Health Laboratory and the six outpost laboratories. The renovation plans and equipment lists have been validated and a tender process has begun. In terms of skills enhancement, training courses that were not able to go ahead because of the health crisis were instead held online, thanks to the creation and adaptation of digital content made available on a Moodle platform.









■ WEST AFRICA

WITH RESAULAB

The first regional network of laboratories to be developed in West Africa, the RESAOLAB initiative was renewed in 2019 with the support of the Agence Française de Développement (AFD). Its objective is to pursue the development of medical biology in its seven member countries (Benin, Burkina Faso, Guinea, Mali, Niger, Senegal and Togo), whilst also improving regional cooperation, the surveillance of antimicrobial resistance and the quality of biological monitoring for HIV and tuberculosis.

Its main activities in 2020 focused on the response to the COVID-19 epidemic. The Laboratory Directorates were all in great demand from the health authorities in their respective countries, demonstrating the relevance of structuring efforts carried out since the launch of the network in 2009. Thanks to additional financing from the AFD, emergency assistance was provided: protective equipment, reagents, consumables and key information on testing COVID-19 with the translation into French of the COVID-19 MOOC (Massive Open Online Course) created by FIND (Foundation for Innovative New Diagnostics) and the London School of Hygiene and Tropical Medicine (LSHTM).

The International Steering Committee meeting went ahead in Senegal in November 2020, allowing countries to share their experiences after this year of intense efforts. RESAOLAB is managed in partnership with the Ministries of Health of its seven member countries and with the support of the WHO Regional Office for Africa and the West African Health Organization (WAHO).



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OTHER **PROJECTS**

OUALITY INITIATIVE GUARANTEEING RELIABLE RESULTS FROM LABORATORY TESTS

The Mérieux Foundation's Quality Initiative is a program providing support for member laboratories of the GABRIEL network to set up a quality management system. It is based on the international ISO 15189:2012 standard specific to medical analysis and biology laboratories, and it pays particular attention to the development of best practices in biosecurity and biosafety.

This year, the Rodolphe Mérieux Laboratory at the Charles Mérieux Center for Infectious Disease in Mali was awarded accreditation for the ISO 15189:2012 standard by the Moroccan Accreditation Service (SEMAC). underlining its compliance with the requirements for quality and expertise in its biochemistry, hematocytology, infectious serology and bacteriology activities. In 2020, the initiative also welcomed a new member: the Rodolphe Mérieux Laboratory in Phnom Penh, Cambodia. The second session of the MOOC (Massive Open Online Course) on quality management provided by the Mérieux Foundation in partnership with AFNOR and the Institut Pasteur began in October, in French and English, and brought together more than 3,000 participants from over 70 countries.

REDISSE REGIONAL DISEASE SURVEILLANCE SYSTEMS ENHANCEMENT

Following the success of the first phase in five African countries (Guinea, Guinea-Bissau, Liberia, Sierra Leone and Togo), the REDISSE project was renewed in 2020 to benefit five new countries: Benin, Mali, Mauritania. Niger and Nigeria. Funded by the World Bank through the West African Health Organization (WAHO), the project has once again been entrusted to the Mérieux Foundation and the Canadian NGO Center for International Cooperation in Health and Development (CCISD). The project is based on the creation of 53 epidemiology surveillance centers, and includes the reinforcement of skills, the provision of IT equipment and the development of networks. The project's activities started during the third guarter of 2020 with the organization of meetings with the health authorities of the five countries concerned. The first assessments were launched during the last quarter of the year.

NINE MEMBER LABORATORIES OF THE QUALITY **INITIATIVE IN 2020**

HAITI: GHESKIO Centers (Haitian Group for the Study of Kaposi's Sarcoma and other Opportunistic Infections)

LAOS: Center of Infectiology Lao Christophe Mérieux in Vientiane

MALI: Charles Mérieux Center for Infectious Disease of Mali in Bamako

PARAGUAY: Molecular Biology and Biotechnology Department, Health Research Institute at the National University of Asunción

BANGLADESH: Rodolphe Mérieux Laboratory of Chittagong

LEBANON: Rodolphe Mérieux **Laboratory of Beirut**

MADAGASCAR: Charles Mérieux **Center for Infectious Disease** of Madagascar in Antananarivo **MOROCCO:** Institut Pasteur

in Casablanca

CAMBODIA: Rodolphe Mérieux Laboratory in Phnom Penh



G5 SAHEL ALLIANCE FOR BIOSECURITY AND BIOSAFETY IN SAHEL

The G5 Sahel Alliance aims to develop capacity to react to biological threats in the G5 Sahel countries: Mali, Burkina-Faso, Mauritania, Niger and Chad. It is based on training and deployment exercises for the mobile laboratories of the Charles Mérieux Center for Infectious Disease in Bamako, with the aim of establishing their capacity for use by rapid intervention teams. Two deployments were carried out in Mali in 2020 as part of the fight against the COVID-19 pandemic: one in Timbuktu and the other in Mopti in the middle of the country. Support was also provided (training in diagnosis, supply of testing kits).

The project is run by the Mérieux Foundation, the Charles Mérieux Center for Infectious Disease, the German Federal Enterprise for International Cooperation (GIZ), and the Bundeswehr Institute of Microbiology in Munich, as part of the German "Enable and Enhance Initiative" funded by the German Ministries of Foreign Affairs and Defense. The other stakeholders are: the National Research Institute for Public Health in Mauritania, the Muraz Center/INSP in Burkina Faso, CERMES in Niger and the Ministries of Health in the G5 Sahel countries.

▶ FACILITATING **ACCESS TO HIGH-QUALITY** DIAGNOSTIC TESTS

2020 marked the inauguration of the diaTropix platform, a production unit for diagnostic tests that was built on the Institut Pasteur campus in Dakar. This 300 m² non-profit facility aims to produce high-quality rapid tests at accessible prices for African countries with limited resources. An initiative developed by the Institut Pasteur in Dakar, the Mérieux Foundation, the Foundation for Innovative New Diagnostics (FIND) and the French National Research Institute for Sustainable Development (IRD) in partnership with MOLOGICS and bioMérieux, for the diagnosis of neglected tropical diseases, the platform has also been used to produce COVID-19 tests.

SPHAÏTILAB DEFINITION OF A NATIONAL PUBLIC HEALTH STRATEGY

After five years, the SPHaïtiLAB project was completed in 2020. It has enabled the formalization of several structural elements forming the basis of a public health strategy a National Health Research Policy, a National Strategic Plan for the Laboratory System, a National Quality Plan and a National Initial and Continuing Training Plan. The project has also played a major role in reinforcing laboratory and data management skills. Significant progress has also been made in the biological diagnosis of tuberculosis.

SPHaïtiLAB was led in partnership with the GHESKIO Centers (Haitian Group for the Study of Kaposi's Sarcoma and other Opportunistic Infections), the African Institute of Public Health in Burkina Faso and the Mérieux Foundation.





Strengthening research capacity in countries with limited resources is an essential prerequisite for implementing public health initiatives aligned with national priorities. With a strong local presence thanks to its network of partner laboratories and expertise in the field, the Mérieux Foundation supports the upgrading of infrastructures and skills.

Its objective is to ensure the autonomy and continuity of applied research structures in these countries.

The Mérieux Foundation works to facilitate and develop applied research programs in developing countries through collaborations with public and private research institutes on an international or local scale. It runs the GABRIEL network of laboratories of excellence located in infectious disease hotspots, with many members having been named as reference laboratories in their respective countries. In this respect, they play a key role in the control and surveillance of the COVID-19 pandemic (see the article on p. 8).

PRIORITY FOR WIDE-REACHING, LONG-TERM INITIATIVES

Following a period of significant growth over the past ten years, and its contribution to the development of a vast network of scientific expertise, particularly through the creation of the Rodolphe Mérieux Laboratories and the GABRIEL network, the Mérieux Foundation realigned its scientific strategy in 2020 to focus on the continuity of its actions to improve access to diagnosis (see p.18) and those directly benefiting developing countries.

Priority is therefore given to pivotal research initiatives helping to:

- Promote access to diagnostics and diagnostic innovation;
- Strengthen research capacity in direct association with the most vulnerable communities;
- Support community intervention projects with an impact on the prevention and treatment of infectious pathologies, particularly in children, in the most disadvantaged countries and communities.

This strategy illustrates the desire to decompartmentalize the Foundation's actions and capitalize on the expertise developed around three priority areas: acute respiratory infections, tuberculosis and antimicrobial resistance.

ENCOURAGING THE AUTONOMY OF RESEARCH INSTITUTIONS

ACADEMIC COLLABORATIONS

In 2020, the Mérieux Foundation consolidated the research skills it needs to reinforce the capacity of teams in the Global South, by establishing strategic collaborations with academic researchers in three main areas:

- Antimicrobial resistance with a team led by Jean-Yves Madec at Anses (French national agency for food, the environment and work), a reference laboratory for the FAO (UN Food and Agriculture Organization) and the OIE (World Organization for Animal Health);
- Tuberculosis with a team led by Oana Dumitrescu and Florence Ader from the Hospices Civils de Lyon, with expertise in basic, translational and clinical research recognized by the international scientific community;
- Acute respiratory infections
 with a team led by
 Manuel Rosa-Calatrava and
 Bruno Lina from
 the VirPath laboratory
 (Université Claude Bernard, Lyon),
 a team with a reputation in
 pathophysiological and clinical
 research into respiratory infections
 and the analysis of new antivirals
 research, which is linked to
 the main national center for
 respiratory viruses.

In 2020, the Foundation also reaffirmed its desire to use local scientific ecosystems to accelerate the transfer of innovation to countries in the Global South and to strengthen research capacity in the countries in which it operates. With the closure of the Emerging Pathogens Laboratory in Lyon, the Foundation is refocusing its commitment on boosting local facilities, autonomy and new initiatives taken by Rodolphe Mérieux Laboratories and other members of the GABRIEL network.

Its technical and scientific expertise has therefore been realigned to focus on collaborative work: close ties have been established with three academic teams working on North/South programs, who have international reputations in their respective fields (see box). These collaborations aim to capitalize on synergies in terms of expertise (the Foundation's local expertise and the academic partners' technical, scientific and medical expertise) in order to optimize the relevance of research programs and their impact on the health of populations.

QUARRAISHA ABDOOL KARIM, 2020 WINNER OF THE CHRISTOPHE MÉRIEUX PRIZE



The 2020 Christophe Mérieux Prize was awarded to Quarraisha Abdool Karim for her work on the prevention and treatment of HIV in South Africa. An infectious diseases epidemiologist, Quarraisha Abdool Karim is Associate Scientific Director of CAPRISA (Centre for the AIDS Programme of Research in South Africa).

Her research concentrates on understanding the evolution of the HIV-Aids epidemic and on prevention amongst young women, who represent 60% of people infected by the virus in South Africa.

The Christophe Mérieux Prize, worth €500,000, is awarded each year to a researcher working on infectious diseases in developing countries by the Fondation Christophe et Rodolphe Mérieux. The prize winner is selected by the Institut de France based on a proposal by the Mérieux Foundation.



GABRIEL NETWORK

THE GABRIEL NETWORK IN FIGURES

- 30 collaborative studies, 14 of which are still under way
- 712 publications between 2012 and 2020, including 47 collaborative publications
- 900 people trained (57 tutorial training sessions and 49 training workshops)
- 7 laboratories accredited under the ISO 15189/17025 quality standard

SUPPORT FOR YOUNG RESEARCHERS

For the second year in succession, the Mérieux Foundation launched a call for funding applications for PhD research grants within the GABRIEL network (€15,000/year for three years).

In 2020, the grant was awarded to Dalal Nour at the Microbiology, Health and Environment Laboratory at the University of Tripoli in Lebanon.

Her PhD thesis is on the characterization of SARS-CoV-2 lineages circulating in the north of Lebanon. The Foundation's scientific and medical activities rely heavily on the international GABRIEL network (Global Approach to Biology Research, Infectious diseases and Epidemics in Low-income countries). The network is made up of laboratories of excellence in developing countries and helps to strengthen research capacity through the development of collaborative studies, technology transfer, the organization of training courses and the sharing of experience. It is also directly involved in improving surveillance and research capacity for infectious diseases with a major impact on public health.

The GABRIEL network has 20 members in 16 countries across four continents: height Rodolphe Mérieux Laboratories (set up by the Mérieux Foundation with support from Fondation Christophe et Rodolphe Mérieux), plus public and private academic research institutes at universities and hospitals. The Institute of Tropical Medicine at the University of São Paulo in Brazil joined the network in 2020. It will work closely with the Rodolphe Mérieux Laboratory in Rio Branco in the state of Acre, offering its support in the field of arboviruses.

A webinar was organized in December 2020 to cover four subjects of shared interest: how to prepare for the next epidemic, pediatric vaccination, vaccines against tuberculosis and the fight against antimicrobial resistance during a pandemic.

ENCOURAGING INTERNATIONAL SCIENTIFIC COLLABORATION

To support the structuring of the GABRIEL network around three priority areas of research (respiratory infections, antimicrobial resistance and tuberculosis) and to combine the skills of the Foundation's "research" and "diagnostic" networks, a call for applications was launched in 2020 to finance collaborative projects involving at least three members of GABRIEL and of the West African Network Of Medical Biology Laboratories, RESAOLAB. Two projects have been selected and will be awarded seed funding of 600,000.





ACUTE RESPIRATORY INFECTIONS

NOSO-COR PROJECT: ASSESSING THE RISK OF NOSOCOMIAL TRANSMISSION OF COVID-19

To address the high circulation of COVID-19 within healthcare institutions, the Mérieux Foundation and the Hospices Civils de Lyon developed the NOSO-COR research protocol to assess and reduce the risk of nosocomial transmission. This is a non-interventional prospective study in a hospital environment, aiming to map the circulation of the SARS-CoV2 virus and identify chains of transmission and risk factors to enable preventive measures to be defined.

The project was launched in March 2020 in France and seven countries in Africa, Asia, Latin America and the Middle East: Bangladesh, Brazil, Ivory Coast, Guinea, Lebanon, Madagascar and Mali. The Mérieux Foundation is managing the worldwide roll-out of the protocol with the support of the Bill & Melinda Gates Foundation, and the Hospices Civils de Lyon are responsible for implementation in eight French university hospitals thanks to funding from the Fondation AnBer and a one-off donation from bioMérieux dividends.

In 2020, the investigator sites fulfilled their intermediate recruitment objectives, and a centralized data management system was introduced. This work has already led to the publication of two scientific papers.

LARI-ROHINGYAS: ANALYZING THE ORIGINS OF RESPIRATORY INFECTIONS IN HUMANITARIAN CRISES

Launched in 2018 on the initiative of the Mérieux Foundation, the LARI-ROHINGYAS study sets out to examine the etiology of respiratory infections in Rohingya refugee camps in Bangladesh. The objective is to assess risk factors, compare diagnostic performances and improve patient care, in particular by reducing the unnecessary prescription of antibiotics. An additional element allowing the study of the circulation of Sars-CoV-2 (retrospective evaluation of the biobank) was added in 2020. The LARI-ROHINGYAS study is conducted in collaboration with the Ministry of Health of Bangladesh, icddr,b (International Center for Diarrheal Disease Research), ideSHi (Institute for Developing Science and Health Initiatives), BITID (Bangladesh Institute of Tropical and Infectious Diseases) and the International Organization for Migration (IOM).





TUBERCULOSIS

HINTT PROJECT: MULTICENTRIC EVALUATION OF DIAGNOSTIC TOOLS FOR TUBERCULOSIS

HINTT is the first multicentric study of tuberculosis developed by the GABRIEL network. Funded by the Fondation Christophe et Rodolphe Mérieux and the Fondation AnBer, it aims to assess new approaches to diagnosis leading to improvements in the screening and monitoring of vulnerable populations infected by Mycobacterium tuberculosis. The study includes in-depth laboratory analyses carried out in laboratories in five countries (Bangladesh, Georgia, Lebanon, Madagascar and Paraguay), as well as more exploratory aspects carried out in France at the International Center for Infectiology Research in

The approach is based on the examination of innovative diagnostic solutions which will allow a distinction to be made between patients who will respond well to the four-drug combination recommended by WHO

and those who will need to follow a different course of treatment. Initial results published in 2020 show that a high number of white blood cells and a low production of lymphocytes are associated significantly with the risk of failure of the standard treatment for tuberculosis. This means that testing blood counts at the start of treatment could help to monitor subjects at risk of the treatment failing.

In 2020, a new diagnostic test using molecular biology developed by the SATVI (South African Tuberculosis Vaccine Initiative) was rolled out to laboratories in five member countries of the GABRIEL network. Evaluation results confirm the reliability of this solution and underline the importance of evaluating its performance in the screening of children.

⇒ "FND TB" STRATEGY

- Tuberculosis (TB) remains the number one infectious killer worldwide. In 2019, 10 million people contracted the disease and 1.4 million died (including 200,000 people with HIV).
- The HINTT project is part of the "End Tuberculosis" international strategy for fighting TB. Defined by WHO, the strategy aims to reduce the number of deaths by 95% and the number of new cases by 90% by 2035.
- The screening of latent forms (without any clinical signs) of the disease, which affects about a quarter of the world's population, is a key intervention strategy since 10% of those affected will go on to develop the disease at some point in their lives, with increased probability of contracting it within 6 months to a year for young children or people living with HIV.



TUBERCULOSIS

APRECIT: IDENTIFYING THE BEST SCREENING STRATEGIES FOR LATENT TUBERCULOSIS

Financed by the Expertise France Initiative, the APRECIT study is coordinated by the Mérieux Foundation, the Centre Pasteur in Cameroon and the Institut Pasteur in Madagascar. It is based on the introduction of a community screening program for latent

tuberculosis infections in Cameroon and Madagascar. This work involves identifying and following up contacts within families of active tuberculosis cases, in line with WHO recommendations, which advocate early treatment among vulnerable populations.

An additional element was integrated in 2020 to measure the impact of COVID-19 on the severity of tuberculosis infections.

DIAGNOSIS AND MANAGEMENT OF RESISTANT TUBERCULOSIS CASES IN GEORGIA

The Mérieux Foundation has been supporting the National Tuberculosis Program in Georgia since 2017. Georgia is one of the countries worst affected by the disease in the world, particularly the drug-resistant strains. As part of the introduction of new treatments for patients for whom no other treatment options are available, this support has three objectives: to reinforce laboratory capacity for the clinical diagnosis of resistant strains, patient care and

the study of transmission clusters. Financed jointly by Expertise France and the Mérieux Foundation, the project's operational activities were finalized in 2020 (recruitment of patients, training and technology transfer) thanks to the support of the National Center for Tuberculosis and Lung Disease in Tbilisi and Assistance Publique-Hôpitaux de Paris.



ANTIMICROBIAL RESISTANCE

TSARA: FIGHTING MICROBIAL RESISTANCE IN HOSPITALS

The TSARA project (an updated surveillance technique for resistance to antibiotics) was launched in 2020 with the financial support of the University of Oxford. Its objective is to limit the development and transmission of bacterial resistance by offering the best care to hospital patients in Madagascar. TSARA therefore targets one of the main causes of bacterial multi-resistance: the excessive consumption of antibiotics (+ 35% worldwide between 2000 and 2010 according to a publication in the Lancet Infectious Diseases/2014).

TSARA draws on synergies of expertise between laboratory and clinical staff in hospitals to rationalize the prescription of antibiotics. In practice, this involves enhancing coordination between the results of microbiological analyses and the prescription of antibiotics by doctors. The project is operating at five hospitals: three university hospitals in Antananarivo, one in Toamasina and one in Fianarantsoa.

Initial results demonstrate that in 60% of cases, antibiotics prescribed in a probabilistic way were not effective according to data from the antibiogram. In 16% of cases, an antibiotic de-escalation was carried out, whilst in 24% of cases prescriptions remained the same. TSARA is an operational project with an innovative approach and is set to be rolled out rapidly to other countries in which the Foundation operates.



TRICYCLE: DETECTION AND SURVEILLANCE OF BACTERIAL RESISTANCE IN MADAGASCAR

The TRICYCLE protocol, developed and supported by WHO as part of the fight against antimicrobial resistance, is based on the monitoring of a key indicator in humans, the environment and the food chain. This is the prevalence of Escherichia coli bacteria that produce extended-spectrum beta-lactamases (ESBL), enzymes that make the bacterium resistant to beta-lactam antibiotics related to penicillin. The project was launched in Madagascar in 2018 and is being conducted in seven hospital laboratories in the RESAMAD network and the Charles Mérieux Center for Infectious Disease in Antananarivo.

Six hundred people were included in the study in 2020, and six water sampling campaigns and a carriage study involving farmed chickens were carried out. The results are currently being written up. This research is funded by the European JPI-AMR initiative (Joint Programming Initiative on Antimicrobial Resistance) for 2020-2022 and has the backing of the Ministry of Public Health in Madagascar.

→ FROM TRICYCLE TO TRIUMPH

(Improving the TRICYCLE protocol: upscaling to national monitoring, detection of CPE and WGS pipelines for One Health Surveillance)

In 2020, the TRICYCLE protocol was extended with the TRIuMPH project, which covers:

- The surveillance of carbapenemaseproducing Enterobacteriaceae, a different enzyme rendering certain classes of antibiotic inactive:
- The use of freely accessible new-generation sequencing analysis platforms (whole-genome sequencing):
- New regions joining the study:
 Netherlands, France, Pakistan and Malaysia:
- Samples taken from other studies, such as the environmental surveillance campaign for poliomyelitis.



LES PENSIÈRES CENTER FOR GLOBAL HEALTH

Les Pensières is an international public health center run by the Mérieux Foundation, with over 40 years of experience in dialog and engagement in the fight against infectious diseases.

This unique and historic location, which over the years has hosted many "virus hunters" to talk about emerging diseases and their prevention, was hit hard by the health crisis. But 2020 was put to good use to renovate the Center's emblematic Charles Mérieux conference room. Fitted with new audiovisual equipment and a state-of-the-art video conferencing system, the Center now offers a multitude of possibilities for online, in-person, remote or hybrid events, making it possible to bring together renowned experts and people working in the field to discuss major public health issues.



Sharing knowledge is part of the Mérieux Foundation's DNA, with the aim of transferring expertise between all countries, promoting multidisciplinary dialog and developing new collaborations.

This area of activity saw a profound change in 2020, with the health crisis preventing us from being able to get together in person. The Mérieux Foundation adapted rapidly, so that it could continue to pursue its mission of sharing knowledge and maintaining contact despite the distance, with the help of new digital solutions and platforms.

Spreading scientific innovation is one of the driving forces behind the Mérieux Foundation's initiatives worldwide. By organizing and participating in international conferences, training sessions and advanced courses, the Foundation promotes the exchange of expertise, the circulation of new ideas, emulation among scientists, and progress in public health to benefit the greatest number of people.

In 2020, the program of training sessions and conferences was hit hard by the health crisis. Many meetings were not able to go ahead in person, at the very time when we needed to maintain close contact with our partners in the field to be able to manage the crisis effectively. To ensure that people working in healthcare were able to stay in touch and continue their discussions despite the travel restrictions, new forms of communication were developed.

A PERIOD OF TRANSFORMATION

Several events usually organized at the Les Pensières Center for Global Health, the Mérieux Foundation's conference center near Annecy (France), were postponed or cancelled in 2020. Some of them went ahead in different formats: webinars, hybrid events combining in-person and remote contact, MOOCs (massive open online courses) for training sessions, etc.

The many webinars on subjects dealing with current health issues brought together international experts and allowed high-quality content to be shared with a wide audience. In total, more than 30 online or hybrid conferences were organized in 2020. Faced with epidemics and the growing threat of antibiotic resistance, the health crisis confirmed the absolute necessity of sharing and distributing knowledge and encouraging the exchange of experience between countries.

ADVANCED **TRAINING COURSES**

The three advanced training courses offered by the Mérieux Foundation, on vaccines (ADVAC), diagnostics (ACDx) and resistance to antibiotics (AMR), attended by dozens of participants each year at Les Pensières Center for Global Health, were cancelled and postponed to 2021. Webinars were organized instead to maintain contact and share knowledge in the context of the pandemic.

ACDx REMOTE MEETING

— Advanced course on diagnostics

An ACDx webinar was organized on the anniversary of the course on 15 September 2020. Led by Professor Rosanna Peeling from the London School of Hygiene and Tropical Medicine, this online conference brought together international experts from four continents (Asia, Africa, Europe and Latin America) to discuss the management of the COVID-19 epidemic in their regions, with a particular focus on access to diagnostics and patient care. 374 participants from 68 countries took part in the event.

WEBINARS FOR ADVAC ALUMNI

Advanced course on vaccinology

The network of former students of the ADVAC course, organized by the Mérieux Foundation and the University of Geneva every year since 1999, now has more than 1200 members worldwide. These alumni are particularly active and regularly get together at international meetings organized during major conferences on vaccines. Several meetings between former students were planned for 2020, particularly on subjects related to the COVID-19 vaccine. One meeting took place alongside the meeting of the Global NITAG Network (National Immunization Technical Advisory Groups) in Atlanta on 25 February 2020, and five webinars were organized between April and December 2020, with about 100 participants at each event.



SCIENTIFIC **CONFERENCES**

In partnership with a broad network of international experts, the Mérieux Foundation organizes scientific conferences attended by various health stakeholders to explore major topics of scientific and medical interest. In 2020, these conferences were held in the form of online webinars.

— SIHI network meetings: Social Innovation in Health Initiative

- → Webinars held on 9 September and 7 October 2020
- 70 participants

In partnership with SIHI (Social Innovation in Health Initiative)

The first workshop was attended by innovators, government representatives, researchers and foundations to discuss the role of social innovation in the fight against COVID-19 and in dealing with health crises more generally. The second meeting covered the subject of research: how to develop a research network for social innovation in health? Several innovations were presented at the meeting, including a project from the Last Mile Health association, which helps to ensure access to health services for the most isolated communities.

- 5th Asia Dengue Summit

- → Webinar held on 28 October 2020
- 150 participants

In partnership with the ADVA working group (Asian Dengue Vaccine Advocacy), GDAC (Global Dengue and Aedes transmitted Diseases Consortium) and the SEAMEO TROPMED network in Southeast Asia (Southeast Asian Ministers of Education Tropical Medicine and Public Health Network)

Objective: to improve prevention strategies by raising awareness among regional stakeholders and promoting better connectivity between actions in the field.

— 6th "One Health" Congress **Evaluation based on the One Health parameters** for the control of vector-borne diseases in the context of climate change

- → Webinar held on 2 November 2020
- 100 participants

In partnership with the WHO and TDR (Special Program for Research and Training in Tropical Diseases)

Broadcast on the One Health Platform, the objective of this conference was to discuss the interlinking of One Health principles (interdependence of human and animal health and environmental protection) and the development of research projects using transdisciplinary approaches.

— Regional Symposium on Viral Hepatitis (Mekong Hepatitis Symposium)

- → Webinar held on 23 November 2020
- 60 participants

In partnership with FIND, hosted by the Center of Infectiology Lao Christophe Mérieux (Laos), the Program for HIV Prevention and Treatment (Thailand) and the Mérieux Foundation's office in Cambodia

Three countries, three conference rooms, one subject: Hepatitis B Cure and Hepatitis C Eradication. More than sixty international experts from this regional network for dealing with chronic hepatitis met during the Mekong Hepatitis Symposium to make progress on discussions and decision-making on this major public health concern in the Greater Mekong Basin, a region at the center of major outbreaks of these infections worldwide.

KNOWLEDGE SHARING





The Mérieux Foundation contributes to several global public health initiatives. By combining complementary areas of expertise and pooling public and private sector resources in different regions of the world, these partnerships play an essential role in the fight against infectious diseases.

GLOBAL PARTNERSHIP TO FIGHT CHOLERA

- GLOBAL TASK FORCE ON CHOLERA CONTROL (GTFCC)

GTFCC, a global multi-sector partnership for cholera control, brings together more than 50 organizations around a global roadmap (WHO, Gavi, the Vaccine Alliance, the Bill & Melinda Gates Foundation, WaterAid, etc.).

It has set a target of a 90% reduction by 2030 in deaths due to cholera, a disease transmitted by contaminated water or food.

The Mérieux Foundation has been a GTFCC partner since 2017 and plays an active role in the development of activities related to the knowledge-sharing platform. GTFCC meetings are traditionally organized at the Foundation's Les Pensières Center for Global Health. In 2020, these events were held remotely: the annual meeting of GTFCC took the form of a hybrid event organized on 20 and 21 October 2020 and attended by 225 participants in 32 countries. The themed workshops that make up the task force were organized in the form of webinars: 15 sessions involving more than 1,000 participants. A GTFCC conference was also organized on 9 June 2020 as part of the 73rd World Health Assembly.

GTFCC THEMED WORKSHOPS 2020

WASH (Water, Sanitation, Health) working group

- 4 webinars:
- 25 March 22 April
- 13 May 8 December
- 90 participants

Current practices in countries, assessment of existing tools, strategies and approaches.

Epidemiology and surveillance working group

- 4 webinars: • 12 June • 26 June
- 10 July 2 October
- 50 participants

Review of the surveillance tool and new indicators to be integrated.

Case management working group

2 webinars:

- 17 September 1st October
- 40 participants

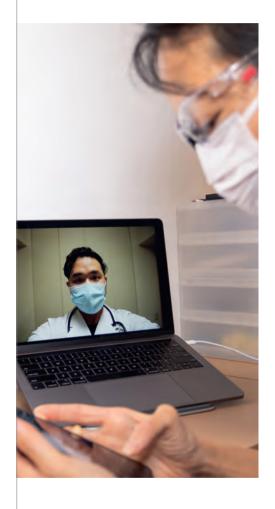
Presentation of work and measures to improve access to treatment. particularly for children.

Oral cholera vaccine working group

3 webinars:

- 19 November 3 December
- 10 December
- 100 participants

Impact of COVID-19 on the use of the oral vaccine. research projects.



COORDINATION OF THE SECRETARIAT **UNTIL 2023**

Financed by the European Commission through its Horizon 2020 program, GloPID-R was renewed in 2019 for a period of three years. The Mérieux Foundation coordinates the global activities of the secretariat and the GloPID-R network in partnership with the University of Oxford, which oversees the scientific aspects.

ACCEPTANCE OF VACCINATION

Vaccine Acceptance Initiative

How to deal with failing confidence in vaccination? In the context of increasing mistrust of vaccines, the disruptions to vaccination programs caused by the pandemic pose an additional threat to public health in many countries. The Mérieux Foundation is particularly committed to disease prevention and vaccination. On 16 December 2020, it organized a conference with the aim of pursuing dialog and intensifying multisectoral efforts to promote acceptance of vaccination and the resilience of vaccination programs in the context of the COVID-19 pandemic. 150 people took part in the conference.



COORDINATING RESEARCH ON INFECTIOUS DISEASES

— GloPID-R: Global Research Collaboration for Infectious Disease **Preparedness**

Set up with the aim of accelerating the response to epidemics, the international GloPID-R initiative played its role to the full in 2020 when dealing with the COVID-19 pandemic. The partners in the initiative took action from January 2020 onwards: GloPID-R members published a "Joint statement on sharing research data and findings" and a global forum was organized jointly with the WHO in Geneva on 12 February. Research priorities were identified and a database of more than 5,000 projects was made available online.

→ GloPID-R COVID-19 Research Synergies Meetings Webinars held on 16, 17, 20, 21 and 23 July 2020

As part of its mobilisation against COVID-19, GloPID-R brought together global funders, researchers & stakeholders in a series of webinars in July 2020. The purpose of these meetings was to provide a platform to promote and establish collaboration and synergies between researchers funded by GloPID-R members. These discussions helped optimize the use of available resources, generate connections between ongoing research projects. create opportunities to share information on progress, barriers and outstanding research gaps and facilitating the progress of a collective effort to end COVID-19.



As part of its global health approach, the Mérieux Foundation is committed to supporting the health and well-being of vulnerable groups in the countries in which it operates. This commitment covers programs to provide access to education, hygiene, and treatment, with priority given to women and children, who are the first victims of crises and insecurity.

Since progress in healthcare depends on living conditions, the Mérieux Foundation supports local humanitarian projects helping communities of refugees and displaced or impoverished groups of people. The objective of these projects is to improve provision for primary needs, including hygiene, accommodation, and education, which are all important factors in the prevention of infectious diseases. Many campaigns are aimed at children and young people, who make a major contribution within their communities to the understanding and spread of a culture of infectious disease prevention.

The Foundation's work relies on its strong connections with skilled local partners and NGOs in the field, which have an in-depth understanding of the local context and the most urgent requirements. Some of these relationships go back many years, such as in Madagascar and Haiti.

These activities are mainly funded by the Fondation Christophe et Rodolphe Mérieux as part of the close partnership between the two family foundations.

FONDATION CHRISTOPHE ET RODOLPHE MÉRIEUX

The Fondation Christophe et Rodolphe Mérieux is an independent family foundation created in 2001 under the aegis of the Institut de France. It devotes most of its resources to funding projects in the field. It draws on the expertise and human resources of the Mérieux Foundation for the operational implementation of its projects.

LEBANON



OPENING OF THE DURIS HEALTH CENTER Bekaa Valley

Inaugurated in 2019, the Duris health center in northeast Lebanon has been operational since March 2020. It was built by the Mérieux Foundation as part of the MELIBAN project, with support from the Department of International Cooperation of the Principality of Monaco. The Mother and Child primary health center was built to treat and refer patients to secondary and tertiary health facilities in the Bekaa plain, a rural area with one of the lowest levels of health infrastructure. Managed by Amel Association International, the health center benefits from the support of the Ministry of Public Health in Lebanon, the Governorate of Baalbek-Hermel and the municipality of Duris.

On the front line of the fight against the COVID-19 epidemic, the center has carried out large numbers of tests, with a day organized to raise awareness on 30 April and a sampling campaign in refugee camps on 14 May. Nearly 2,500 patients, mostly women and children, benefited from consultations (general medicine, pediatrics, gynecology, and cardiology) between April and December 2020. In partnership with Médecins du Monde, Amel has also initiated mental health consultations to respond to the strong deterioration of the psychological state of the population in the context of the severe economic, health and political crisis the country is going through. Plans for the second stage of this project, which consists of the construction of a second floor for consulting rooms and training areas, began in 2020. Work commenced in January 2021.



EMERGENCY IN LEBANON

- The MELIBAN project is part of the United Nations Strategic Framework for Lebanon 2017-2020.
- According to the UNHCR (UN High Commission for Refugees), Lebanon has the highest density of refugees per inhabitant in the world. With a population of 4 million, Lebanon has around 1.5 million refugees, mainly in Akkar in the north of Lebanon and in the Beqaa Valley.



MADAGASCAR







INAUGURATION OF THE ALAIN MÉRIEUX HIGH SCHOOL

Built as part of the long-standing partnership between the Mérieux Foundation and the Akamasoa ("good friends") association set up by Father Pedro, the Alain Mérieux high school was inaugurated on 6 January 2020. The first high school in the village of Mahatsara, on the outskirts of Antananarivo, it welcomed around 50 pupils in 2020. Since 2014, the Mérieux Foundation has supported several of the association's projects to improve living conditions for villagers in Madagascar (center for the poor, housing, a medical diagnostic laboratory, trash cans and water tanks). A program to pay for hospital care and treatment for the poor has also been in place since 2018.

The Mérieux Foundation also works with Akamasoa on health education activities, lice treatment for primary school children, soap donations to improve hygiene and support for HIV and syphilis screening for pregnant women.

HEALTH EDUCATION

The Mérieux Foundation manages several health education initiatives in partnership with the health authorities in Madagascar and many local representatives, including associations caring for people with severe social problems. Five priorities have been selected in line with the national education system's programs in Madagascar, resulting in the creation of teaching kits. Following on from the kits for hygiene, malnutrition and reproductive health, the kit for preventing infectious diseases was finalized in 2020. With the support of the Ministry of Education, the kits were distributed to a hundred high schools, primary schools, centers, and associations. The fifth kit, which will deal with fighting addiction, will be distributed in 2021. Developed to create maximum impact amongst children and their families, these approaches to raising awareness are based on an innovative, fun, and immersive learning system using videos and new technologies.

As part of the fight against COVID-19, several donations have been made to associations and healthcare facilities in rural regions, including coveralls and caps, masks, disinfectant, and medical equipment.

FIGHTING MALNUTRITION

The Mérieux Foundation launched a new project in 2020 to combat malnutrition, which affects many people living in remote areas of Madagascar, particularly children. In partnership with Fitia, a local association which will manage operations, a production unit for nutritional products will be set up in Tolagnaro. This container-factory was developed by Nutriset, a global specialist in producing nutritional solutions for treating and preventing malnutrition, and is funded by the Fondation Christophe et Rodolphe Mérieux. The nutritional bars produced in this "turnkey" unit will be distributed in school canteens in the Anosy and Androy regions in the south of the country, where, according to the World Food Program, 750,000 people are at risk of malnutrition.

The project includes an economic development dimension, since it relies on local agricultural sectors for the purchase of raw materials (maize, rice, peanuts, etc.) and promotes the empowerment of women through its recruitment program.

MALI

OPENING OF THE SIRAKORO MATERNITY HOSPITAL

Funded by the Fondation Christophe et Rodolphe Mérieux, the construction of the new Youssouf Issabré maternity hospital in Sirakoro, on the outskirts of Bamako, was completed in 2020. Named after the first director of the Charles Mérieux Center for Infectious Disease in Mali, the maternity hospital opened towards the end of the year. To improve access to healthcare for the people of Sirakoro, the old maternity hospital will be renovated and converted into a health center, thanks to an exceptional donation granted by bioMérieux shareholders in 2020.



SUPPORT FOR THE SANTÉ MALI RHÔNE-ALPES ASSOCIATION (SMARA)

A long-standing partner of the Mérieux Foundation, Santé Mali Rhône-Alpes is a humanitarian association supporting the health of isolated groups of people living in northern Mali. The Foundation supported three projects in 2020:

- A tuberculosis detection program, based on the training of community volunteers in remote villages;
- Pediatric healthcare and COVID-19 awareness campaigns through free consultations in the towns of Niafunké, Goundam and Diré (Timbuktu region);
- The creation of tools to support diagnosis and treatment: specialist medical leaflets (gynecology, pediatrics, dermatology) have been sent to Bamako thanks to the support of Aviation Sans Frontières and made available throughout the country via the Ministry of Health.

SCIENCE AND HEALTH EDUCATION

The Mérieux Foundation, via the Charles Mérieux Center for Infectious Disease in Mali, launched a collaboration with the "La Main à la Pâte" Foundation in 2015 to introduce a science and health education program in primary schools in Mali. The project is run in partnership with the Ministry of Education and the Ministry of Innovation and Scientific Research and is based on a hands-on learning method. A total of 224 teachers have received training so far, benefiting 7,000 pupils. In 2020, a decision was taken to develop self-learning tools, which will be made available to teachers in countries that are members of the GABRIEL network.



IRAQOPENING OF A SCHOOL IN QARAQOSH

The new public school in Qaraqosh, a Christian town in northern Iraq, opened its doors in 2020. Completely destroyed by ISIS, the school has been rebuilt by the Mérieux Foundation with financial support from the Fondation Raoul Follereau, the Ile-de-France (Paris) region and the Fondation Saint-Irénée. The school, the oldest in Qaraqosh, is now the only public school in the region. It has almost 600 pupils of all religions, with twelve classrooms in three buildings.

The Mérieux Foundation was asked by the Nineveh Plains Director General of Education to manage this construction project. The Foundation received support during the implementation phase from the Ministry of Education in Iraq, the Hammourabi association and several local businesses.



CENTER FOR YAZIDI WOMEN AND CHILDREN

The Shekan health and social center in Iraqi Kurdistan was inaugurated in 2019 and supports Yazidi women and children who are victims of

persecution by ISIS. The project was initiated at the request of the Yazidi Supreme Spiritual Council. Its support facilities are made up of units offering psychological care, craft workshops and play areas for children. The center was forced to close for several months in 2020 due to the heath crisis. Production activities resumed when it reopened, including the manufacture of 20,000 masks, which were then distributed to hospitals, refugee camps and police forces as part of the fight against COVID-19. The Shekan center also benefits from the support of the Fondation AnBer, the Fondation Saint Irénée and the Auvergne-Rhône-Alpes region.

CAMBODIA • SUPPORT FOR THE ENFANTS DU MÉKONG ASSOCIATION

The Mérieux Foundation has been a partner of the NGO Enfants du Mékong since 2010, with support provided by the Dr. Christophe Mérieux University Center to help students from disadvantaged backgrounds and families living in extreme poverty. In 2020, the Center welcomed 300 students in higher education, about twenty nursery school pupils and 250 families in need.

The Foundation has also been supporting a Mother & Child program since 2017, with social workers maintaining a link with children who have dropped out of school, mothers in difficulty, and marginalized communities. This support allows campaigns to be run to suit different needs, including nutritional support, housing repair or construction, and training. In 2020, a campaign in Sihanoukville in southern Cambodia helped mothers in difficulty, with 300 women and children receiving support and protection.

AFRICA • PARTNERSHIP WITH SAMUSOCIAL

Having initially committed to supporting Samusocial Mali in 2005, the Mérieux Foundation, with funding from the Fondation Christophe et Rodolphe Mérieux, has been helping Samusocial International since 2009, with a program to support children living on the streets in cities in developing countries. In 2020, this support allowed Samusocial to fund healthcare and prevention campaigns in Mali, Burkina Faso, and Senegal, including screening and healthcare on night rounds, daytime medical care, health education and preventive measures for dealing with the COVID-19 pandemic. The Foundation also supports advocacy in favor of giving these young people access to basic rights, especially to healthcare.

VIETNAM • PARTNER OF VIETNAM ESPÉRANCE

In 2020, the Fondation Christophe et Rodolphe Mérieux supported Vietnam Espérance, an association set up to support the reconstruction of places of worship, and educational and healthcare establishments in remote and poor regions of Vietnam. 480 projects have been completed since the NGO was set up in 1994, and the priority now is on education and training for children and young people. In 2020, 11 extension and construction projects were completed (multi-functional homes, accommodation for high school pupils, household equipment, purchase of materials).

HAITI • PROMOTING MICROFINANCE

In 2005, the Mérieux Foundation, ACME (a local association for cooperation with small companies) and the GHESKIO Centers, the Foundation's long-term partner in Haiti, created "MAG" (Mérieux-ACME-GHESKIO) loans for women who are living with HIV or are vulnerable to HIV. The beneficiaries of these loans are given training in the management of profitable businesses, as well as three months of support from ACME. The Mérieux Foundation, with the support of the Fondation Christophe et Rodolphe Mérieux, takes on the risk of non-repayment of loans through a credit guarantee fund and covers the cost of training the social assistants who manage these projects. In 2020, 576 women benefited from a loan.

>>> SMALL GRANTS

The Mérieux Foundation's Small Grants program is a €50,000-a-year fund that awards grants of up to €5,000 to small organizations and individual projects with a strong local impact. Two application review sessions are held each year. Ten projects received support in 2020:

■ Support to provide equipment for health facilities

- Fitting out a Mother and Child health center in Sandae-Batouri. Cameroon:
- Reinforcement of three medical clinics in Cairo to ensure the health and safety of refugees suffering from infectious diseases in Egypt:
- Installation of a hand-washing station in the Zoétélé maternity hospital in Cameroon:
- Support for CEDAMEDI (an association providing trauma counselling, medical, social, and legal support and development) in the Democratic Republic of the Congo.

■ Education and awareness

- Training for healthcare professionals in the use of essential oils in Madagascar;
- Campaign to raise awareness of hygiene amongst teachers, mothers and children at daycare centers in a shanty town in Cairo, Egypt.

■ Research and Innovation

- Detection of group B streptococcus in pregnant women at a maternity teaching hospital in Rio de Janeiro, Brazil;
- Detection and early treatment of malaria in pregnant women in Burkina Faso.

■ Helping people back into the workforce

- Microloans and psychosocial support for people living with HIV in the Democratic Republic of the Congo to set up profitable businesses;
- Support for community healthcare workers to provide psychological care and nutritional and economic advice for pregnant women and HIV-positive mothers in Ivory Coast.

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2020 GOVERNANCE

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- Chantal MÉRIEUX
- Karine MEHLER
- Olivia MÉRIEUX
- Alexandre MÉRIEUX

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- Dr. Marie-Paule KIENY
- Prof. Didier RAOULT
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The Prefect of the Auvergne-Rhône-Alpes

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• Dr. François-Xavier BABIN Director of International

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Agence Française de Développement (France)

• Dr. Firdausi QADRI

International Centre for Diarrhoeal Disease and Research (Bangladesh)

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• Dr. Wenhong ZHANG

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Clare O'BRIEN

Shearman & Sterling (United States)

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Barbara JAUREGUI WURST

Director of Programs since February 2020

Program and Operations Director until February 2020

Aline FRIMON-RICHARD

D'ADMINISTRATION

President London School of Hygiene

Center for Global Health.

• Dr. Kevin DE COCK

Control and Prevention) (Kenya)

• Dr. Warren JOHNSON

(United States)

Karine MEHLER

Mérieux Foundation Board of Directors (France)

 Koren WOLMAN-TARDY CEO since March 2020

■ Emily PENROSE

2020 FUNDING PARTNERS

"Building on our expertise in biology, we are working closely with international and local partners as part of multidisciplinary, complementary and, above all, concerted approaches with a long-term perspective." ALAIN MÉRIEUX

To successfully carry out its development and research projects in emerging countries and ensure they produce sustainable results, the Mérieux Foundation brings together national and international public and private partners with local organizations. The trust and commitment of nearly 80 partners have made it possible for the foundation to help local stakeholders in their fight against infectious diseases. The Mérieux Foundation thanks them warmly for their support.

REGIONAL. NATIONAL & INTERNATIONAL INSTITUTIONS

- African Society for Laboratory Medicine (ASLM)
- Agence Française de Développement (AFD)
- Auvergne-Rhône-Alpes
- Coalition for Epidemic Preparedness Innovations
- Defense Threat Reduction Agency (DTRA)
- Department of Foreign Affairs and Trade, Australian Government (DFAT)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- European and Developing Countries Clinical Trials Partnership (EDCTP)
- European Commission
- Expertise France
- Fleming Fund (UK Department of Aid and Social Care)
- Global Fund to Fight AIDS. Tuberculosis and Malaria
- Ile-de-France Region
- International Organization for Migration (IOM)
- Kreditanstalt für Wiederaufbau (KWF) ■ L'Initiative

- Ministry for Europe and Foreign Affairs -via Expertise France
- Pan American Health Organization (PAHO)
- Prince's Government of Swedish International
- Agency (SIDA) ■ The Joint Programming Initiative on Antimicrobial

Development Cooperation

- Resistance (JPIAMR) ■ U.S. Centers for Disease
- Control and Prevention (CDC) ■ UK Foreign Commonwealth Development Office (FCDO)
- United States Agency for International Development (USAID) ■ World Bank - via the West
- African Health Organisation (WAHO) ■ World Health Organization
- **FOUNDATIONS & NGOS**
- Alliance Médicale de Madagascar
- Bill & Melinda Gates Foundation

- Fondation Pierre Fabre
- Fondation Raoul Follereau ■ Fondation Saint-Irénée
- Fonds Decitre
- Fonds Habert ■ Fonds Pour Eux
- Foundation for Innovative New Diagnostics (FIND)

Global Alliance for Rabies

- Control (GARC)
- Institut Pasteur ■ Jameel Community
- PATH ■ Red Cross Society of China
- Santé Sud ■ TDR, the Special Programme for Research and Training in Tropical Diseases
- The Social Innovation In Health Initiative (SIHI)
- Wellcome Trust

UNIVERSITIES & RESEARCH INSTITUTES

- Agence France Recherche Nord&Sud Sida-HIV Hépatites (ANRS)
- Agence nationale de la recherche (ANR)
- Bioaster
- Centre International de Recherche en Infectiologie (CIRI)

- Institut de Recherche pour le Développement (IRD)
- Lyonbiopôle
- Oxford University University of Geneva
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- BluSense

■ Gilead

- Cepheid
- GFA Consulting Group ■ GlaxoSmithKline Biologicals
- (GSK) ■ Institut Mérieux
- Janssen Vaccines & Prevention (JNJ)
- Merck/MSD ■ Oxford Immunotec

■ Pfizer

- Qiagen
- Roche
- Sanofi Pasteur ■ Serum Institute of India
- Shearman & Sterling Société M.B.D.
- Takeda

■ Fondation AnBer ■ Luxembourg Government Huashan Hospital of Fudan Director of Finance & Operations Aid and Development ■ Fondation Christophe et Rodolphe Mérieux * Until December 2020 University (China) since May 2020 Agency (LuxDev)

BALANCE SHEET

| ASSETS (K€) | NET DEC. 31, 2020 | NET DEC. 31, 2019 |
|--|----------------------|----------------------|
| FIXED ASSETS | | |
| Intangible fixed assets | 1,431 | 14 |
| Property, plant and equipment | 4,266 | 1,668 |
| Investments and other financial assets | 37,310 | 36,568 |
| TOTAL | 43,007 | 38,250 |
| CURRENT ASSETS | | |
| Accounts receivable | 708 | 743 |
| Other receivables | 18,860 | 19,027 |
| Marketable securities | 40,600 | 41,814 |
| Cash and cash equivalents | 22,096 | 3,086 |
| Prepaid expenses | 3,038 | 1,123 |
| Unrealized exchange losses | 7 | - |
| TOTAL | 85,309 | 65,794 |
| TOTAL ASSETS | 128,316 | 104,044 |
| | | |
| LIABILITIES AND FUND BALANCE (K€) | DEC. 31, 2020 | DEC. 31, 2019 |
| FUND BALANCE | | |
| True endowment | 68,216 | 64,916 |
| Reserves | 884 | 884 |
| Retained earnings | 12,806 | 13,367 |
| Net income / loss for the period | - 3,802 | - 562 |
| Other endowment | 7 | 7 |
| TOTAL | 78,111 | 78,613 |
| QUASI ENDOWMENT | | |
| Allowence for contigencies | 144 | 153 |
| Funds reserved for future engagements | 3,644 | 2,040 |
| TOTAL | 3,788 | 2,193 |
| LIABILITIES | | |
| Loans | 5,476 | 2,100 |
| Accounts payable | 1,699 | 1,443 |
| Tax and social debts | 1,485 | 1,177 |
| Investment payable | 36 | - |
| Other payable | 2,787 | 2,008 |
| Deferred income | 34,933 | 16,510 |
| Unrealized exchange gains | 1 | 1 |
| TOTAL | 46,417 | 23,238 |
| TOTAL LIABILITIES AND FUND BALANCE | 128,316 | 104,044 |

INCOME STATEMENT

| (K€) | ACTUAL 2020 | ACTUAL 2019 |
|--|-------------|-------------|
| INCOME | | |
| Services revenue | 106 | 710 |
| Contributions | 0 | 7 |
| Income from third-party funders | 16,905 | 11,227 |
| Expenses refund | 1,017 | 1,970 |
| Other operating income | 50 | 4 |
| Uses of dedicated funds* | 2,040 | 2,666 |
| TOTAL INCOME | 20,118 | 16,584 |
| EXPENSES | | |
| External purchases and expenses | 11,474 | 9,328 |
| Financial aid | 2,884 | 6,730 |
| Taxes and duties | 856 | 747 |
| Salaries and social contributions | 5,422 | 5,006 |
| Depreciations | 456 | 278 |
| Dedicated funds carried over* | 3,644 | 2,040 |
| Other operating income | 49 | 49 |
| TOTAL EXPENSES | 24,783 | 24,178 |
| OPERATING RESULTS | - 4,665 | - 7,594 |
| FINANCIAL INCOME | | |
| Dividends | 899 | 3,150 |
| Other financial income | 812 | 1,302 |
| Reverse on financial allowances | 56 | 834 |
| Net income from marketable securities | 828 | 2,291 |
| TOTAL FINANCIAL INCOME | 2,595 | 7,577 |
| FINANCIAL EXPENSES | | |
| Financial allowances | 1,196 | 57 |
| Other financial expenses | 413 | 553 |
| TOTAL FINANCIAL EXPENSES | 1,609 | 610 |
| FINANCIAL RESULTS | 986 | 6,967 |
| EXCEPTIONAL INCOME | | |
| Exceptional income | 1 | 66 |
| Exceptional reverse in allowances | - | - |
| TOTAL EXCEPTIONAL INCOME | 1 | 66 |
| EXCEPTIONAL COSTS | | |
| Exceptional expenses | 1 | 1 |
| Exceptional allowances for contingencies | 123 | |
| TOTAL EXCEPTIONAL COSTS | 124 | 1 |
| EXCEPTIONAL RESULT | - 123 | 65 |
| Income tax | - | |
| TOTAL INCOME | 22,714 | 24,227 |
| TOTAL EXPENSES | 26,516 | 24,789 |
| INTERMEDIATE BALANCE | - 3,802 | - 562 |
| INTERMEDIATE BALANCE The presentation of the 2020-2019 statutory accounts is subject to a modification (o | | |

^{*} The presentation of the 2020-2019 statutory accounts is subject to a modification (on the form) in the framework of the application of the new ANC regulation 2018-6.

The actual 2019 has therefore been restated in form.

2020 ACCOUNTS & KEY FIGURES



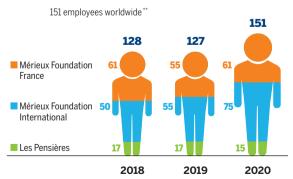
| Missions | 64% |
|-----------------------|-----|
| Administration | 31% |
| International support | 5% |



| 42 % |
|-------------|
| 26% |
| 18% |
| 8% |
| 4% |
| 1% |
| 1% |
| |

⁽¹⁾ Activities carried out by teams based in Europe, in or for the other countries (including coordination)

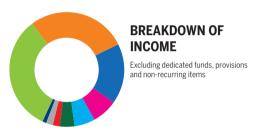
CHANGES IN HEADCOUNT* AS AT DECEMBER 31ST



* Full-time equivalents



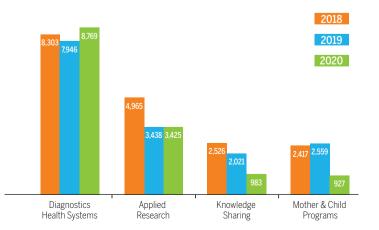
| Diagnostics - Health Systems | 62 % |
|------------------------------|-------------|
| Applied Research | 24% |
| Knowledge Sharing | 7% |
| Mother & Child Programs | 7% |



| Sponsorship | 33% |
|--|------------|
| Public Partnerships | 28% |
| Endowment income & investment | 17% |
| Financial Products | 7 % |
| Other Private Partnerships | 6% |
| Real estate income | 4% |
| Fondation Christophe et Rodolphe Mérieux | 2% |
| Other income | 2% |
| Donations and legacies | 1% |

EVOLUTION OF EXPENSES BY STRATEGIC AREA OF FOCUS

• In K€, excluding depreciation, provisions, financial expenses and future engagements



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FONDATION MERIEUX

Fondation reconnue d'utilité publique

rue Bourgelat

Statutory auditor's report on the financial statements

For the year ended 31 December 2020

To the Board of FONDATION MERIEUX

pinion

in compliance with the engagement entrusted to us by your Board of Directors, we have audited the accompanying financial statements of FONDATION MERIEUX for the year ended 31 December 2020.

In our opinion, the financial statements give a true and fair view of the assets and liabilities and of the financial position of the Foundation as at \$1 December 2020 and of the results of its operations for the year then ended in accordance with French accounting principles.

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The note "Accounting principles, methods and rules" to the financial statements sets out in particular the accounting rules and methods relating to the valuation of investments. As part of our assessment of the accounting rules and principles followed by your Foundation, we have verified the appropriateness of the accounting methods referred to above and the information provided in the notes to the financial statements, and have ensured that they are correctly applied.

Specific verifications

We have also performed, in accordance with professional standards applicable in France, the specific verifications required by French law and regulations.

We have no matters to report as to the fair presentation and the consistency with the financial statements of the information with respect to the financial position and the financial statements given in the management report of the Treasurer and in the other focuments provided to the Board members.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with French accounting principles, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatements, whether due to fraud or error.

In prepaying the financial statements, management is responsible for assessing the Foundation's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless it is expected to liquidate the Foundation or to coate operations.

The financial statements were approved by the Treasure

Statutory Auditor's Responsibilities for the Audit of the Financial Statements

Our role is to issue a report on the financial statements. Our objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with professional standards will always, detect a material misstatement when it exists. Misstatements can arise from fisuad or error and are considered material fit, individually or in the augmegate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial scatements.

As specified in Article L 823-10-1 of the French Commercial Code (code de commerce), our statutory audit does not include assurance on the Viability of the Foundation or the quality of management of the affairs of the Foundation.

8 (PONDATION MEREUX) Statutory auditor's report on the financial statements (for the year ended 33 December 2000

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Basis for Opini

Audit Personnered

We conducted our audit in accordance with professional standards applicable in France. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our responsibilities under those standards are further described in the "Statutory Auditor's Responsibilities for the Audit of the Financial Statements" section of our report.

Indonesia de pero

We conducted our audit engagement in compliance with independence requirements of the French Commercial Code (code de commercia) and the French Code of Ethics (code de étentologie) for statutory auditors, for the period from 11 January 2020 to the date of our report.

Emphasis of Matter Observation

We draw your attention to the following matter described in Note "Accounting principles, methods and rules" to the financial statements relating to the change in accounting methods resulting from the application of the ANC rule N°2018-06. Our opinion is not modified in respect of this matter.

Instifferation of Assessments

Due to the global crisis related to the Covid-19 pandemic, the financial statements of this period have been prepared and audited under specific conditions. Indeed, this crisis and the exceptional measures taken in the context of the state of saintary emergency have had numerous consequences for companies, particularly on their operations and their financing, and have fed to greater uncertainties on their future prospects. Those measures, such as travel restrictions and remote working, have also had an impact on the companies' internal organization and the performance of the audits:

It is in this complex and evolving context that, in accordance with the requirements of Articles L823-9 and R823-7 of the French Commercial Code (code decommercy) relating to the justification of our assessments, we inform you of the following assessments that, in our professional judgment, were of most significance in our audit of the financial statements of the current period.

These matters were addressed in the context of our audit of the financial statements as a whole, approved in the conditions mentioned above, and in forming our opinion thereon, and we do not provide a separate opinion on reactife fewer of the financial statement.

2 FONDATION MERGUX I Statutory auditor's report on the financial statements I for the year ended 83 December 2000

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As part of an audit conducted in accordance with professional standards applicable in France, the statutory auditor exercises professional judgment throughout the audit and furthermore:

- Identifies and assesses the risks of material misstatement of the financial statements, whether due to fraud or
 error, designs and performs audit procedures responsive to those risks, and obtains audit evidence considered to
 be sufficient and appropriate to provide a basis for his opinion. The risk of not detecting a material misstatement
 resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgers, intentional
 omissions, misrepresentations, or the override of internal control.
- Obtains an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the
- Evaluates the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management in the financial statements.
- Assesses the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant color on the foundations skelling to continue as a poing content. This assessment is based on the audit evidence obtained up to the date of his audit report. However, future events or conditions may cause the Company to cease to continue as a going connern. If the stantony auditor concludes that a material uncertainty exists, there is a requirement to draw attention in the audit report to the related dictiosures in the financial statements or, if such disclosures are not provided or inadequeate, to modify the opinion expressed therein.
- Evaluates the overall presentation of the financial statements and assesses whether these statements represent the underlying transactions and events in a manner that achieves fair presentation.

Lyon, 4 June 2021.

The Statutory Auditor

DELOTTE & Associes

Arnauld de GASQUET

4 FONDATION MERITURY Statutory auditor's recort on the financial statements I for the year ended 31 December 200

^{**} Excluding interns, temporary employees

2020 KEY FIGURES

- **■** More than 50 years in the fight against infectious diseases
- → 4 areas of intervention
- ≥ 25 countries where we work
- **■** 17 laboratories of excellence built or under construction, including 14 Rodolphe Mérieux Laboratories since 2004
- **■** More than 70 laboratories renovated since 2005
- A network of 20 applied research units in 16 countries
- **■** More than 30 scientific conferences hybrids or online
- **→** 151 employees in 15 countries
- An annual budget of close to 22 million euros





Discover our 2020 annual report online!

PHOTOS

- KHELIL AITOUT
- AMEL ASSOCIATION
- ERIC BERGOEND
- ANTHONIN BOUVIER
- FONDATION MÉRIEUX
- MARTIN GROSJEAN
- iSTOCK
- ODAIR LEAL
- LES PENSIÈRES
- LIGNE DE FRONT
- JB MERCIER AND STUDIO K
- OLIVIA MÉRIEUX
- MARIE MOROSO
- MICKA PERIER
- ADN RANARISOA ■ RÉGIS SODOYER
- SUSIE WAROUDE

WRITING

Fondation Mérieux

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