



ANNUAL REPORT **24**



The Institut Pasteur de Dakar (IPD) is an non-profit foundation under Senegalese law, recognized as being of public utility.



2024

At the service of communities, we work to ensure equitable, sustainable, and affordable access to healthcare in Senegal, across Africa, and around the world.

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List of abbreviations

Acronyms	Description
4S	Sentinel syndromic surveillance network in Senegal
ACDC	Africa Centres for Disease Control and Prevention
ACE2	Angiotensin-Converting Enzyme 2
DNA	Deoxyribonucleic Acid
ARBOSEN	ARBOSEN (Inter-regional study of the transmission, adaptation and pathogenesis of viruses with pandemic potential)
RNA	RiboNucleic Acid
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (German Federal Ministry for Economic Cooperation and Development)
CARE	Centre for Africa's Resilience to Epidemics
CCHF	Crimean-Congo Hemorrhagic Fever
CEPI	Coalition for Epidemic Preparedness Innovations
CHIK	Virus Chikungunya
CHIKV	Chikungunya Virus
CHNP	Pikine National Hospital
CHRB	King Baudouin Hospital
CNR	National Reference Centre
COHWA	Project on viral haemorrhagic fevers in pastoral environments
COVID-19	Coronavirus disease
CRM	Customer Relationship Management
CVACi	Integrated Community Alert and Watch Committee
DCH	Human Capital Directorate
DDSI	Digital and Information Systems Directorate
DIATROPIX	Local production initiative for rapid diagnostic tests
DREI	Research, Education and Innovation Directorate
EDCTP	European & Developing Countries Clinical Trials Partnership
GF	Global Fund (Fonds Mondial de lutte contre le sida, la tuberculose et le paludisme)
GIHSN	Global Influenza Hospital Surveillance Network
GIISER-IPD	Genomic and Immunologic Integration for Surveillance and Epidemic Response – Institut Pasteur de Dakar
HCoV	Human Coronavirus
HEAR	Albert Royer Children's Hospital
HED	Diamniadio Children's Hospital
HPV	Human Papillomavirus infection
IANPHI	International Association of National Public Health Institutes
IFBA	International Federation of Biosafety Associations



Acronyms	Description
IFC	International Finance Corporation
ILI	Influenza-Like Illness (Syndrome Grippal)
IPD	Institut Pasteur de Dakar
SARI	Severe Acute Respiratory Infections
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
MADIBA WDI	MADIBA Workforce Development Initiative
LSAHE	Environmental Health and Safety Laboratory
LuxDev	Luxembourg Development Agency
mAb	Monoclonal antibodies
MADIBA	Manufacturing in Africa for Disease Immunization and Building Autonomy
HMPV	Human metapneumovirus
MRC	Medical Research Council
MultiSero-Surv	Serological and parasitological surveillance programme for malaria and neglected tropical diseases
NDA	Non-Disclosure Agreement
NIAID	National Institute of Allergy and Infectious Diseases
WHO	World Health Organization
PaluVOM	Plasmodium vivax, ovale and malariae malaria study programme
PCR	Polymerase Chain Reaction
PfRH5	Target protein for the development of malaria vaccines
PIU-Immuno	Pasteur Immunology Unit - Immunology research initiative
PIV	Human parainfluenza virus
RT-PCR	Reverse Transcription Polymerase Chain Reaction
RV	Rhinovirus
SANDIA	US Department of Energy research and development laboratories
IS	Influenza Surveillance
RDT	Rapid Diagnostic Tests
USUV	Usutu Virus
VaxSen	A subsidiary of the Institut Pasteur de Dakar for the sale and distribution of vaccines
VRC	Vaccine Research Center
RVFV	Rift Valley Fever Virus
HEV	Hepatitis E Virus
RSV	Respiratory Syncytial Virus
WAASuN	West African Aedes Surveillance Network
YFV	Yellow Fever Virus

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1924 - 2024

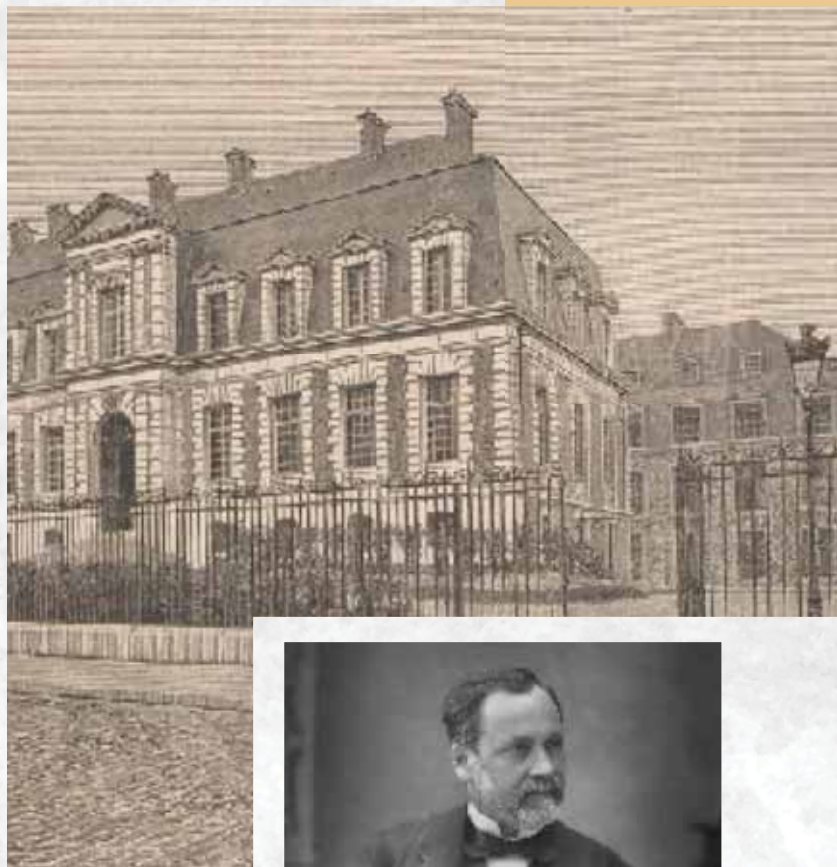


INSTITUT
PASTEUR
de Dakar

About **Louis Pasteur** and the **Institut Pasteur**

I am firmly convinced that the IPD will continue to play a pivotal role in shaping a healthier future for Africa. It is a privilege to do my bit in advancing this mission, and I look forward to working closely with the IPD teams, our partners, and all stakeholders to achieve our shared objectives.

1924



2024

The year
of the centenary
celebration of
the Institut Pasteur
de Dakar.



FOREWORD BY THE CHAIRMAN OF THE BOARD OF DIRECTORS

El Hadji SY

Chairman of the Board
of Directors

2024 marks a historic milestone for the Institut Pasteur de Dakar (IPD) as we celebrate our centenary. A century of commitment to public health in Africa and around the world. It is great honour and a huge responsibility for me to chair the IPD Foundation Board of Directors in this very special year. I am deeply impressed by the achievements of the Institute since its creation in 1924, and I am resolved to continue this work with the same determination and commitment.

The IPD has proven its worth as a major player in the fight against epidemics, as a world-renowned scientific research centre and as a key partner in improving healthcare systems. Our mission, as a Senegalese non-profit foundation, has always been to ensure fair, sustainable and affordable access to quality healthcare services, by proposing innovative solutions tailored to the needs of African populations.

Celebrating our centenary is much more than looking back on a rich and glorious history. It is a unique opportunity to reflect on the future of public health in Africa. This is a unique opportunity to reflect on the future of public health in Africa. The IPD, a pillar in the manufacture of vaccines, essential diagnostics and epidemiological surveillance, plays a key role in the prevention and treatment of endemic infectious diseases. Our expertise in managing health crises, including yellow fever, polio and COVID-19, helps to build a more resilient and responsive African healthcare system.

I am convinced that the IPD will continue to play an essential role in building a healthier future for Africa. I am privileged to be part of this mission and look forward to working with the IPD teams, our partners and all stakeholders to achieve our common goals

M. El Hadji Sy



A WORD FROM THE CHIEF ADMINISTRATOR

Dr. Amadou Alpha SALL

Chief Administrator

The year 2024 will forever be engraved in the history of the Institut Pasteur de Dakar. We celebrated our centenary with pride and emotion, a century of commitment to public health in Africa and around the world.

Since its creation in 1924, the IPD has established itself as a major player in the fight against epidemics, an internationally renowned scientific research centre and a key partner in improving healthcare systems. Our mission, as a Senegalese non-profit foundation, has always been to guarantee equitable and affordable access to quality healthcare services, by proposing innovative solutions tailored to the needs of African populations.

This special centenary comes at a time when the world is facing unprecedented health challenges. The COVID-19 pandemic has highlighted the glaring inequalities in access to diagnostics, treatments and vaccines in Africa. This underlines the urgent need to strengthen regional production capacities and public health institutions. In the face of these challenges, the IPD has embarked on an ambitious transformation to meet today's needs and anticipate tomorrow's challenges.

Celebrating our centenary is more than just looking back on a rich and glorious history. This is a unique opportunity to reflect on the future of public health in Africa. The IPD, a pillar in the manufacture of vaccines, essential diagnostics and epidemiological surveillance, plays a key role in the prevention and treatment of

endemic infectious diseases. Our expertise in managing health crises, such as those linked to yellow fever, polio or COVID-19, is helping to build a more resilient and responsive African healthcare system.

This activity report recaps the highlights of this celebration and sheds light on the commitments made as well as the next steps to be taken with a view to strengthening regional health security.

We are particularly proud of the IPD's achievements in 2024, including:

- The launch of CARE
- The creation of VaxSen
- The development of the syndromic surveillance system in 8 African countries.
- The extension of Diatropix to Mbao
- The opening of a medical analysis and public health laboratory in Touba.

We have also set up new sentinel sites, decentralised public health laboratories and an antimicrobial resistance surveillance programme. We have trained healthcare professionals, conducted clinical studies and strengthened our strategic collaborations with key partners.

We are grateful to all those who have contributed to the success of the IPD over the past hundred years, and we pledge to continue our mission with the same passion and dedication to public health in Africa.

Dr. Amadou Alpha Sall



I

INSTITUT PASTEUR DE DAKAR (IPD) PRESENTATION



**INSTITUT
PASTEUR**
de Dakar

Our Mission

Accelerate equitable, sustainable,
and affordable access to healthcare in Senegal,
Africa, and worldwide.

Our vision

Save and protect lives



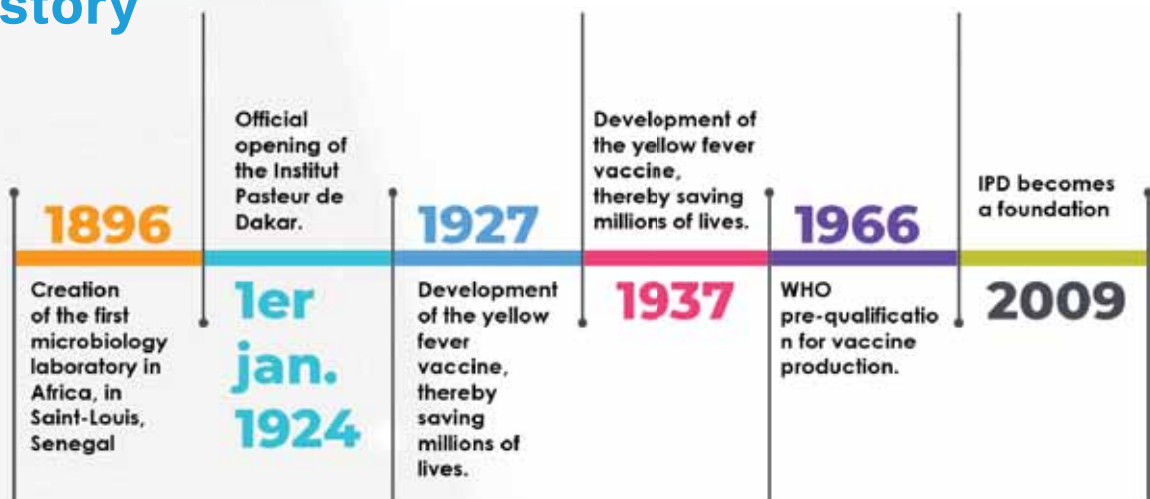
Our Quality Certifications



A century of innovation

Created in 1924, Institut Pasteur de Dakar (IPD) works to accelerate equitable, sustainable and affordable access to health in Africa. As a Senegalese not-for-profit foundation recognized as being of public utility, IPD provides communities with healthcare solutions and laboratory services, engages incutting-edge biomedical research and innovation, manufactures vaccines and diagnostics essential to African populations, develops human capital, and engages in public health activities such as epidemic intelligence, outbreak response, and surveillance.

Our history



Our Values

Ethics



Excellence



Creativity



Equity



Collective intelligence

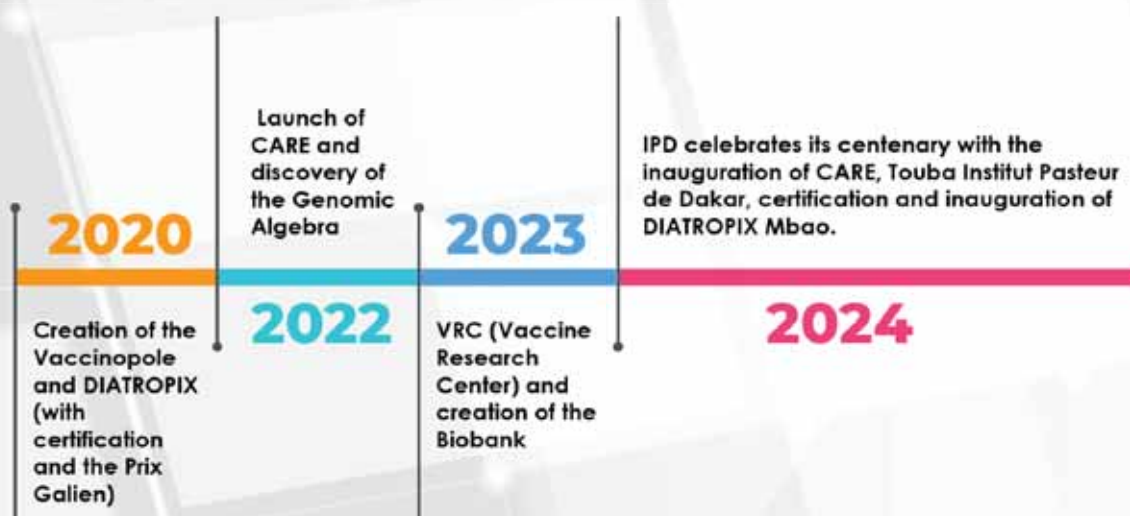


Inclusion



PASTEUR NETWORK

Member of Pasteur Network: Alliance of 33 institutes spanning 25 countries across 5 continents, playing a key role in global public health.



Strategic pillars

RESEARCH



Biomedical research and innovation



SPECIALIST LABORATORY



Healthcare solutions and specialist laboratory services



PRODUCTION



Production of Vaccines and Diagnostics



PUBLIC HEALTH



Public health, epidemiological surveillance and response to epidemics



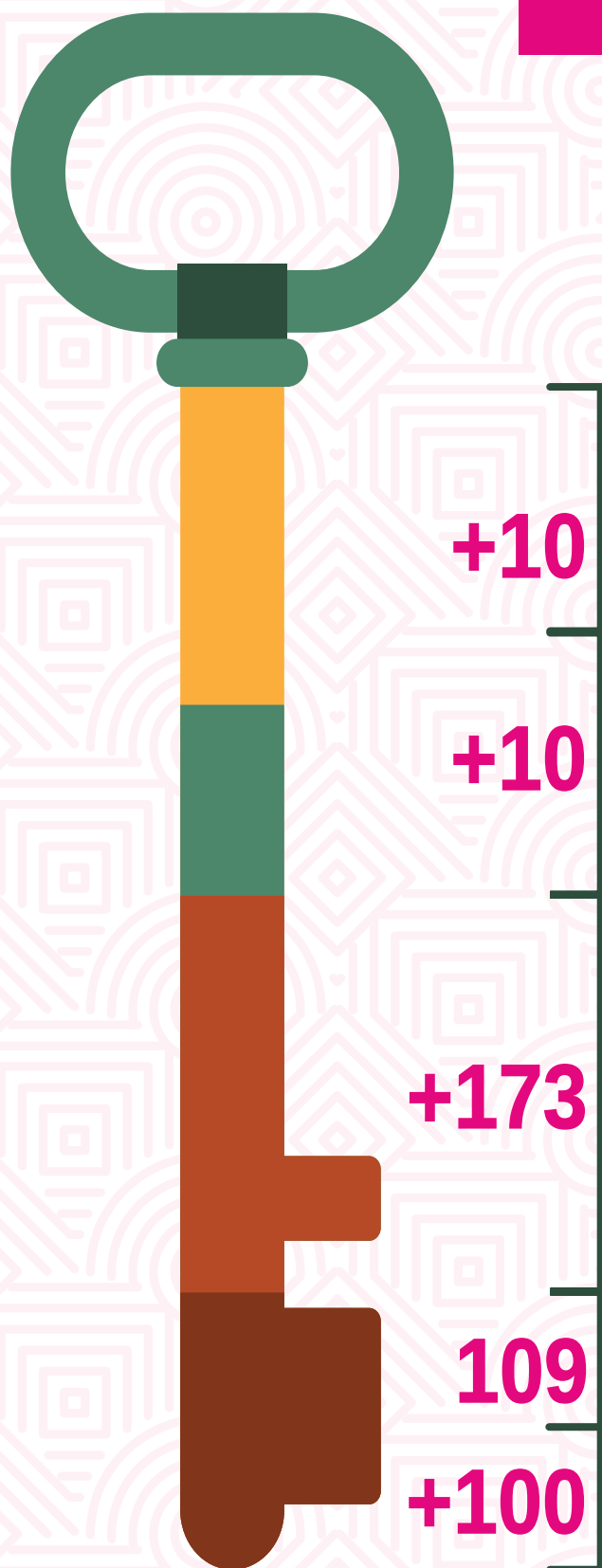
EDUCATION



Education, training and talent development



Key figures for 2024



New sentinel sites have been opened in Senegal and neighbouring countries, increasing the total number from 28 to 39, mainly in border areas such as the districts of Podor, Kidira and Vélingara.

countries in the region have implemented the sentinel syndromic surveillance (4S) system set up in eight West African countries (Gambia, Mauritania, Cape Verde, Niger, Mali, Guinea, Togo and Guinea-Bissau) with the support of Africa CDC, the Gates Foundation and the Global Fund. • Opening of the DIATROPIX factory for the production of rapid tests in MBAO

staff recruited, representing 33% growth in staff numbers compared to the end of 2023

research articles published in 2024

strategic partners





III

HIGHLIGHTS OF 2024

19 January 2024:

Inauguration of CARE (Centrefor Africa's Resilience to Epidemics)

- Highlights: Launch of the centre of excellence for research and biomanufacturing. The event marked an important milestone in IPD's mission to build local capacity for the production of vaccines and other biopharmaceuticals.



February 2024:

- 24 February, 2024 : Inspiring educational visit for 21 students from Lycée Jean Mermoz in Dakar
- Highlights : 21 students visited IPD facilities to learn about microbiological sciences and biomanufacturing. The students took part in interactive activities on microbes and immunity, including laboratory sessions. The visit is part of IPD's educational efforts, in line with its commitment to training future generations of scientists.



March 2024 :

- The Institut Pasteur de Dakar was pleased to welcome the President of the Republic, His Excellency Macky Sall, on a special visit to the Diamniadio Vaccinopole. Together with Dr Marie Khemesse Ngom Ndiaye, Minister of Health and Social Action, the President of the Republic visited the various facilities of MADIBA and AfricAmaril, two infrastructures with state-of-the-art equipment designed to enable the production and filling of various vaccines of regional interest.



April 2024 :

- **From 17 to 19 April 2024**, the Institut Pasteur de Dakar organised a workshop to draw up the strategic plan for its Health System Strengthening (HSS) division, which aims to support African ministries of health in meeting the health needs of their populations through research, innovation and evidence-based decision-making.



May 2024:

- **23 May 2024** : Visit to SANDIA Laboratories at the CARE campus
- Highlights: IPD hosted a 25-person team from SANDIA Laboratories for a training session on biosafety and biosecurity. Sandia Laboratories is a research and development laboratory for the US Department of Energy. The visit provided an opportunity to strengthen collaboration on IFBA certification and BBS training.



- **28 May 2024 (morning)**: Visit by 40 European Union diplomats to the Diamniadio Vaccinopole
- **Highlights**: The diplomats visited the Vaccinopole for a better understanding of the challenges of pharmaceutical sovereignty in Africa. The visit highlighted the role of the IPD in this strategic area.



- **28 May 2024 (afternoon):** Visit by BMZ (German Federal Ministry for Economic Cooperation and Development) and KfW (German Development Bank) to the Vaccinopole in Diamniadio
- Mr. Jochen Flasbarth, Secretary of State, and Dr. Bernhard Braune, Head of the Sahel Division and West Africa of the Ministry and Mr. Sönke Siemon, German Ambassador to Senegal and Guinea-Bissau.
- **Highlights:** German delegations inspected the progress made at MADIBA, with a particular focus on the development of the vaccine production project.



- **16-17 May 2024 :** Visit to the Medical Research Council (MRC) Unit of Gambia
- **Highlight:** Scientific discussions with Prof. Martin Antonio, Dr. Effua Yusuf, Dr. Ed Clarke, Mr. Dembo Kanteh and IPD researchers.



June 2024 :

- **4-5 June 2024:** Pasteur Network scientific meeting in Dakar
- **Highlight :** Enhanced collaboration on vaccine and epidemiological research with the MRC of Gambia was discussed.
- **Photo exhibition** to mark the centenary of the Institut Pasteur de Dakar.



- **24-28 June 2024:** 4th Annual Meeting of WAASuN (West African Aedes Surveillance and Control Network) in Dakar
- **Highlight :** Regional conference on the control of arboviral diseases with the participation of 90 public health experts.



July 2024 :

- **13 and 14 July :** Visit to Dielmo and Ndiop villages by Mr Christophe Rogier, with teams from the Immunology and Epidemiology divisions. This mission is part of a major malaria control project led by the Institut Pasteur de Dakar. A number of monitoring and research sites (epidemiological, parasitological, etc.) have been set up since 1990 to gain a better understanding of the dynamics of malaria. This research, carried out in collaboration with the local authorities, has made it possible to collect valuable longitudinal data on the incidence of the disease and its impact on local populations.



- **4 July 2024 :** Inauguration of the Medical Biology Laboratory in Touba
- **Highlight:** The inauguration of a new state-of-the-art medical biology and public health laboratory in Touba. This event was attended by Serigne Mame Thierno Mountakha Mbacké, son of the Khalif General, the Governor of the Region and representatives of the Senegalese Minister of Health.



- **July 2024:** Cauris d'Or 2024 Ceremony
- **Highlight:** Dr Amadou SALL, Chief Executive Officer of the IPD was honoured at the prestigious Cauris d'Or scientific awards in Senegal. He received an award at this major event.



- **1 to 5 July:** The Institut Pasteur de Dakar held a training session on biological risk management. It brought together 22 dynamic and motivated participants from 11 African countries (Benin, Burkina Faso, The Gambia, Guinea, Mali, Mauritania, Niger, Senegal, Sudan, Togo, Chad and Cameroon). This initiative is part of the Reverse Linkage project, launched by the Islamic Development Bank (IDB) to promote South-South cooperation through peer-to-peer experience sharing and technical and organisational support.



September 2024 :

- **13 September, 2024 :** Visit to the National Institute of Allergy and Infectious Diseases (NIAID) at the IPD campus
- **Highlight:** A visit was organised with discussions around research opportunities in West Africa. Collaboration between the two entities was strengthened around malaria, human genetics, bioinformatics and public health research.
- **The Biosafety and Biosecurity training course** for practitioners from Togo was successfully completed on Saturday 7 September 2024. This intensive session, which began on September 2, 2024, took place at the Africa CDC's West Africa Centre of Excellence, hosted by the Institut Pasteur de Dakar.



- **From September 2 to 13, 2024,** 10 experts from the National Public Health Laboratories of Mali, Burkina Faso, Cameroon, the Republic of Congo and the Comoros will be taking part in a training course in Molecular Diagnostics for the Detection of Pathogens at CARE.



October 2024 :

- **Pasteur Network Annual Meeting in Rio de Janeiro, Brazil under the sponsorship of FIOCRUZ Fundação Oswaldo Cruz**
- **Highlight :** Dr Amadou Alpha SALL, Chief Executive Officer of the Institut Pasteur de Dakar, took part in the Pasteur Network Annual Meeting in Rio de Janeiro. This gathering brought together public health experts, scientific institutions and international organisations to promote global health. A Memorandum of Understanding is signed for research into an mRNA vaccine candidate.



- **22-25 October 2024** : Galien Forum (Support for the global health sector)
- **Highlight** : Attendance of the Institut Pasteur de Dakar at the Galien Forum, a major science and health event.
- **On October 10, 2024**, the Institut Pasteur de Dakar organised a must-attend conference at the Centre for Africa's Resilience to Epidemics (CARE), of the Institut Pasteur de Dakar with a view to addressing the crucial issues of the vaccination system in sub-Saharan Africa. The conference was held as part of the AllianceSHSAfrique project, and highlighted the challenges in ensuring the accessibility and acceptability of immunisation services.



November 2024 :

- **From 11 to 15 November 2024**, the Introduction to Vaccine Manufacturing course will be conducted at CARE in collaboration with African CDCs. This specialised training is part of our ongoing mission to strengthen the biomanufacturing workforce in Africa, designed to provide a comprehensive understanding of the vaccine manufacturing process, from initial steps to finished product



- **21 November 2024**, a delegation from LuxDev - Luxembourg Development Agency visited the campus of the Institut Pasteur de Dakar (IPD), marking an important milestone in our collaboration with LuxDev. This visit highlighted the significant progress achieved as a result of their financial support. This progress includes: Strengthening the storage capacity of the Biobank: Acquisition of 20 freezers in 2022 to improve the conservation of biological resources.



- **On November 20 and 21**, we organised immersion days where we were able to talk to students and share our vision. After visiting the Lycée Coumba Cara, the Lycée Alpha Molo Baldé, the Lycée de Djirédji and the Lycée Ibou Diallo, we met students who are passionate about science and ready to build ambitious careers.



December 2024:

- **December 4, 2024** : Centenary press conference
- **Highlight:** As part of the official launch of the IPD's centenary science week (December 9 to13), the national and international press were invited to a meeting on campus on Wednesday, December 4, 2024. Around twenty journalists (radio, TV and press) were present for a tour of the campus and a visit to some of the IPD's laboratories and departments.



- **December 19, 2024** : Visit by Mr. Makhtar Diop, Managing Director of the International Finance Corporation (IFC) to the vaccinopole of the Institut Pasteur de Dakar

- **Highlight** : On 19 December 2024, Mr Makhtar Diop visited the Vaccinopole of the Institut Pasteur de Dakar in Diamniadio. He reiterated his support for the IPD's health and vaccine sovereignty project, welcoming the progress made and IFC's commitment to supporting this initiative. Mr Diop visited the MADIBA and AfricAmaril factories, which will produce vaccines for emerging diseases and yellow fever respectively. During the visit, particular emphasis was laid on the optimisation production to meet the needs of the African continent.



- **From 16 to 19 December**, the Institut Pasteur de Dakar (IPD), in collaboration with the Ministry of Health and Social Action (MSAS), the Directorate of Maternal and Child Health, the Primary Health Care Unit and the Livestock and Environment sectors, organised a training workshop for members of the Integrated Community Surveillance and Alert Committee (CVACi) at Agname Civol, in the Matam region of northern Senegal.





Celebration of the IPD Centenary Scientific Week

The Institut Pasteur de Dakar (IPD) is about to celebrate its centenary in great style from 9 to 13 December 2024 Under the theme 'Empowering the future: a centenary of excellence in public health'. The event will be an opportunity to look back on the highlights of the institution's history and to outline its future prospects.

A rich and varied programme :

- **9-10 December 2024:** Scientific Symposium - From pathogens to countermeasures
- **11 December 2024 :** Forum on innovation and entrepreneurship in healthcare - Presentation of groundbreaking innovations and entrepreneurial initiatives
- **12 December 2024 :** Inauguration of Diatropix Mbaou
- **12 December 2024 :** 3rd IPD Annual Forum on Epidemics - Discussions on the fight against epidemics and public health policy
- **13 December 2024 :** Partners' Forum
13 December : We were honoured to receive a visit from H.E. President Bassirou Diomaye Faye to the Vaccinopole, Madiba in Diamniadio, and to sign the IFC, ADB and VaxSen agreement.
- **15 December :** the staff walking event was organised as part of the centenary celebrations under the theme: «Empowering the future: A centenary of excellence in public health».
- **16 December :** IPD staff event - Centenary celebration







IV

**STRATEGIC
SUPPORT
UNIT**

Directorate Highlights for 2024

The «Study of the genetic predisposition to early-onset breast cancer in Senegal» project, launched in September 2024, aims to study the genetic predisposition to breast cancer diagnosed before the age of 40 in Senegalese women. This type of cancer, which is often more aggressive, is still under-documented in African populations and leaves a significant gap in terms of genetic diagnosis, prevention and targeted treatment. This project seeks to bridge this scientific gap, while integrating genomic medicine into healthcare practices in Senegal, through research, clinical screening, capacity building and international collaboration.

Since its inception, the project has achieved a number of significant milestones. A comprehensive research protocol has been drawn up, covering the entire process from the identification of participants to the analysis and reporting of results. An active collaboration has been established with Hôpital Aristide Le Dantec, where a cohort of 125 women with early-onset breast cancer has been set up. The associated clinical data is rigorously collected for in-depth analysis.

In terms of human resources, a research nurse was recruited and funding was provided to support the involvement of local scientists and clinicians. In addition, an international conference held in Dakar brought together experts from around the world and local partners and further strengthened the momentum of the project. Moreover, a training workshop on Whole Genome Sequencing (WGS) was organised, resulting in the first human genome sequence carried out in Senegal. This represents a major step towards the development of genomic medicine in the country.

The next stages include the expansion of the cohort, bioinformatics analysis of the genetic data, new training sessions, and the strengthening of local partnerships (in particular with Cheikh Anta Diop University) and international partnerships (including Illumina). The project is a strategic turning point for cancer research in Africa, with the aim of reducing inequalities in access to medical genetics and improving the clinical management of Senegalese women with breast cancer.

As part of “Catalyzing Equitable Artificial Intelligence (AI) Use to Improve Global Health” initiative, Grand Challenges Sénégal launched a call for projects aimed at promoting the equitable use of artificial intelligence to strengthen healthcare systems. The call attracted a great deal of interest. A total of 75 applications were submitted and 40 were shortlisted and examined by a panel of multidisciplinary experts. Following the evaluation process, 10 innovative projects were selected for funding. These initiatives cover a wide range of fields, including clinical decision support, healthcare communication, AI-assisted diagnosis and improving training for healthcare professionals. The selected projects reflect a strong commitment to adapting advanced technologies to the local context, integrating inclusive, linguistic and community-based approaches, in order to respond effectively to the health challenges in West Africa, and more particularly in Senegal.





V

**RESEARCH,
EDUCATION, AND
INNOVATION
DIRECTORATE**

5.1.1 Background and Reminder of The Directorate Objectives

In 2024, the Institut Pasteur de Dakar's Directorate of Research, Education and Innovation (DREI) continued to excel in its mission to stimulate scientific discovery, educational excellence and innovative advances to improve human health. DREI is rooted in curiosity-driven research and has actively generated new knowledge in the life sciences and biomedical sectors. It tackled critical scientific issues in a way that was both innovative and impactful.

On the operational side, the DREI has structured its activities around a research department with five specialised research hubs, three state-of-the-art technology platforms, a dedicated training centre and two key support services for research activities: the Grants Office and the Scientific Careers Unit. These entities collectively provided a dynamic and integrated ecosystem that fostered multidisciplinary collaboration, effectively translating scientific discoveries into tangible solutions.

5.1.2 Alignment with Strategic Priorities

The Directorate of Research, Education and Innovation (DREI) is fully in line with the strategic pillars of the Institut Pasteur de Dakar (IPD), particularly the pillars focusing on biomedical research and innovation as well as education, training and talent development. In 2024, the IPD continued to play a key role in generating new scientific knowledge through cutting-edge research in the life sciences and biomedicine. In this way, it contributes to the IPD's objective of responding to major health challenges with innovative and relevant approaches. By structuring its activities around five specialised research hubs and high-level technology platforms, it has consolidated an ecosystem conducive to innovation, encouraging the translation of scientific discoveries into concrete solutions for public health.

In addition, through its training centre and its scientific career development initiatives, DREI is actively building local and regional capacity. DREI is training a new generation of researchers, experts and health professionals in Africa, thereby contributing to scientific empowerment and knowledge sustainability. In addition, by facilitating access to funding, the Grants Office and the Scientific Careers Unit provide support for career development, thereby fostering excellence and continuity in scientific commitment. In short, the DREI is the embodiment of the IPD's strategic vision, catalysing innovative research and developing human capital to better respond to the health priorities of the African continent.

5.1.3 Directorate highlights for 2024

In 2024, the Grants Office of the Institut Pasteur de Dakar (IPD) played an active role in facilitating the Institute's research funding strategies. Dr Fatoumata NIANG was hired as the new director to lead a team of four project managers. Despite its small team, the office managed a portfolio of 52 active projects, funded 16 project applications and secured a total project funding of over € 25.9 million. The Office achieved a 30% success rate in grant applications. The support provided ranged from pre-contractual reviews (NDA, due diligence, MoU), to research contracts, subcontracting, material transfer agreements (MTAs) and collaboration agreements, for a total of 60 contractual actions. The office has made major digital transformation efforts to improve efficiency and compliance, including the deployment of Zoho One, the optimisation of project management, the facilitation of task automation and the centralisation of project information.

Moreover, educational initiatives have been developed to ensure widespread dissemination of knowledge, equipping both existing and future healthcare professionals with cutting-edge skills and expertise to address the ever-evolving threats to global health. The Centre for Africa's Resilience to Epidemics (CARE), launched on January 19, 2024, has rapidly established itself as a dynamic hub for scientific collaboration, education and innovation at the Institut Pasteur de Dakar. Under the leadership of Ms Isha Njai, CARE successfully organised more than 120 high-impact meetings and training sessions throughout the year, and succeeded in attracting more than 1,200 students and professionals to the IPD campus. This ambitious educational programme included specialised courses such as malaria diagnostics powered by artificial intelligence, single-cell genomics and REDCap 101. These courses were delivered in close collaboration with world-renowned institutions such as the NIH, Stanford University and the Massachusetts Institute of Technology/Broad Institute. These partnerships have significantly raised the profile of IPD, attracting exceptional talent and fostering an environment of intellectual exchange. In addition, the establishment of the CARE Scientific Advisory Board has laid a solid foundation for future strategic directions and strengthened IPD's position at the forefront of epidemic preparedness and response in Africa.

Under the leadership of Ousmane Noël Diallo, significant progress was made in 2024 on two of the Institut Pasteur de Dakar's major technological platforms: the Biobank and the Mobile Laboratory. Key investments were made to strengthen the Biobank, especially through the recruitment of a dedicated team of eight people. Substantial progress was made thanks to the successful implementation of ModulBio, an advanced Laboratory Information Management System (LIMS), which was fully

set up, installed and deployed. The Biobank therefore stored more than 20,000 new biological samples this year, considerably strengthening the IPD's research infrastructure. In addition, the team undertook intensive preparations to achieve certification in accordance with ISO23187, underlining IPD's ongoing commitment to international best practice and quality assurance in biobanking. Our three mobile laboratories were actively deployed in various field missions and simulation exercises throughout 2024, proving their crucial role in rapid epidemic response and preparedness. Extensive in-house training and routine mechanical maintenance programmes have been carried out to ensure operational readiness and optimal sustainability. In addition, efforts are being made to establish a robust rental-based business model, supported by detailed standard operating procedures (SOPs with a view to promote the long-term viability and efficiency of this strategic resource.

In parallel, DREI has vigorously pursued innovative translational projects, protecting intellectual property, encouraging new ventures and facilitating the deployment of tangible and virtual experiments to ensure a broad societal benefit. As a result, the Directorate has strengthened its role as an effective catalyst for socio-economic development and improved public health. As such, it is firmly committed to its mission of harnessing discovery, education and innovation for the benefit of humankind.

5.2 Virology Division

5.2.1 Alignment with Strategic Priorities

Our virology department, true to Pasteur's mission, is dedicated to public health, research, training and expertise. We monitor key viruses (polio, influenza, yellow fever, measles, rabies, arboviruses) and conduct in-depth research into:

- arboviruses and haemorrhagic fever viruses,
- enteric viruses,
- respiratory viruses,
- rabies and encephalic viruses,
- and viral cancers.

Our research is organised around a number of unifying programmes, including:

- the development of diagnostics,
- the study of virus/vector/host interactions,
- the molecular evolution of viruses,
- monitoring and discovering new pathogens,
- vaccine research,
- and the study of viral cancers.

In 2024, we completed several flagship projects in each of these areas.



5.2.2 Major Achievements

Over the past year, research and surveillance activities have led to significant advances in several key areas of public health. These advances were achieved through approximately thirty projects focused on six priority areas: the development of diagnostic tools, the study of virus-vector-host interactions, the molecular evolution of viruses, the surveillance and characterization of emerging pathogens, vaccine research, and the investigation of virus-induced cancers.

1. Development of innovative diagnostic tools

Several projects enabled the design of rapid and accessible solutions adapted to local contexts for the detection of infectious diseases. The PREPARE-TID project, in consortium with European and African partners, has contributed to the development of a digital pipeline for «One Health» surveillance of cross-border diseases. Other projects have developed multiplexed molecular tests for dengue and yellow fever (LFD-LAMP), detection algorithms for sylvatic strains of DENV-2, and a rapid test based on the MxA protein, validated for CHIKV and DENV. The OMiCount bioinformatics tool has also optimised the design of primers, taking viral diversity into account.

2. Studies on virus-vector-host interactions

These studies led to a deeper understanding of the biological dynamics between pathogens, vectors and hosts. In particular, the lineage H Rift Valley fever virus has shown a strong capacity for replication in vitro, and a study to validate biomarkers in children has made it possible to better differentiate between bacterial and viral infections, resulting in better management of antibiotics.

3. Molecular evolution of viruses

The continuous epidemiological surveillance of respiratory and enteric viruses has led to the identification of new strains and analysis of their circulation. The studies that have been carried out

enabled the documentation of the genetic diversity of rabies viruses, enteroviruses, encephalogenic arboviruses and chikungunya, thanks to innovative tools such as the AmpliSeq system, which is specific to the West African genotype.

4. Surveillance and characterisation of emerging pathogens. A number of projects have enhanced the detection and characterisation of zoonotic and respiratory viruses through genomic and eco-epidemiological approaches. Studies on avian influenza viruses, climate-related arboviroses, haemorrhagic fevers and the hepatitis E virus have revealed high viral diversity, active transmission and environmental and behavioural risk factors. A particular focus was placed on xenomonitoring (detection of viruses in mosquitoes), with more than 400 samples analysed.

5. Vaccine research

Three major projects focused on the clinical evaluation of vaccines: the EuTCV typhoid vaccine was proven to be non-inferior and safe, the NIFTY project evaluated divided doses of yellow fever vaccine, and the partnership with CEPI made it possible to build local capacity for vaccine evaluation tests. These results will guide future vaccine policies.

6. Studies on viral-induced cancers

A multicentre study of HPV infection in women in Senegal revealed a high prevalence (27.9%) with a high genotypic diversity, particularly of high-risk HPVs. This study paves the way for targeted prevention strategies and the search for early biomarkers of carcinogenesis. All these projects reflect the growing expertise in viral genomics, diagnostics and integrated surveillance. They provide practical tools for anticipating epidemics, improving clinical management and guiding evidence-based public health policies.



5.2.3 Quantification of Impact and Results

The Virology division contributed to 32 publications, which can be found on the publications page

5.3 Immunopathophysiology and infectious diseases

5.3.1 Alignment with the 5 Strategic Pillars of the IPD

The IMI (Immunophysiopathology and infectious diseases) division has made significant progress, becoming a dynamic research centre on malaria and immunity. We have promoted interdisciplinary collaboration, launched cross-disciplinary projects and invested in cutting-edge technologies and capacity building.

Our goal: to translate research into public health solutions (vaccines, diagnostics). The integration of diverse expertise (immunology, parasitology, genomics) has strengthened our leadership in the fight against endemic and epidemic pathogens.

Our activities are aligned with the IPD's three strategic pillars:

- Biomedical research and innovation: basic and applied research for new prevention strategies.
- Public health and epidemic response: contributing to epidemic surveillance and response.
- Education and talent development: training future leaders in immunology.

These advances strengthen our role in global IPD research.



5.3.2 Major achievements

In 2024, the division of Immunophysiopathology and Infectious Diseases (IMI) of the Institut Pasteur de Dakar, under the leadership of Dr Inès Vigan-Womas, strengthened its structure around four dynamic research groups, bringing together 25 professionals with complementary profiles. The division has made significant contributions to biomedical innovation, the fight against infectious diseases, and local capacity building by leveraging significant scientific advances, strategic partnerships, and sustained investment in cutting-edge technologies.

Area I - Immunity to infectious diseases

The team has stepped up its efforts to understand immune protection mechanisms and support the development of new tools to respond to epidemics. The GILSER-IPD project funded by the Gates Foundation, has enabled the integration of genomics, clinical epidemiology and immunology to improve monitoring of circulating viral variants (in particular SARS-CoV-2) and enhance diagnostic capabilities. A technological platform for the discovery of monoclonal antibodies has been set up thanks to the acquisition of the 10x Genomics system. In addition, the ALERRT-ACE2-TMPRSS2 study explored the genetic factors associated with the severity of COVID-19 in Senegal.

The CEPI-CLN-IPD laboratory, integrated into the global network of CEPI laboratories, has been set up to standardise immunological tests and accelerate vaccine development. In addition, the PIU-Immuno initiative, coordinated with the Pasteur Institutes of Cambodia and Madagascar, has launched new training courses on adaptive immune responses to emerging pathogens (COVID-19, dengue, disease X).

Area II - Malaria and neglected tropical diseases (NTDs)

Under the coordination of Dr Makhtar Niang, several projects have transformed the epidemiological surveillance of malaria. The MultiSeroSurv project, supported by the ERC, has implemented an integrated approach combining serological and parasitological data, monitoring 600 people in Kédougou. ASYMALE, funded by the EDCTP, analysed the asymptomatic transmission of malaria in Dielmo and Ndiof, revealing high-risk areas and the dynamics of silent transmission. PaluVOM documented the prevalence of non-falciparum species in Senegal, and reported the first cases of severe *P. vivax* malaria. Axe.

Area III – Development of malaria vaccines

Under the direction of Prof Amy K. Bei and Dr Laty Gaye Thiam, the research aimed to understand the immune evasion of the *Plasmodium falciparum* parasite. Monoclonal antibodies derived from clinical trials showed effective inhibition of erythrocyte invasion. Genomic

analysis revealed new mutations in vaccine targets (PfCyRPA, PfRH5), validating their potential in broad-spectrum vaccine formulations. Several complementary projects (EDCTP-MVC-2G, NIH-R01, ARISE, PTR Pasteur) have strengthened our understanding of genetic diversity and its impact on vaccine efficacy, particularly through multicentre trials in Africa.

Area IV - Resistance to antimalarial drugs

Dr Alassane Mbengue has led efforts to monitor resistance markers in Kédougou. The absence of PfKelch13 mutations reassures us that ACT is effective, while the emergence of the 581G mutation in the dhps gene calls for increased vigilance. These data are essential for adjusting therapeutic policies and preventing the emergence of resistant strains.

Public health and response to epidemics

Finally, IMI has coordinated several serosurveillance projects (MultiSeroSurv, xSTAR, ULTIMaSero, EFA-SEN, DSP-SeroSurv), using advanced multiplex tests and modelling to map exposure to pathogens and guide the response to epidemics. These tools provide critical information on herd immunity, vaccine effectiveness and the circulation of emerging pathogens. As a result, regional and global health security is strengthened.

5.3.3 Quantification of Impact and Results

- o Key IMI achievements in 2024 include:
- o 17 international peer-reviewed publications
- o 3 training and workshop sessions held at IPD (CARE) with over 72 young Senegalese and African scientists trained on malaria control and elimination strategies, data management with REDCap and the discovery of monoclonal antibodies based on single-cell RNA sequencing methods
- o Training and capacity-building for students at Cheikh Anta Diop University (UCAD), with the thesis defence of 2 Masters students and 2 PhD students
- o Setting up and coordination of the Coalition for Epidemic Preparedness and Innovation (CEPI-CLN-IPD) reference centre for the validation of vaccines during clinical trials.
- o Paving the way for a new generation of malaria vaccine with the first report on the sensitivity of clinical *P. falciparum* isolates from natural infections to PfRH5 monoclonal antibodies induced by the vaccine.
- o Implementation of the MultiSeroSurv project aimed at strengthening molecular and serological tools for the integrated surveillance of malaria and several neglected tropical diseases (malaria, lymphatic filariasis, gastrointestinal parasites, onchocerciasis, schistosomiasis),
- o Besides COVID-19, several collaborative programmes have been launched to improve serosurveillance of pathogens (including arbovirus and haemorrhagic fever pathogens) and guide public health interventions (MultiSeroSurv, xSTAR,

ULTIMaSero, EFA-SEN, DSP-SeroSurV)

- o Participation of IMI scientists in international training programmes and workshops
- o Workshop for laboratory technicians and health workers on sampling to assess the functional impact of genetic diversity on malaria vaccines (October 2024, N'Djamena, Chad): Dr. Amy K. Bei (faculty member).
- o Antimicrobial resistance: integrated surveillance for public health in Chad (October 2024, N'Djamena, Chad): Dr. Amy K. Bei (faculty member).



- o Antimicrobial resistance: integrated surveillance for public health in Chad (October 2024, N'Djamena, Chad): Dr. Amy K. Bei (faculty member).
- o Training on microscopic diagnosis of malaria as part of Novartis' clinical trials of new antimalarial drugs, Ghana (Kintampo & Navrongo, March 18-29, 2024) and Rwanda (Kamembe & Rubavu, May 13-24, 2024). Dr. Makhtar Niang (faculty member).

5.4 Microbiology

5.4.1 Alignment with the 5 Strategic Pillars of the IPD

The Institut Pasteur de Dakar is a major driver of scientific innovation and public health expertise for Senegal and the West African region. In 2024, the IPD's commitment to research, education, and innovation continued to drive progress in addressing some of the most pressing health challenges facing Africa. This annual report describes the achievements of the Microbiology Pole in basic and applied research, capacity building, and public health in the fields of antimicrobial resistance, the microbiome, and bacterial pathogenesis.

5.4.2 Major Achievements

HoliCare: A holistic approach to patient care and epidemic surveillance through the convergence of diagnostic technologies, capacity building, and stakeholder engagement

The HOLICARE project aims to transform healthcare delivery in sub-Saharan Africa by addressing the challenges associated with poverty-related diseases. By prioritizing lower respiratory tract infections, given their profound clinical and socioeconomic impact, HOLICARE seeks to develop innovative diagnostic solutions tailored to low- and middle-income countries.

Major milestones were achieved in 2024 with significant progress in the development of two-tier diagnostic devices. The multiplex lateral flow tests for URTIs have been completed and clinical validation will be carried out in 2025. The development of the lower respiratory infection diagnostic instrument is currently underway, alongside the optimization of biomarkers and molecular targets. All of these devices will be digitized and data will be collected via the Redcap platform.

The consortium is made up of 14 partners from Europe and Africa and includes: Teesside University, GADx, and Teesside University in the United Kingdom; Kungliga Tekniska Högskolan, Karolinska University, and Stockholm University in Sweden; Hahn Schickard and Mast Diagnostica from Germany; Blumopho from France; iSTOC from Finland; Armauer Hansen Research Institute from Ethiopia; Makerere University and Epicentre from Uganda.

5.4.3 Quantification of Impact and Results



The Holicare project focuses on capacity building and offers a series of online webinars. The latest webinar was held on April 26, 2024, and focused on LAMP technology. In addition, a doctoral student working on this project traveled to Sweden and Germany for a secondment to gain a better understanding of the diagnostic solutions proposed in this project. The annual meeting and workshop were held in Uganda in November 2024, and the next session will be held in Dakar in 2025 on a large scale with the participation of start-ups and local and international stakeholders as well as health authorities.

This is a cross-cutting project carried out institutionally in collaboration with Diatropix for the mass production of multi-LFTs.

5.5 Medical Zoology

5.5.1 Alignment with the 5 Strategic Pillars of the IPD

In 2024, the IPD's Medical Zoology Unit contributed to the fight against vector-borne diseases through research on the transmission of malaria and arboviruses, including vector ecology and animal reservoirs. The IPD projects led to a better understanding of insecticide resistance, the development of innovative methods such as the use of Wolbachia and inhibitor molecules to control vectors, and the strengthening of regional capacities for epidemiological surveillance. The international collaboration has been crucial in supporting epidemic prevention and management through publications and training.

5.5.2 Major Achievements

In 2024, the IPD's Medical Zoology division made significant progress in the fight against vector-borne diseases, particularly malaria and arboviruses. These efforts focused on understanding transmission, vector ecology, and animal reservoirs, with innovative projects and growing international collaboration.

With regard to the vector transmission of malaria, several studies have highlighted the adaptation of mosquitoes, particularly the *Anopheles gambiae*, to environmental changes. The ANR MoVe=>ADAPT and ANORHYTHM projects analyzed the impact of variations in salinity and artificial night lighting on mosquito survival. This research has revealed the potential emergence of new taxonomic units in Casamance, calling for enhanced surveillance. An innovative approach has been explored with the study of inhibitory molecules aimed at disrupting mosquito reproduction. This offers a new approach in the fight against malaria transmission.

The ASYMALE and MESRI-CRDI projects studied residual malaria transmission by *Anopheles arabiensis* and *Anopheles funestus*, highlighting the persistence of outdoor and daytime transmission despite conventional control measures. This finding underscores the need to adopt complementary control strategies, particularly in the face of insecticide resistance.

The ecology of arbovirus vectors has also received special attention. The WAC-EID project in Kédougou revealed the presence of multiple arboviruses in mosquitoes which increases the risk of zoonotic transmission. The identification of new mosquito species, such as *Culex watti*, *Aedes albopictus*, and *Anopheles culicifacies*, as well as the detection of emerging viruses, has enriched our understanding of vector biodiversity. Analysis of natural hosts has shown the circulation of viruses such

as CHIKV in ruminants and dogs, and the presence of orthohantaviruses in rodents and bats, highlighting their crucial role as pathogen reservoirs.

As part of the ARBOSEN** project, an interregional study was conducted to analyze the spread of potentially pandemic viruses such as **Rift Valley fever virus** and **Crimean-Congo hemorrhagic fever virus**. Samples of mosquitoes, ticks, and animal serum were collected, revealing the presence of several viral strains, including **CCHF** and **Pestivirus A**. Acaricide efficacy tests also showed promising results for controlling the ticks that carry these viruses.

The project to map the risk of arbovirus transmission in Senegal, funded by the GATES FOUNDATION and the US Navy, has provided a better understanding of the dynamics of *Aedes aegypti*, the main vector of dengue fever and other arboviruses. Unprecedented results have been obtained on insecticide resistance in local populations of *Ae. aegypti*, including the discovery of mutations which increase resistance to chemicals.

At the same time, the center organized the 4th Annual Meeting of the West African Aedes Surveillance Network (WAASuN), which brought together 85 participants from 16 countries, and contributed to the fight against dengue and CCHF epidemics in Senegal, Cape Verde, and Mauritius.

In addition, new projects have been launched to prevent the transmission of arboviruses through the use of Wolbachia, to study the impact of climate change on Rift Valley fever, and to explore mosquito diversity in West Africa as part of the DIV-Yoo project. These initiatives aim to strengthen regional capacity for vector-borne disease surveillance and control.

In short, the achievements of 2024 demonstrate an integrated and multidisciplinary approach to health threats related to vectors and emerging pathogens, while strengthening scientific and regional collaboration to anticipate and respond to epidemics.

5.5.3 Quantification of Impact and Results

- Courses, training, and mentoring activities
- Publications : A total of 12 articles were written by members of the division.
- Supervision of doctoral theses. The Zoology division admitted eight doctoral students in science.
- Division members participated in eight examination committees, including seven theses and one HDR (Habilitation à Diriger des Travaux de Recherche, or accreditation to supervise research) at Cheikh Anta Diop University in Dakar, the University of Abomey-Calavi in Cotonou, Benin, and the University of Montpellier in France.

- Division members took courses during the 2024 session of the course on insect vectors and pathogen transmission (IVTAP) at the Pasteur Institute in Paris, the 2024 sessions and the DES in clinical biology at the Dakar Faculty of Medicine in March and April 2024.

5.6 Biobank

The IPD biobank plays a crucial role in biomedical research and innovation by providing standardized biological samples, such as DNA, tissue, and serum, which are essential for in-depth study of diseases, particularly infectious diseases and chronic pathologies. It provides privileged access to genomic and clinical databases, facilitating the identification of specific biomarkers and the development of new therapies. This infrastructure also supports translational studies, thereby promoting the transition from basic research to concrete clinical applications. By enabling the use of high-quality biological resources, the biobank actively contributes to biomedical innovation, in line with the IPD's strategic objectives for research and innovation.

In the fields of vaccine and diagnostic product production, the biobank provides essential support by storing and distributing microbial strains and samples containing pathogens or biological resources that are essential for preclinical testing.

It also plays a leading role in the validation of diagnostic kits, providing representative samples from various populations, and participates in the development of specialized biobanks to accelerate the development of vaccines and therapeutic antibodies. This direct contribution to research on infectious agents positions the IPD biobank as a key player in responding to public health needs and combating infectious diseases.

With regard to public health and epidemic response, the IPD biobank provides continuous monitoring and storage of samples from populations at risk, facilitating the study of disease emergence and spread. It contributes to the creation of pathogen strain banks used to analyze genetic variations in infectious agents and track their evolution. In addition, its ability to provide rapid access to biological resources during health crises, such as pandemics or epidemic outbreaks, makes it an indispensable tool for emergency public health responses. This supportive role in epidemic control efforts makes the biobank a fundamental pillar of the IPD's public health strategy.

Training and talent development are also core activities of the biobank. By providing a learning platform for students and researchers in fields such as biology, public health, and biotechnology, the IPD biobank contributes to the skills development of future experts. It offers in-depth training on biobanking techniques, such as collection, storage, and data analysis, as well as on the ethical, regulatory, and social implications of biological resource management. This pedagogical approach, in

collaboration with universities and institutes, promotes best practices in biological resource management, thereby fostering a rigorous and ethical research environment.

Finally, the IPD biobank plays a key role in developing healthcare solutions and specialized laboratories. Through partnerships with clinical and industrial laboratories, it promotes the development of diagnostic and therapeutic solutions based on the biological samples it stores. Its integration into hospital infrastructures and personalized medicine platforms enables better optimization of biosafety protocols and sample traceability, ensuring their quality for various medical and scientific applications. By aligning with international standards, such as ISO 20387: 2018, it ensures the quality, reliability and traceability of biological samples and associated data, reinforcing its credibility and effectiveness on the scientific, industrial and regulatory arena.

In summary, the IPD biobank is a strategic tool for biomedical research, public health, innovation, and training. Through its role in providing high-quality biological samples and its ability to support various research projects, it fits perfectly with the IPD's strategic pillars, actively contributing to advances in the fight against infectious and chronic diseases, while supporting the development of diagnostic and therapeutic solutions tailored to public health needs.

5.6.1 Major Achievements

- Biomedical research and innovation: Dry ice production project in progress
- Vaccine and diagnostic product production: Biological resource plate development project underway
- Public health, epidemiological intelligence, and epidemic response: Optimization of biological resource quality, installation of a PSM3 (in progress), delineation of biobank spaces, control of biosafety, biosecurity, and environmental conditions, centralized reception of epidemiological surveillance samples in Senegal (e.g., the 4S network), installation and configuration of software for managing biobank operations (Modul-Bio, "Biobank Information Management System")
- Education, training, and talent development: Facilitation during training organized by Africa CDC on biobanking in Africa

5.6.2 Quantification of Impact and Results

To date, the Biobank contributes to more than 40% of the quality of scientific research results and public health initiatives in Senegal and Africa.

5.7 Grant Office

The Grant Office's activities are designed to support the IPD's mission by financing and managing research projects in the institute's various areas of expertise. The Grant Office's alignment with the IPD's strategic pillars is reflected in its ability to identify suitable funding opportunities and assist with the preparation of project proposals. Through the planning and budgeting of research projects and the negotiation of contracts with donors and partners, the Grant Office facilitates the implementation of initiatives that contribute to the deployment of the strategic pillars. Project management and monitoring ensure that scientific and operational objectives are achieved, while internal scientific coordination promotes the dissemination of knowledge, the development of collaborations, and thus interdisciplinarity in the development of innovative research projects. The Grant Office also contributes to strengthening infrastructure and specialized laboratories by mobilizing resources for laboratory equipment and technology platforms, thereby enhancing the IPD's impact on public health (surveillance and response to epidemics) and biomedical research.

5.7.1 Major Achievements of the Grant Office

In 2024, the DREI Grant Office strengthened its strategic role in supporting research and innovation projects. The team made up of four members specialized in project management, finance, legal, and scientific fields ensured comprehensive coverage of the project lifecycle. The grant office's support enabled the organization of several key events, including workshops on malaria, confined environment diagnostics (BSL3/4), and the launch of the SeqAfrica project. On the operational level, 68 projects were actively funded with over 42 million euros. At the same time, the implementation of the Zoho One digital suite has helped modernize grant management by automating certain tasks, centralizing information, and making it easier for people to work together within the Pasteur ecosystem.

5.7.2 Quantification of Impact and Results

The year 2024 was marked by tangible results in terms of impact. The Grant Office contributed to an increase in the success rate of bids. A total of 52 projects were submitted, of which 22 were funded, accounting for a success rate of 42%. Analysis of the responses to the 2024 satisfaction survey, sent to project leaders and internal partners, reveals a satisfaction rate of 89%, highlighting the quality of support, the responsiveness of the team, and the relevance of the advice provided. In addition, the implementation of internal KPIs has made it possible to better monitor contractual deadlines, compliance with implementation schedules, and compliance with donor rules. These tools contribute to the continuous improvement of project management by ensuring transparency, traceability, and efficiency.







VI

**INDUSTRIAL
OPERATIONS
DIRECTORATE**

6 Industrial Operations Directorate

6.1 Background and Reminder of The Directorate Objectives

Implementation of the Vaccinopole project in Diamniadio to support vaccine production in Dakar and manage the sharp increase in production capacity which is expected to reach 300 million doses per year.

6.2 Alignment with the 5 Strategic Pillars of the IPD

1. Collaboration with research and training projects for efficient and impactful research
2. Continued implementation of the MADIBA (Vaccines) and DIATROPIX projects (RTTs)
3. Cooperation with the public health department on target vaccines and diagnostics and their distribution areas
4. Collaborative work with the KWAME vaccine training center project to develop its product offering
5. Collaboration with various parties on water and microbiology issues, which are key areas in vaccine production

6.3 Directorate Highlights for the Year 2024

1. Adherence to the recruitment and training plan with a doubling of staff numbers.
2. Installation of the filling facility at the first production site in Diamniadio.
3. Renewal of WHO prequalification for the production of yellow fever vaccines.
4. Inauguration of the DIATROPIX factory for the production of rapid tests in MBO and achievement of BSI certification.





VII

DIATROPIX

7 DIATROPIX

7.1 Background and Reminder of The Directorate Objectives

DIATROPIX (DTX) is committed to research and development and the manufacture of diagnostic tests for neglected tropical diseases and epidemics. Its main objective is to give everyone access to diagnostics in Africa and help strengthen health surveillance systems through rapid, decentralized detection of pathogens and rapid response to epidemics. As part of its geographic expansion and portfolio development, DTX is diversifying its expertise and training young talent to ensure its competitiveness in the field of in vitro diagnostics.

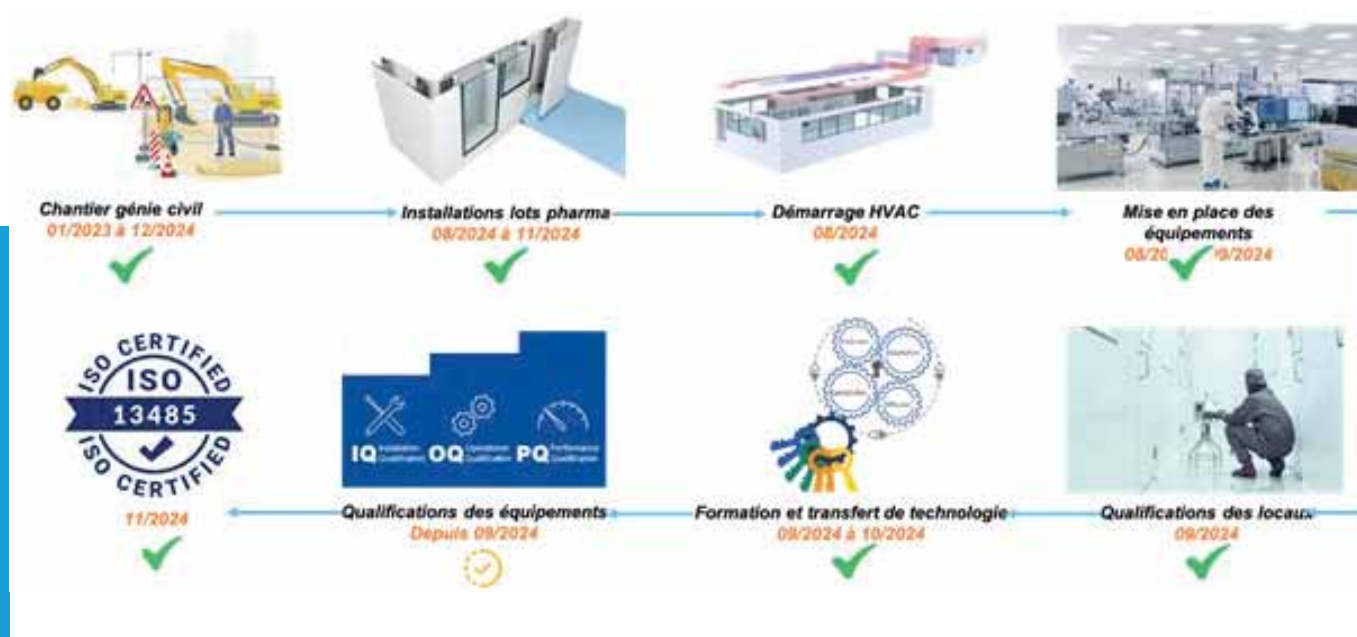
7.2 Alignment with the 5 Strategic Pillars of the IPD

Diatropix (DTX) is fully aligned with the IPD's strategic pillar dedicated to the production of vaccines and diagnostic products by developing and manufacturing rapid tests for neglected tropical diseases and epidemics. In 2024, DTX reached a major milestone with the construction of an ISO 13485-certified factory in Mbao, which considerably increased its production capacity (up to 75 million tests/year). This facility enables a rapid response to epidemics, strengthens African health sovereignty, and supports local production of essential diagnostics (HIV, measles, yellow fever), while training a new generation of in vitro diagnostics professionals.

7.3 Directorate highlights for 2024

In 2024, DTX built a factory with the support of the DRO, covering three floors of 1,250 m2 each, including a clean room in Mbao. The new factory has a production capacity of 15 million tests per year in a single 8-hour shift with a limited workforce (max. 40 operators) and 75 million tests per year in three shifts with a workforce of 120 operators.

The construction schedule is detailed in the chart below.



Following the qualification of the premises, DTX began the transfer of an HIV1/2 test for the detection of total anti-HIV1/2 antibodies in blood, plasma, and serum. The transfer of this test, with technical support from Bionote, combined with product documentation and the strengthening of the quality management system, enabled DTX to certify the Mbao plant to ISO 13485 in November 2024.

Beyond the HIV product and certification, DTX is actively involved in the production of a measles IgM test. In 2024, thanks to funding from the Gates Foundation and Médecins Sans Frontières, the product was optimized to meet the performance criteria defined in the Target Product Profile published by FIND. This optimization also includes an increase in the production of active substances used as semi-finished products in the production of the test, without changing the initial manufacturing process.

The creation of a new production plant in Mbao provides the IPD with resilience in the distribution of rapid diagnostic tests during epidemics. It is part of the national and continental agenda for health sovereignty. In addition, increased production capacity offers a competitive advantage to DTX, which will be able to benefit from economies of scale and reduce its costs while expanding its product portfolio to include high-volume products (HIV, malaria) without deviating from its initial mission of focusing on neglected and epidemic diseases. Discussions are also underway to expand the product portfolio to other diseases such as sickle cell disease.

The certification of the Mbao plant now allows DTX to partner with various companies for the assembly or complete production of RDTs as a subcontractor, thereby enabling the use of unused production capacity.

7.4 DTX's outlook for 2025 is as follows:

1. Strengthening the team in the areas of research and development, production, quality and regulatory affairs, clinical affairs, continuous improvement, and industrial project management. A strong commercialization strategy, including marketing and sales, is also being developed with management.
2. Finalization of verification and validation activities for the measles IgM RDT.
3. Submission of the measles IgM dossier to regulatory authorities.
4. Commencement of verification and validation activities for the HIV antibody RDT.
5. Commencement of verification and validation activities for the yellow fever RDT.
- 6- Finalization of the product portfolio for 2025-2030.







 **INSTITUT
PASTEUR**
de Dakar

VIII

**VACCINE
RESEARCH
CENTER**

8 Vaccine Research Center

8.1 Background and Reminder of The Directorate Objectives

The Vaccine Research Center (VRC), Africa's leading vaccine research and development center, was established in July 2024. The VRC is a cutting-edge bioprocessing research and development unit that aims to accelerate the availability of vaccines against diseases of local interest by focusing on pilot projects and conducting preclinical trials.

The first Advanced Vaccine Bioprocessing Laboratory (AVBL) was established in 2022 as part of the first vaccine development project in Africa, "Measles & Rubella."

In 2024, there was an expansion and establishment of the VRC with the creation of the Computational Vaccine Design (CVD) unit based on artificial intelligence and the Preclinical unit.

The strategy involves a translational research approach covering the early stages of vaccine development.

The scope of VRC projects includes:

- Develop high-throughput, cost-effective, and scalable bioprocesses.
- Facilitate smooth and efficient technology transfers to IPD manufacturing divisions through a sandbox approach.
- Develop analytical tests for product release and characterization.
- Provide materials for preclinical testing and conduct preclinical testing.
- Provide technical support for the development of regulatory dossiers required for the approval of new products.

8.2 Alignment with Strategic Priorities

The VRC's activities range from basic research into pathogens and computational design of vaccines in silico, to vaccine development and small-scale (preclinical) trial batch production.

The VRC is the first unit of this pandemic preparedness ecosystem established at the IPD.

We use a "from the sidelines to action" translational research approach to accelerate vaccine development and access in Africa.

The VRC is implementing the following action plan to meet the IPD's strategic priorities:

8.2.1 Diversify the vaccine portfolio and identify specific needs

The VRC focuses its activities on priority pathogens in Africa, based on surveillance data generated by reference centers at the IPD and the Department of Epidemiology.

The goal is to define the best strategy to address these pathogens using existing platforms within AVBL.

8.2.2 To be a renowned vaccine development center in Africa and internationally thanks to technology transfers and in-house vaccine development

VRC's strategy is to acquire, develop and optimise vaccine manufacturing processes through innovation, in line with national and international standards.

The cell and mRNA platforms are designed to strengthen Senegal's leadership position and diversify our Drug Substance candidates for various vaccines of local interest. As such, the VRC will play a key role in diversifying the IPD vaccine portfolio.

8.2.3 Investing in skills development

The VRC's goal is to acquire and preserve know-how through technology transfer. And to set up a collaborative programme with international academic partners to train its staff. To achieve this, the strategy is to draw up and implement a training plan in line with VRC's activities.

The aim is to maintain its team's level of expertise in line with technological advances.

At the same time, the VRC would like to have a pool of experts who could train members of other IPD departments, in order to maintain in-house know-how.

8.2.4 Develop a financial strategy for the VRC by offering process development services

The VRC wants to leverage the use of the cell and mRNA platforms, with the development of a diversified portfolio for several vaccine candidates. This will also give us the flexibility to offer solutions in the event of a public health emergency in Africa.

8.3 Directorate highlights for 2024

- Launch of the Frontier Tech Hub programme (Financing of cell engineering activities)
- Final phase of Assays Implementation as part of the Measles & Rubella project
- Launch of MarV project for the Marburg virus
- Start of Measles & Rubella runs on the AVBL site
- Expansion of AVBL to VRC
- Launch of 1st phase of IPD² collaboration (Institut Pasteur de Dakar and the Protein Design Institute in Seattle)
- Training of the VRC team by the IPD Seattle team in Dakar
- handover of the mRNA Laboratory as part of the WHO mRNA Hub programme
- Production of the first mRNA batches
- Announcement of partnership with IAVI (transfer of viral vaccines such as Lassa)







IX

PUBLIC HEALTH DIRECTORATE

9 Public Health Directorate

9.1 Directorate

9.1.1 Background and Reminder of The Directorate Objectives

The DSP of the Institut Pasteur de Dakar (IPD) has three divisions:

- o Epidemic surveillance and response centre;
- o Health system strengthening centre
- o Clinical research centre.

The Directorate of Public Health is responsible for defining, planning and coordinating the strategic missions of the Institut Pasteur de Dakar (IPD) in the field of public health.

Its main tasks and activities are

- o Define strategic orientations in relation to surveillance, epidemic preparedness and response, health system strengthening and clinical research
- o Support the monitoring and coordination of public health projects;
- o Coordinate and supervise the National and Regional Reference Centres;
- o Coordinate the implementation of a clinical research and demographic surveillance platform;
- o Allocate resources to operational teams and ensure that they are functioning properly;
- o Contribute to resource mobilisation strategies in collaboration with the Strategic Support Unit and the Partnership Department;
- o Represent the IPD before the ministries involved in health management and national and international public health organisations. Our strategic objectives for 2024 were to:
- o SO1: Set up 5 new 4S sites in Senegal
- o SO 2: Extend the 4S network to at least 5 sites in Senegal and 6 ECOWAS member countries (Niger, Guinea, Mali, Togo, Guinea Bissau)
- o SO 3: Operationalise the digitisation of the 4S surveillance system
- o SO 4: Set up public health laboratories in Touba and Kédougou
- o SO 5: Set up a surveillance and external quality assessment programme on AMR in West Africa
- o SO 6: Set up 3 pilot community-based surveillance sites in the 4S network
- o SO 7: Set up 3 sites to monitor and improve vaccine acceptability
- o SO 8: Strengthen the IPD's capacity to conduct and supervise clinical trials
- o SO 9: Set up and complete the recruitment phase of the ProfeSEN project

- o SO 10: Participate in the planning of clinical studies for the MR project

9.1.2 Alignment with Strategic Priorities

Our objectives are perfectly aligned with the Institute's strategic priorities by contributing to the achievement of its priorities listed below (each priority is linked to the relevant strategic objectives):

- 1) Strengthen research to help reduce the impact of 5 priority infectious and non-infectious diseases in Africa (SO 1- 7)
- 2) Multiply own revenues by 10 over the next 5 years through the production of Diagnostics and Vaccines for top priority epidemic and endemic diseases in Africa to ensure the IPD's autonomy (SO 2, 8, 9 and 10).
- 3) Create a regional hub of expertise and training for epidemic preparedness and response (SO 2and 5)
- 4) Decentralise diagnosis, access to care and services for patients in 5 regional hubs (SO 4)
- 5) Operational excellence: Strengthening processes and digital transformation for a data-driven organisation (SO 3).

9.1.3 Directorate highlights for 2024

In 2024, the Directorate of Public Health strengthened its role as a pillar in surveillance and responding to health issues, by aligning itself with the five strategic pillars of the IPD.

9.1.3.1 Epidemic surveillance and response

- The surveillance network was extended with the opening of 10 new sentinel sites, targeting border areas for early detection of threats.
- Decentralised laboratories have been set up in Touba and Kédougou, in partnership with MSAS, improving access to diagnostics.
- A «One Health» integrated surveillance pilot site has been set up in Agnam, underlining our holistic approach.
- The syndromic surveillance system (4S) was deployed in 8 West African countries, strengthening the regional capacity to respond to epidemics.
- Three arbovirus epidemics were investigated in Senegal, and support was provided to 4 countries (Cape Verde, Ivory Coast, Gambia, Guinea) for the diagnosis and sequencing of emerging diseases.



- An antimicrobial resistance surveillance programme was implemented in 10 African countries, involving 40 laboratories.

- Three integrated community surveillance pilot sites have been set up (Pikine, Agnam and Kedougou).

9.1.3.2 Research and clinical trials:

- Two phase II clinical trials on the impact of a probiotic on pregnant women and the evaluation of a portable ultrasound probe for pregnancy monitoring. The field studies and patient enrolment finalised. Patient follow-up and data analysis underway.

- A study to assess the effectiveness of the SARS-CoV-2 vaccine has been carried out.

9.1.3.3 Training and capacity building:

- 40 laboratory professionals were trained in the molecular diagnosis of Mpox, and diagnostic kits were distributed.

- 60 healthcare professionals were trained in biological risk management at the Regional Centre of Excellence.

9.1.3.4 Collaborations and acknowledgments:

- Strategic collaborations have been developed with key partners such as GATES FOUNDATION, Global Fund, Oxford University, ACDC, WAHO, WHO and IANPHI.

- The IPD has become an associate member of the IANPHI and has been designated by Africa CDC as a Regional Centre of Excellence for Biosafety and Biosecurity.

9.2 Surveillance and Response Division

9.2.1 Alignment with the strategic pillars of the IPD

The Institut Pasteur de Dakar works to promote the health and well-being of African populations. This vision makes the preparation of surveillance and response to health threats a strategic priority. This is part of the process of strengthening the resilience of the populations of the ECOWAS space, faced with a complexity of health, eco-geographical, socio-economic, political and security contexts.

- The integrated epidemic surveillance and response strategy of the Institut Pasteur de Dakar is an ambitious 5-year programme from 2023 to 2028. The strategy is broken down into six strategic areas, supported by strategic principles and catalysts.
- Alignment of management activities and objectives with the IPD strategy

The strategic priorities for 2023 - 2028 are:

1. Strengthen/implement a Disease Surveillance System
2. Strengthen Community-Based Surveillance
3. Decentralise National Reference Centres
4. Set up One Health Observatory Sites
5. Set up a Public Health Emergency Operations Centre (COU-SP)
6. Set up Regional Epidemic Alert and Response Teams (ERARE).

The Institut Pasteur de Dakar aims to anchor the role of “first detector, first responder” across Africa in new approaches (advanced technological concepts, One Health approach, community approach, digitalisation), strategies and activities designed to support governments in their ambitions to establish autonomous and resilient health systems in the face of health threats.

Over the past two years, the IPD, through the DSP, has led multi-sectoral coordination of the detection of and response to epidemics in Senegal through the Sentinel Syndromic Surveillance System (‘4S’). In neighbouring countries and in the sub-region, the Institute supports ministries of health in the early detection of epidemics by setting up syndromic sentinel sites for respiratory viruses, arboviruses and haemorrhagic fever viruses.

We are also a major player in the field of genomic surveillance in West Africa, as part of an integrated strategy in the response to health threats. The main objective is to strengthen preparedness and resilience in the face of epidemics through innovative and collaborative approaches. The genomic surveillance implemented by the IPD is based on cutting-edge techniques and regional and international collaboration.

9.2.1.2 Major Achievements

In 2024, significant progress was made in strengthening syndromic and epidemiological surveillance systems in several West African countries, particularly as part of the 4S Network. In Senegal, five new syndromic sentinel sites have been set up in the health districts of Sangalkam, Gossas, Touba (CHN Matlaboul Fawzeyni), Goudomp and Koundoul. At regional level, the network has also expanded, with the opening of two sites in Guinea Conakry, three in Togo, two in Guinea Bissau, two in Mali and two in Niger. This expansion reflects a strong commitment to early detection and rapid response to epidemics in the sub-region.

Alongside this geographical expansion, significant efforts have been made to digitise the 4S network in Senegal. Digital dashboards have been developed for chief district medical officers (CDMOs) and management teams to facilitate the monitoring of key indicators. In addition, a system for the automatic production of weekly bulletins has been put in place. This process was accompanied by a study of the needs of stakeholders (MSAS, IPD, laboratories, sites, districts) to ensure that the digital solution was adapted to the realities on the ground.

Other noteworthy actions include the opening of two hospital-based surveillance sites for severe respiratory infections (SARI) and the commissioning of decentralised laboratories in Touba and Kédougou. These infrastructures strengthen diagnostic capacity at local level, contributing to more responsive surveillance. Integrated surveillance based on the “One Health”

approach has also been launched in the Agnam Civol health district, in conjunction with the AMR, underlining the importance of a multi-sectoral approach.

In the field of training and capacity building, the IPD/ ECHO initiative was launched, with the organisation of a first session, the drafting of a training plan and the development of a dedicated platform. Human resources management tools have also been designed (organisation charts, job descriptions, chain of command), along with the drafting of COUS IPD standard operating procedures (SoPs).

The 4S network also benefited from logistical support in the form of equipment for sentinel sites and the installation of environmental sensors in four pilot sites in Senegal (Matam, Kédougou, Mbour and Touba), for real-time monitoring of climatic and environmental parameters.

Finally, several missions were organised to strengthen Mpox surveillance, particularly at the borders (Rosso, Matam, Kidira, Salemata, Saraya, Vélingara), with the introduction of tools, training of service providers, participation in the development of teaching modules, training of trainers and epidemic intelligence champions (EIOS), and SGI activities on the response to the Mpox virus. These achievements mark a major step towards more integrated, responsive and resilient surveillance systems.

9.2.1.3 Quantification of Impact and Results

Over the past year, a number of tangible results were achieved with regard to strengthening the 4S Network and epidemic response capacity. In Senegal, the 5 new sentinel sites planned were installed, marking a 100% completion rate. Similarly, thanks to funding from the Bill & Melinda Gates Foundation (BMGF), 6 sentinel sites have been set up in three West African countries: Mali, Niger and Guinea Conakry. In addition, 4 other sentinel sites have been set up in Togo and Guinea Bissau thanks to funding from the Global Fund, reaching a coverage rate of 100%.

In terms of monitoring and coordination, two annual supervisions of sentinel sites in Senegal have been carried out, as well as an annual coordination meeting of the 4S Network. Two of the four planned meetings of the steering committee (COPIL) were held, which accounts for 50% of completion rate.





With regard to the decentralisation of diagnostic services, the two laboratories in Touba and Kédougou were successfully opened. Major progress has also been made in the area of capacity building, with the development of the IPD/ECHO platform, the organisation of its first session, and the development of an associated training plan.

As for internal structuring, human resources management tools have been developed, including the organisation chart, job descriptions and the chain of command. In addition, the standard operating procedures (SoPs) for the IPD's centre for health emergency operations (COUS), including activation and deactivation protocols, have been developed.

Finally, 47 out of the expected 52 weekly epidemiological bulletins were produced, ensuring regular and relevant health monitoring.

9.2.2 National Reference Center for Influenza and Other Respiratory Viruses

9.2.2.1 Alignment with the 5 Strategic Pillars of the IPD

Influenza viruses are known for their ability to mutate frequently, enabling them to evade the human immune system. This constant variability makes the prevention and treatment of influenza particularly complex, requiring continuous surveillance of the viral strains in circulation. The National Influenza Reference Centre (CNR), which has been part of a global surveillance network since 1996, plays a crucial role in this surveillance. Its main mission is to detect and identify influenza viruses associated with community influenza syndromes and severe acute respiratory infections, to isolate these viruses, and to share the information with the World Health Organisation (WHO). The CNR also alerts the international community of atypical viral strains or unusual influenza-related phenomena.

Two programmes have been set up to carry out this surveillance. The first, community surveillance

of influenza-like illness (ILI), is based on Senegal's syndromic surveillance network (4S), which has 27 sites across the country. The second programme, hospital-based surveillance of severe acute respiratory infections (SARI), focuses on patients hospitalised in Dakar with severe respiratory symptoms. Samples taken are analysed for 26 different respiratory pathogens, providing comprehensive surveillance of respiratory viruses circulating in Senegal.

9.2.2.2 Major Achievements

In 2024, the National Reference Centre (CNR) for influenza and other respiratory viruses made significant progress in monitoring respiratory infections in Senegal. The community-based surveillance of influenza-like illness (ILI) enabled the collection of 4,518 samples from a network of sentinel sites. The most active sites were Pont de Tamba, Mbour Toucouleur and Goutte de Lait. Viral circulation peaked in October, with 715 samples taken, then followed a period of stability from January to June and a gradual increase from July onwards.

Analysis by multiplex RT-PCR revealed a predominance of influenza A viruses, mainly of subtype H3N2, detected in 26.4% of samples. Influenza B virus (Victoria lineage) was identified in 13.1% of cases, while SARS-CoV-2 and respiratory syncytial virus (RSV) were found in around 3 to 4% of samples. Other respiratory viruses such as rhinovirus (10.2%), adenovirus (4.6%) and human metapneumovirus (HMPV) were also detected, the latter at an unusually high level. Children under the age of 5 were most affected by these infections, particularly RSV. Young adults (aged 16-25) were also particularly affected by influenza and SARS-CoV-2.

In parallel, hospital surveillance of severe acute respiratory infections (SARS) covered 1,378 collected samples, mainly from Hôpital Albert Royer, Hôpital de Diamniadio and CH Roi Baudouin. Rhinovirus was the most frequently identified pathogen (20.4%) followed by RSV (11.2%), MPVH (6.8%) and influenza A (6.8%). The viruses mainly affected children under one year of age. Respiratory bacterial agents such as *Haemophilus influenzae* (21.8%) and *Streptococcus pneumoniae* (15.7%) were also frequently found.

Targeted surveillance for enterovirus D-68 (EV-D68) detected 76 cases out of 5,938 samples, with genomic characterisation showing that it belonged exclusively to genotype B3.

As far as virology is concerned, attempts were made to isolate influenza viruses from 588 samples, with a success rate of 41.1%. This resulted in the isolation of 180 H3N2 strains, 59 B/Victoria strains and 3 H1N1pdm09. Sixty strains were sent to the WHO Collaborating Centre in London for further analysis.

Genomic sequencing was intensified with the analysis of 674 samples. Complete genomes were obtained for



several viruses, including 200 H3N2 sequences, 64 for SARS-CoV-2, and 124 for RSV. The Omicron JN.1 sub-variant was dominant in Senegal. Circulating influenza viruses were of clade 2a.3a.1 (H3N2) and genotype V1A.3a.2 (influenza B).

Finally, avian influenza surveillance using the «One Health» approach was implemented in the Thiaroye and Tilène markets in partnership with the LNERV. Out of 538 samples collected, 58.7% were positive for avian influenza, and all were of subtype H9. Sequencing confirmed the presence of the G1 lineage of the A/H9N2 virus, linked to previous human cases and to viruses circulating in West Africa, underlining the risks of cross-border transmission. A diagnostic laboratory has also been set up in Touba to support these efforts.

9.2.2.3 Quantification of Impact and Results

Surveillance data have been used in a number of publications, which are listed in the publication section of this report.

9.2.3 WHO Regional Reference Laboratory for Yellow Fever

9.2.3.1 Alignment with the 5 Strategic Pillars of the IPD

The Institut Pasteur de Dakar (IPD) plays a crucial role in the fight against yellow fever in Africa, hosting a Regional Reference Laboratory (RRL) recognised by the World Health Organisation (WHO). As part of its contract with the WHO, the RRL actively supports the Elimination of Yellow Fever Epidemics (EYE) strategy and builds the capacity of national diagnostic laboratories (NLs) across the continent.

- The RRL carries out confirmatory tests on presumptive positive samples from suspected cases referred by the LNs.

- It carries out quality control tests on 10% of the negative samples sent in by the LNs, in order to assess their performance.

- It carries out genetic sequencing of some yellow fever virus isolates, as well as primary isolation and genetic characterisation from PCR-positive samples.

- The RRL carries out PRNT (Plate Reduction Neutralisation Test) quality control tests within the RRL. The RRL provides technical assistance and training to LNs in Africa to improve their yellow fever diagnostic capabilities.

- It supplies equipment to the Regional Reference Laboratory of the Centre Pasteur Cameroun.

- The RRL actively participates in meetings of the EYE Laboratory Technical Working Group (LTWG). (LTWG).

To improve surveillance, we plan to extend our diagnostics and surveillance of SARIs, to other regions of Senegal, and to step up «One Health» surveillance of influenza viruses at the human/animal interface, particularly in Djoudj Park. We faced reagent stock-outs, limited funding and space constraints, requiring solutions to ensure the continuity of our activities.

9.2.3.2 Major Achievements

In 2024, the Yellow Fever RRL received 2824 samples from national laboratories (NLs) in West and Central Africa, as well as Senegal and other NLs undergoing WHO accreditation, for yellow fever (YF) confirmation and quality control.

- 740 presumed positive samples from operational NL were tested, revealing 4 RT-PCR positive cases (Chad, Ghana, Guinea) and 198 IgM/PRNT confirmed cases (Burkina Faso, Chad, Congo, Ghana, Nigeria).

- Differential diagnoses revealed cases of dengue fever (RT-PCR and IgM/PRNT), West Nile virus (IgM/PRNT), Chikungunya (IgM) and Crimean-Congo haemorrhagic fever (CCHF) (IgM).

- 694 suspected YF samples from Senegal and NL undergoing accreditation were analysed, with 36 presumed positive cases and 8 confirmed by PRNT (Gambia, Niger, Senegal).

- Differential diagnoses revealed cases of dengue fever, Chikungunya, Zika and CCHF.

- Viral genome sequencing was performed on 2 YF-positive samples from Guinea, confirming the West African genotype.

- 1390 presumed negative samples from NL were tested.

- No RT-PCR positive samples were detected, but 22 confirmed IgM/PRNT cases were identified (Nigeria, Ghana).

9.2.3.3 Quantification of Impact and Results

In 2024, the WHO Regional Reference Laboratory for Yellow Fever at the Institut Pasteur de Dakar (IPD) demonstrated its central role in the surveillance and diagnosis of arboviroses in West and Central Africa. A total of 2,824 samples were tested, of which 450 came from Central African countries that requested the laboratory's support due to difficulties encountered by their reference centre (Centre Pasteur du Cameroun). This support, requested by the WHO, ensured the continuity of regional diagnostics in a critical context.

In addition to diagnosing yellow fever, the laboratory carried out differential analyses that led to the detection of other flaviviruses (dengue, Zika, West Nile virus) as well as arboviruses such as chikungunya and Crimean-Congo haemorrhagic fever (CCHF), thereby strengthening syndromic surveillance of viral fevers. All the results were made available within the deadlines recommended by the WHO, meeting the performance indicators for the RT-PCR, IgM ELISA and PRNT tests.

The laboratory also strengthened national capacities by providing technical support to Guinea in evaluating the implementation of molecular diagnostics for yellow fever. It produced and shipped biological reagents (antigens and antibodies) for four major viruses to the Centre Pasteur Cameroun.

In terms of quality, the laboratory achieved a perfect score (100%) in the QCMD molecular proficiency test

and more than 90% in the WHO accreditation visit in June 2024, with an assessment of performance rated as 'excellent'. It has also actively contributed to technical meetings of the WHO network, affirming its position as a regional pillar for yellow fever and arboviroses.

9.2.3.4 Context and perspective

During the reporting period, the Regional Reference Laboratory (RRL) faced several challenges that hindered the overall effectiveness of its operations. These included incomplete information in survey forms, missing sample lists, a low volume of samples received, limited clarity regarding the needs of national laboratories (NLs), and outdated distribution lists for results.

To address these challenges, we recommend that NRLs submit samples in sufficient volume (at least 500 µl), clearly specify the type of test required, notify the RRL prior to shipment, and ensure that all accompanying survey forms are fully completed. In addition, WHO should update recipient lists, standardize request forms, and explore potential improvements to the MAC-HD ELISA plates.

9.2.4 WHO Collaborating Center for Arboviruses and Viral Hemorrhagic Fevers

9.2.4.1 Alignment with the 5 Strategic Pillars of the IPD

The activities of CRORA (Reference Center for Arboviruses and Other Emerging Pathogens) are fully aligned with the IPD's strategic pillar focused on public health, epidemic intelligence, and epidemic response. As a WHO Collaborating Center for arboviruses and hemorrhagic fever viruses, CRORA carries out several essential missions:

- Support for WHO activities for the detection and genomic surveillance of epidemic diseases and emerging pathogens.
- Contribution to response operations to outbreaks of emerging and dangerous pathogens.
- Strengthening the capacities of national laboratories through training, information exchange, and scientific and technical expertise.

CRORA has therefore received samples through a variety of programs, including syndromic surveillance initiatives (Arbosen and others), outbreak investigations, research collaborations such as WAC-EID, and requests for diagnostic confirmation from several African countries.

9.2.4.2 Major Accomplishments

During the reporting period, CRORA processed a substantial total of 8,240 samples, underscoring its strong engagement in the surveillance and diagnostic activities related to arboviruses and other emerging pathogens:

- Syndromic sentinel surveillance (4S) in Senegal: A total of 7,350 samples were analyzed, revealing active circulation of dengue virus (914 cases confirmed by RT-PCR and 34 by IgM/PRNT), primarily in Dakar, Thiès, Louga, and Fatick. Additional detections included one confirmed case of yellow fever (RT-PCR), eleven cases of Crimean-Congo hemorrhagic fever (RT-PCR and IgM), and twenty-one Chikungunya cases identified by IgM.
- Surveillance in other regions: Fourteen samples from Guinea and Gambia confirmed cases of dengue fever and yellow fever.
- Suspected cases: Of the 680 samples analyzed, the majority corresponded to dengue fever cases (56 confirmed by RT-PCR), along with sporadic detections of Chikungunya and Crimean-Congo hemorrhagic fever.
- International collaboration: 81 samples from Chad revealed cases of hepatitis E, and samples from Niger and Guinea confirmed cases of Chikungunya.
- WAC-EID Project: 1,402 samples confirmed the active circulation of yellow fever and dengue fever in Kédougou.

9.2.4.3 Quantification of Impact and Results

- Over 7,000 samples received and analyzed, reflecting the sustained activity of CRORA.
- Significant contribution to arbovirus surveillance through the 4S network.
- Detection of acute cases of yellow fever (4S and WAC-EID) that may have escaped conventional surveillance.
- Compliance with the WHO deadlines for reporting results (100% of results within 7 days for RT-PCR and ELISA IgM, and within 21 days for PRNT).
- Laboratory excellence confirmed by a score of 100% in the QCMD program for dengue fever.

9.2.5 Intercountry Reference Center for Poliomyelitis

9.2.5.1 Alignment with the 5 Strategic Pillars of the IPD

The activities of the Intercountry Polio Reference Center are aligned with Pasteur's missions: public health, research, training and education, as well as services and expertise. In addition to research, training, and expertise activities, the surveillance activities carried out by the Intercountry Center focus on poliovirus surveillance in children with acute flaccid paralysis (AFP) and environmental surveillance (ES) in wastewater. The activities are mainly aligned with the following strategic pillars:

- Biomedical research and innovation
- Public health, epidemic intelligence, and epidemic response
- Education, training, and talent development

9.2.5.2 Major Achievements

The Intercountry Polio Reference Center achieved a score of 95% in the External Quality Assessment Program (EQAP) organized by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) in 2024 for the molecular diagnosis of polioviruses.

9.2.5.3 Quantification of Impact and Results

For the year 2024, a total of 2,518 stool samples and 734 wastewater samples were analyzed. This activity detected 87 and 52 vaccine polioviruses from stool and wastewater samples, respectively. This diagnostic activity not only made it possible to monitor the genetic stability of the new type 2 oral vaccine (nOPV2) in Senegal, Gambia, Mauritania, Burkina Faso, Guinea, and Guinea-Bissau since 2021, but also to identify the circulation of circulating polioviruses derived from the type 2 oral vaccine (cPVDV-2) in Guinea and Senegal, and cPVDV-3 in Guinea in 2024. The data from this surveillance is shared in real time with the countries' ministries of health and the WHO for the implementation of appropriate public health measures and rapid control of poliovirus epidemics.

9.2.6 Surveillance of pathogenic bacteria and antimicrobial resistance

9.2.6.1 Alignment with the 5 Strategic Pillars of the IPD

The Institut Pasteur de Dakar has been a major driver of scientific innovation and public health expertise for Senegal and the West African region. In 2023, the IPD Foundation's commitment to research, education, and innovation continued to drive progress in addressing some of the most pressing health challenges facing Africa. This annual report outlines achievements in basic and applied research, capacity building, and public health in the areas of antimicrobial resistance, the microbiome, and bacterial pathogenesis.

9.2.6.2 Major Achievements

Surveillance of bacterial pathogens and antimicrobial resistance (Dakar)

The project to monitor bacterial pathogens responsible for diarrhea in Dakar has enabled the launch of an active epidemiological surveillance system in peri-urban areas that have historically been poorly documented. In 2024, stool samples were collected from 49 patients from sentinel sites in the 4S network in Pikine and Yeumbeul, as well as from suspected outbreak sites reported by the Ministry of Health and Social Action (MSAS). The analysis revealed a predominance of *Shigella* spp (44%), followed by *Salmonella enterica* (30%) and *Escherichia coli* pathovars (EAEC, EPEC). This initiative provides an accurate map of the enteric pathogens circulating in these communities.

The One Health surveillance project in northern Senegal, conducted for the first time in this cross-border sylvopastoral region, initiated integrated AMR surveillance in the community. Three sampling campaigns were conducted in 2024 among humans (n=43), cattle, goats, and sheep (n=154), as well as in wastewater and surface water. High levels of fecal carriage of ESBL-producing Enterobacteriaceae were observed in humans (65%), sheep (64.5%), and goats (30%), highlighting the role of domestic livestock in the spread of AMR.

The ADAPT project, coordinated by the PMIC in seven sub-Saharan African countries, aims to strengthen integrated surveillance of AMR and neglected tropical diseases through a One Health approach. The PMIC has developed harmonized protocols for the detection of ESBL-producing *E. coli*, carbapenem-resistant *E. coli*, and *Salmonella* from human, animal, food, and environmental samples. In addition to the analysis of 1,000 isolates planned over a one-year period, the project is strengthening human capacity through the

training of doctoral students, postdoctoral fellows, and laboratory technicians.

Etiologies of infectious diseases

As part of the LRTI (Lower Respiratory Tract Infections) project, the PMIC undertook an in-depth study of lower respiratory tract infections in Senegal, analyzing samples from 299 patients (157 adults and 142 children). The samples included nasal swabs, bronchoalveolar lavages, and pulmonary aspirates. This approach enabled the isolation of a variety of bacterial pathogens, dominated by *Klebsiella pneumoniae* (50 isolates) and *Pseudomonas aeruginosa* (42 isolates), followed by *Escherichia coli*, *Haemophilus influenzae*, *Acinetobacter baumannii*, and *Moraxella catarrhalis*. A high proportion of multidrug-resistant bacteria, including ESBL-producing and carbapenem-resistant strains, was detected, illustrating a growing challenge in antimicrobial resistance. The study aims to enroll a total of 600 patients by September 2025.



The second project, CoAg AFI (Acute Febrile Illness), is being conducted in collaboration with the CDC in Atlanta, the CDC in Senegal, the Institut Pasteur de Dakar, and the Ministry of Health. The aim is to gain a better understanding of the non-malarial bacterial etiologies of acute febrile syndromes across five sentinel sites. To date, inclusion has reached a rate of 82.26%, with more than 1,700 samples collected (serum, nasal swabs, urine, CSF). The PMIC has developed molecular tools targeting neglected bacteria such as *Rickettsia* spp., *Leptospira interrogans*, *Brucella abortus*, and *Coxiella burnetii*. Initial results have ruled out bacterial involvement in several suspected cases of meningitis. This project lays the foundations for an integrated multidisciplinary diagnostic approach to infectious diseases in Africa.

External Quality Assessment (EQA) for Antimicrobial Resistance (AMR)

The EQuAFRICA and WARIL-EQA-AMR projects, coordinated by the PMIC and the Institut Pasteur de Dakar, have led to significant progress in establishing and strengthening external quality assessment programs for the detection of AMR in laboratories in West and Central Africa.

As part of the EQuAFRICA project, the PMIC provided proficiency testing panels to laboratories in five countries (Nigeria, Ghana, Sierra Leone, Cameroon, Senegal) through two campaigns in 2024. Each cycle included the analysis of five samples for bacterial identification and antibiotic susceptibility testing. The PMIC has strengthened its role as a regional EQA provider, recognized by the NICD (South Africa), and has expanded its activities to 12 ECOWAS countries and Mauritania, in partnership with the Global Fund and WAHO.

The WARIL-EQA-AMR project, led by the PMIC, enabled visits and assessments of laboratories in 12 West African countries. A General Assembly and practical training on AMR diagnosis were organized in Dakar, involving national AMR focal points, health authorities, and WAHO. The program promoted the harmonization of practices, the strengthening of diagnostic quality, and the establishment of a structured regional network.

9.2.6.3 Quantification of Impact and Results

The bacterial diarrhea project in Dakar enabled the analysis of 49 samples, with an overall positivity rate of 51%, documenting pathogen diversity in two disadvantaged neighborhoods. This is a key step toward establishing targeted and responsive genomic surveillance.

In northern Senegal, more than 260 human, animal, and environmental samples were analyzed. Preliminary results reveal a high prevalence of multidrug-resistant bacteria, particularly ESBL-producing clones. 62.5% of the wastewater samples analyzed were also contaminated, highlighting the role of the environment in the spread of AMR.

The ADAPT project plans to characterize 1,000 isolates from various matrices. It has already enabled the deployment of harmonized protocols in seven countries, including Senegal, and the training of several scientific staff. These results will contribute to mapping AMR risks and identifying bacterial transmission routes at the regional level.

For the LRTI project, the analysis of 299 patients generated more than 150 bacterial isolates, with a high rate of multidrug resistance to antibiotics, demonstrating the etiological complexity of lower respiratory tract infections in Senegal. Ultimately, more than 1,500 samples will be analyzed, enabling robust statistical characterization of pathogen prevalence and resistance profiles. The data will enable the development of evidence-based clinical recommendations.

The CoAg AFI project enabled the collection of 356 nasal swabs, 1,234 serum samples, as well as urine and CSF samples. Although preliminary results showed few bacterial detections, they highlight the importance

of broad and accurate diagnosis for non-malarial febrile syndromes. Clinical validation of molecular tools is underway, and final analyses are expected to be completed in the first quarter of 2025.

The EQA campaigns of EQuAFRICA Phase II mobilized 127 participating laboratories over two cycles. Average performance was 74% for the first cycle and 76% for the second, with 42% of laboratories achieving an acceptable score ($\geq 80\%$) according to CMPT standards. These results highlight areas for improvement and the need for targeted support.

In the WARIL project, field visits covered 12 countries, followed by initial regional training on AMR diagnosis. The program also enabled a systematic assessment of the equipment, human resources, and skills capacities of participating laboratories. These activities lay the foundations for a sustainable regional program for quality assessment and continuous improvement of laboratory practices.

9.3 Health Systems Strengthening Division

9.3.1 Alignment with the 5 Strategic Pillars of the IPD

The division aligns with two of IPD's strategic pillars:

- Public health, epidemiological intelligence, and epidemic response
- Education, training, and talent development

The mission of the Health Systems Strengthening Division is to be a leading center of innovation and a reliable source of evidence for strengthening public health systems in Senegal and throughout Africa. By understanding the needs of communities and the determinants of their health, and by promoting close collaboration with all actors in the health system, we aim to develop innovative and sustainable strategies that lead to measurable improvements in the acceptability, accessibility, and equity of public health interventions.

Our commitment extends to sharing these strategies and results with our partners across the continent, amplifying their impact, and contributing to a collective effort to build stronger, more resilient health systems for all. Our objectives are as follows:

- 1) Expand access to vaccination: Improve the acceptability and accessibility of innovative vaccination solutions for underserved populations.
- 2) Transforming diagnostics: Improving the availability and accessibility of diagnostics for priority diseases.
- 3) Driving Impact: Evaluating the impact of public health interventions.

9.3.2 Major Achievements

The PRSS focused its efforts on three key areas in 2024:

1. Integrated community surveillance: A new community surveillance model has been developed and integrated into the 4S system, adopting a “One Health” approach. This innovative model takes into account several programs, ranging from maternal mortality surveillance to the promotion of universal health insurance. A pilot project has been launched in Agnam Civol, and the model was presented at the Dakar Forum on Epidemics.

Confidence in vaccination: A national survey and qualitative research were conducted to understand the factors influencing the decision to get vaccinated. The results of this study will be used to develop key messages to build confidence in vaccination, targeting areas where hesitancy is highest.

2. Confidence in vaccination: A national survey and qualitative research were conducted to understand the factors influencing the decision to get vaccinated. The results of this study will be used to develop key messages to build confidence in vaccination, targeting areas where hesitancy is highest.

9.3.3 Quantification of Impact and Results

In 2024, the Health Systems Strengthening Program (PRSS) had a significant impact through concrete advances in financing, community monitoring, and capacity building. Financially, the renewal of support from the Susan Thompson Buffet Foundation in the amount of \$360,000, as well as new funding of \$40,000 from Gates Ventures LLC, helped consolidate the program’s activities and ensure their sustainability.

In the area of community surveillance, the PRSS facilitated the surveying of 1,537 community members to assess local perceptions and contextual dynamics—an essential step in informing an appropriate and effective health response. The strengthening of the “One Health” approach was further supported through the training of 28 multidisciplinary professionals and 16 community health workers in the newly integrated surveillance model, thereby enhancing local capacities for the timely detection and management of health risks.

With regard to vaccination confidence, a large-scale national survey was conducted, reaching 3,646 households across the country. In addition, 93 community members participated in in-depth focus group discussions, providing valuable insights into the sociocultural determinants influencing vaccine uptake.

The training component also generated strong engagement, with 2,000 participants enrolled in the MOOC “Humanities, Social Sciences, and Epidemic

Management.” In addition, 46 individuals completed specialized training through the CEPI course, and 17 others through the module offered by the London School of Hygiene & Tropical Medicine (LSHTM), thereby strengthening capacities in the critically important area of vaccine confidence. These results highlight the strategic impact of the PRSS in 2024.

9.4 Center - Clinical Research

9.4.1 Alignment with the 5 Strategic Pillars of the IPD

The Institut Pasteur de Dakar (IPD) is committed to improving health in Africa. Developing clinical research into vaccines, diagnostics, and treatments is a priority. The IPD aims to accelerate the development of its own products, collaborate to evaluate new solutions, and improve existing treatments.

A five-year strategy (2024-2029) has been developed to structure these efforts. It was designed collaboratively and defines six strategic priorities:

- Strengthen the IPD clinical research team.
- Strengthen clinical trial management capacities for diagnostics and treatments.
- Develop clinical trial management capabilities for vaccines.
- Promote sustainable growth and innovation.
- Expand the network of partner sites.

The IPD aims to become a major player in clinical research in Africa by adopting innovative approaches. Its mission is to conduct high-quality research to accelerate the development of innovative health solutions and ensure equitable access to these solutions.

The IPD’s vision is to become a center of excellence in clinical research, a driver of innovation, and a catalyst for collaboration, with the goal of protecting and saving lives.

9.4.2 Major Achievements

In 2024, the PRC made significant progress in several areas:

1. Strategic Plan 2024-2029: The PRC has developed and validated a five-year strategic plan, defining six priority areas for the development of clinical research at the IPD. This plan was designed collaboratively, involving IPD staff and external partners.
2. Clinical trials: The PRC has actively participated in several multicenter clinical trials covering a variety of areas, such as environmental enteropathy in

pregnant women (PROFE-Sen project), pregnancy monitoring by ultrasound (PRESTO project), vaccine efficacy against SARS-CoV-2 (VE-SEN-SARI project), and the development of a rapid diagnostic test for measles (TDR Measles project). These projects included participant recruitment, team training, data monitoring, and collaboration with regulatory authorities.

a. PROFE-Sen Project: Ability of the probiotic Vivomixx to improve environmental enteropathy in pregnant women: a proof-of-concept trial: Full inclusion of the 76 targeted participants in the study. Successful completion of two inspection visits by the ARP and CNER.

b. PRESTO Project: Performance of the EchOpen O1 probe in clinical use for pregnancy monitoring in Senegal.

c. VE-SEN-SARI Project: Evaluation of vaccine efficacy against SARS-CoV-2 infections through surveillance activities for severe acute respiratory infections in Senegal:

d. Measles TDR Project: evaluation of the clinical performance characteristics of a rapid diagnostic test (RDT) for measles produced by the Diatropix division of the IPD.

3. Other activities: The PRC organized a strategic meeting with key partners to strengthen cooperation in clinical research, initiated the creation of an Institutional Ethics Committee, consolidated standardized documents for clinical research, participated in technical groups of the WHO and the Pasteur Network, and registered the IPD on a continental clinical research platform.

Submission of three Grants:

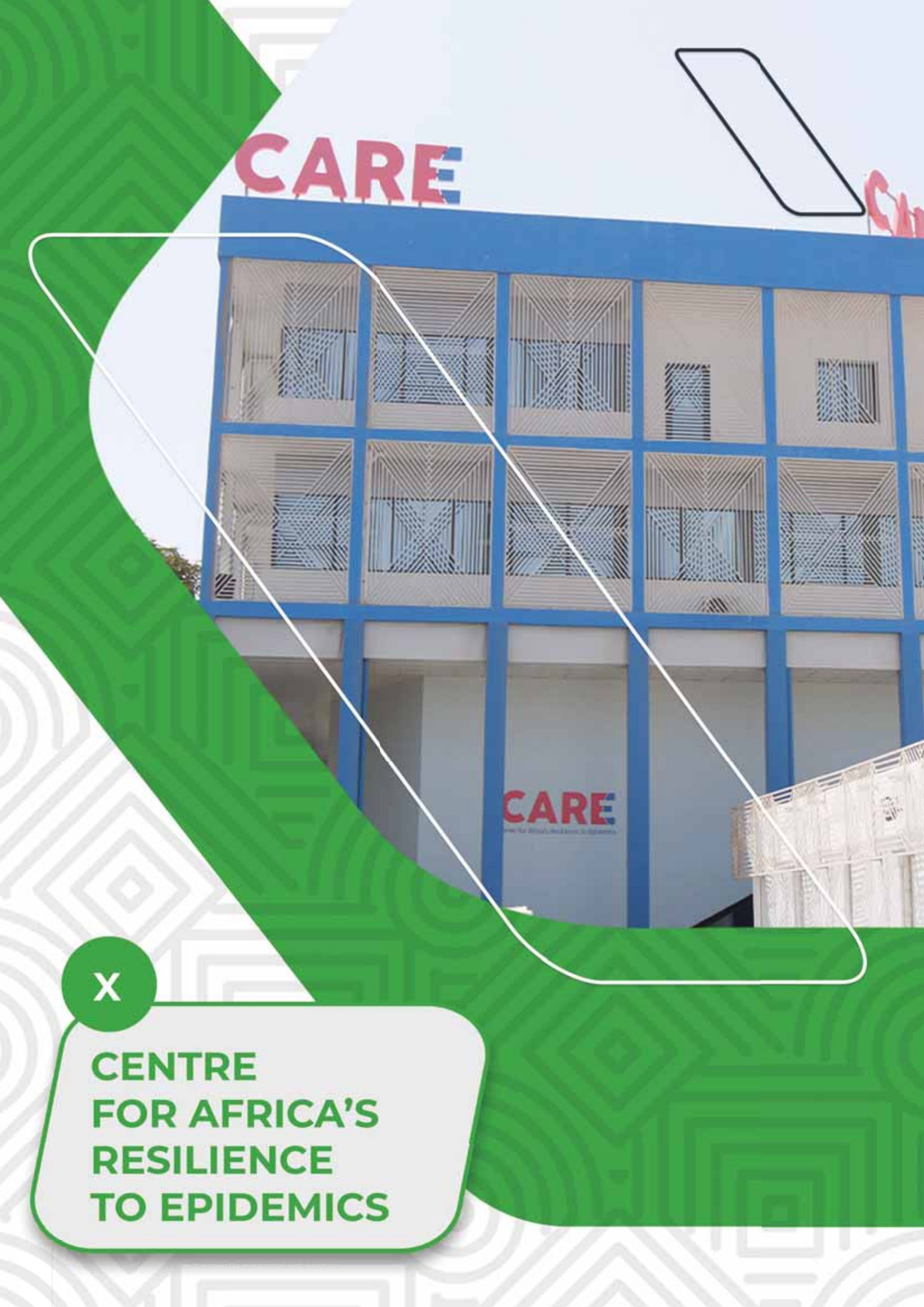
- “Decoding Zika and Dengue Co-Circulation Dynamics and Immune Battles in West Africa (Senegal, Gambia, and Cabo Verde) – DEZIp,” a proposal submitted to the Wellcome Trust. IPD serves as the principal lead for this project, in partnership with other IPD centers.
- “Multi-country implementation of PDMC with robust evidence generation to inform future guidance and accelerate uptake in seven African countries,” a proposal submitted to Unitaid. IPD serves as co-lead for this project, in collaboration with other IPD centers.
- Submission of an investment proposal, developed in partnership with CDT Africa (Addis Ababa), to host the French version of an online clinical research training curriculum aimed at strengthening clinical research capacity across Francophone Africa. The proposal was submitted to the Gates Foundation, with IPD serving as the lead institution and CDT Africa as the subaward recipient.

9.4.3 Quantification of Impact and Results

The impact of the PRC in 2024 is reflected in concrete achievements:

- Strategic plan: Approval of the 2024-2029 strategic plan for clinical research.
- Clinical trials: Implementation of two clinical trials with full recruitment of participants, implementation of a research protocol with drafting of a first draft article, and submission of a clinical trial to the Pharmaceutical Regulatory Agency for approval.
- Communications: Two oral presentations at the Science Summit at the United Nations General Assembly and the IPD Centenary.
- Funding: Submission of three funding applications to the Wellcome Trust, Unitaid, and the Gates Foundation.
- Training: Certified training in statistical methods, 12 monitoring missions carried out for the PRESTO project.





CARE

X

**CENTRE
FOR AFRICA'S
RESILIENCE
TO EPIDEMICS**

10 Centre for Africa's Resilience to Epidemics

10.1 Major Achievements

As we conclude our inaugural year at the African Center for Epidemic Resilience (CARE), we reflect with pride on a remarkable journey marked by growth, innovation, and measurable impact. Since our launch in January 2024, this first year has been dedicated to building momentum, forging strong and lasting partnerships, and laying the groundwork for a more resilient and epidemic-prepared Africa. At CARE, our mission is clear: to equip African talent with the knowledge, skills, and partnerships needed to effectively prepare for and respond to epidemics. In this first year, we have made significant strides toward establishing CARE as a hub for knowledge exchange, scientific innovation, and capacity building in public health. At the core of our efforts lies training—tailored, innovative, and impactful. To address critical needs in epidemic preparedness and response, CARE delivered an extensive range of specialized courses to participants from more than 30 African countries. This year, our training programs covered a broad spectrum of priority topics, including single-cell genomic sequencing, 3D protein modeling and generative AI, malaria diagnosis, pathogen discovery, good manufacturing practices, genomic algebra, clinical genomic medicine, biosecurity, and biosafety, among others.

10.2 Quantification of Impact and Results

During its first year of operations in Africa, CARE organized more than 100 specialized training courses, engaging an average of 100 participants each month.

- We launched our “Race-As-A-Service” offering and introduced flagship initiatives such as “African Women Leaders in Biosecurity and Biosafety” and “Introduction to Vaccine Manufacturing” (developed with partners such as the European Commission and the KWAME Initiative, respectively), equipping participants with essential skills through innovative, interactive, and simulation-based methods.
- We have worked with more than 70 different partners around the world, including leading research institutions, multilateral organizations, governments, regional bodies, local actors, academic institutions, entrepreneurs, policymakers, etc.
- CARE extends beyond classrooms and into collaborative spaces thanks to the networks we create. Our premises have proudly hosted high-profile events such as the first annual Grand Challenges Senegal forum, the Pasteur Network meeting on climate and health, the first general assembly of the West African Regional Initiative on Antimicrobial Resistance, and more. We have built our brand identity and cultivated a dynamic digital presence, and have also introduced our e-learning initiative. This includes the launch of the Conversations at CARE podcast, which has sparked active discussions, generating massive global engagement and widespread interest.
- With over 215 bookings of our premises and a LinkedIn following that surpassed 1,000 in just 90 days—reaching cities such as Qingdao, Cape Town, Montreal, Nairobi, Geneva, Washington, DC, and beyond—CARE is rapidly becoming Africa’s hub for epidemic knowledge and collaboration. Our center features state-of-the-art training rooms, an amphitheater, simulation labs, workspaces equipped with hybrid and translation capabilities, and virtual and augmented reality tools that elevate immersive learning experiences and drive innovation.



XI

**MADIBA
WORKFORCE
DEVELOPMENT
INITIATIVE**

11 MADIBA Workforce Development Initiative

11.1 Alignment with the 5 Strategic Pillars of the IPD

For the IPD, the opportunity lies in Africa's youth. Today, more than 60% of Africa's population is under the age of 25, and young Africans are expected to account for 42% of the world's youth by 2030.

The Institut Pasteur de Dakar has launched the MADIBA Workforce Development Initiative (MADIBA-WDI) to "accelerate the development of a formally trained workforce in Africa through collaborations with African countries and manufacturers and with a long-term vision at the higher education system level to support manufacturing projects on the continent." Through partnerships, MADIBA-WDI will become a center of excellence for bio-manufacturing training on the continent, supporting MADIBA's ambitions for local production and enabling the manufacture and supply of high-quality, affordable, and relevant vaccines for Africa in Senegal, training young men and women for new skilled jobs.

The MADIBA Workforce Development Initiative is fully aligned with the strategic pillars of the Institut Pasteur de Dakar, actively contributing to:

Production of vaccines and diagnostic products:

- The MADIBA-WDI program aims to strengthen the capacities of experts and other professionals. In addition, through its various activities, the program works to ensure a qualified and competent workforce for the bioproduction of vaccines and diagnostic products.
- The implementation of the Regional Training Hub (RTH) - objective 3 of the MADIBA-WDI Program - aims to offer training courses starting in 2025 that will prepare experts capable of effectively meeting local vaccine bioproduction needs while ensuring quality and autonomy in the event of health emergencies.
- Education, training, and talent development:
- MADIBA-WDI, through the train-the-trainer program, builds the capacity of trainers and experts from MADIBA and IPD to ensure their professional development and enable them to train and educate those who will be selected for future training cohorts. This enables continuous training and development of talent that can be recruited internally. In addition, through its third objective, the MADIBA-WDI program trains and develops talent among the next generation in the field of vaccine bioproduction.

11.2 Major Achievements

The past year has been marked by significant progress in the development of the MADIBA Workforce Development Initiative. The Institut Pasteur de Dakar has consolidated its network of partners by signing partnership agreements with renowned institutions such as NIBRT in May 2024 and Rose Dieng University France Senegal in November 2024.

A key element of the partnership with NIBRT is access to expertise in training and education in the biopharmaceutical field. The partnership with NIBRT will provide access to over 15 years of proven teaching materials and a virtual academy offering a comprehensive library of training in biomanufacturing. The partnership with URD FS aims to establish a certificate in biofabrication that includes a hands-on component and will train technicians ready for immediate employment.

Discussions are also underway with Amadou Makhtar Mbow University (UAMM) and Arizona State University (ASU) for future collaborations. In terms of infrastructure, construction of the RTH has been completed and equipment has been purchased, paving the way for the training course scheduled for November 2024 on Introduction to Vaccine Manufacturing, which will bring together 20 participants from eight African countries and experts from pharmaceutical regulatory agencies, research institutes, and industry.

As part of its awareness-raising activities, the MADIBA Workforce Development Initiative team visited four high schools in Kolda, in collaboration with the NGO Batonga, to promote scientific careers among young people (date of these activities). The Institut Pasteur de Dakar's commitment to training healthcare professionals was recognized by its pre-selection for the Regional Capacity Center Network (RCCN) by Africa CDC. Finally, the Institute launched a six-month certification program in partnership with URD (in biofabrication—technician training) and provided training for Madiba members at NIBRT, thereby strengthening the skills of its staff.

11.3 Quantification of Impact and Results

The MADIBA Workforce Development Initiative program has generated tangible and measurable results over the past year.

The training of 20 professionals from 8 African countries, organized in collaboration with NIBRT at IPD, helped strengthen vaccine production skills and introduced the MADIBA-WDI program to an international audience.

- Interacting with 512 high school seniors, 95% of whom were girls, helped raise awareness among the next generation about careers in bioproduction and sparked interest in the field.
- The signing of three key strategic partnerships paved the way for the development of training curricula and the awarding of certification programs for professionals and students.
- In addition, the training of 11 IPD experts and trainers at the NIBRT site paved the way for the launch of the “train the trainer” program, which will in turn enable other professionals to be trained.





A portrait of a man with dark skin and short black hair, looking directly at the camera. He is positioned in the lower center of the frame. Behind him is a blue banner with the text 'INSTITUT PASTEUR' in large white capital letters, and 'Dakar' in smaller white capital letters below it. The banner is slightly out of focus.



BIOSECURITY & BIOSAFETY

12 Biosecurity & Biosafety

12.1 Alignment with the 5 Strategic Pillars of the IPD

Faced with biosafety and biosecurity challenges in Africa, Africa CDC launched a major initiative in 2019. The priority: a regional training and certification program for experts, focusing on biological risk and waste management, laboratory safety, and biocontainment. Biological risk management is crucial to preventing epidemics. Africa CDC offers a 5-day training course to:

- Strengthen knowledge and standards.
- Provide tools and skills to assess and manage risks.
- Promote collaboration between member states.
- Certify Level 1 experts.
- The RCoEBB: Center of Excellence for West Africa.

The Regional Center of Excellence for Biosecurity and Biosafety (RCoEBB), based in Dakar, plays a key role:

- Roll out the training and certification program in 15 countries.
- Train experts in the four key areas.
- Develop a knowledge base that complies with international standards.
- Provide competent experts to respond to epidemics.
- Strengthen national biosecurity systems.
- The overall goal is to build a more resilient Africa in the face of biological threats.

12.2 Major Achievements

- Training workshop for trainers for focal points in Togo

As part of the Global Fund's C19RM financing, Togo—through the Laboratories Division of the Ministry of Health—requested the expertise of the RCoEBB to strengthen national biosafety and biosecurity capacities. A training-of-trainers program focused on biosafety and biosecurity standards was held from September 2 to 7, 2024, at CARE. Led by Dr. Eric NZEKO, an expert from Africa CDC, the initiative trained 20 laboratory professionals. Its primary objective was to enhance the implementation of a biorisk management system, improve staff safety in medical biology laboratories within a One Health framework, and ultimately protect both the community and the environment.

- Regional Workshop on Biohazard Management Certification: Level 1

The regional workshop, held from November 11 to 15, 2024, at CARE, had as its primary objective the strengthening of biosafety and biosecurity capacities among early-career professionals. The program aimed to equip participants with the knowledge and skills required to understand and apply international principles, practices, and standards in biological risk management. More specifically, it sought to enable participants to effectively assess, mitigate, and manage biological risks within their respective national contexts. The workshop also fostered collaboration and knowledge sharing among the 17 participants from nine countries, culminating in their certification as Level 1 experts in biological risk management.

- Participation in the AWL (African Women Leaders) Workshop

From September 16 to 19, 2024, the RCoEBB participated in the AWL workshop on the theme: "Biosecurity and Biosafety Frontiers to Prevent Future Pandemics."

12.3 Quantification of Impact and Results

Togo workshop (September 2-7, 2024): 20 laboratory professionals were trained.

Regional workshop (November 11-15, 2024): 17 participants from 9 countries were trained.

In total, 37 people were trained during these two workshops.



XIII

TRAINING AND WORKSHOPS FOR SERVICES

13 Training and Workshops for Services

13.1 Capacity building in biomedical research and public health

The Institut Pasteur de Dakar (IPD), through its Department of Immunophysiopathology and Infectious Diseases, organized several regional training programs during the year. From January 15 to 27, 2024, a West African workshop on malaria control—co-organized with NIAID/NIH—brought together 20 participants from eight countries for hands-on sessions in genomics, immunology, and malaria control tools. In addition, a cutting-edge workshop on single-cell RNA sequencing and monoclonal antibody discovery, conducted in collaboration with the Ragon Institute (MIT, Harvard, Cambridge), provided advanced biotechnology training to 32 African researchers.

13.2 Proficiency in research data management tools

From April 15 to 19, 2024, the IPD, in partnership with the Pasteur Institute in Paris, organized training on the REDCap platform, dedicated to secure research data management. Twenty staff members were trained, thereby strengthening local autonomy in the digital management of scientific projects.

13.3 Training in social sciences and health communication

The Health Systems Strengthening cluster contributed two chapters to the MOOC “Humanities, Social Sciences, and Epidemic Management,” launched in November 2024 and now enrolling more than 2,000 participants. The cluster also supported international training programs on vaccine confidence, including those offered by CEPI (46 participants) and LSHTM (17 participants), by providing African expertise on communication in crisis contexts. These efforts were further complemented by a series of webinars and conferences, notably the “Alliance SHS Afrique” sessions and the “African Women Leaders – Biosecurity and Biosafety” program.

13.4 Development of clinical research skills

The Clinical Research Division contributed to teaching at several prestigious forums, including the IPD Centenary and the UN Science Summit. It also delivered practical training programs on clinical trials, Good Clinical Practice, and research ethics in epidemic contexts, alongside specialized sessions such as the PRADES course and training for early-career Clinical Research Associates (CRAs). These activities have strengthened the quality of clinical research conducted at IPD and across its partner sites.



XIV

**SALES
DIRECTORATE**

14 Sales Directorate

14.1 Directorate

14.1.1 Background and Reminder of The Directorate Objectives

In 2024, the Institut Pasteur de Dakar created a Sales Directorate to strengthen its financial autonomy, a major strategic issue for ensuring the sustainability and development of its public health missions in Senegal and Africa.

The Sales Department has three key objectives:

- Develop services and partnerships to ensure the sustainability and competitiveness of the IPD's offering.
- Place customer experience at the heart of priorities by establishing a culture of satisfaction and proximity.
- Optimize business operations to streamline costs and maximize impact.

14.1.2 Alignment with the 5 Strategic Pillars of the IPD

Since its creation, the Sales Department has focused its efforts on developing the diagnostics business, contributing directly to Pillar 2 (Production of vaccines and diagnostics). It also works to improve access to healthcare solutions and specialized laboratory services, thereby supporting Pillar 5. The Sales Department spent its first few months developing an ambitious roadmap, which was finalized in November. Structured around five strategic areas, it aims to professionalize the sales function, stimulate organic revenue growth, strengthen customer relationships, and initiate innovative partnerships.

14.1.3 Directorate highlights for 2024

During its first year of operation, the Sales Department has:

- Finalized its commercial strategy and launched the first priority areas for diagnostics and services.
- Provided support for the development of the Touba Pasteur Institute laboratory.
- Initiated actions to increase laboratory activity and secure the supply of inputs and consumables.
- Prepared for the rollout of rapid diagnostic tests (RDTs) to be produced by Diatropix.
- Contributed to operational optimization (billing, collection, new CRM, etc.).

These structural initiatives lay the foundations for growth in 2025.

14.2 Food Safety and Environmental Hygiene Laboratory

14.2.1 Alignment with the 5 Strategic Pillars of the IPD

The Food Safety and Environmental Hygiene Laboratory (LSAHE) actively contributes to the IPD's strategic pillar dedicated to health solutions and specialized laboratories. The LSAHE is a specialized laboratory that provides microbiological and chemical analysis services for water and food. It plays an essential role in food and water safety, contributing to the prevention of foodborne illnesses.

By providing its specialized services, the LSAHE enables industry stakeholders to verify the effectiveness of the measures implemented to ensure the compliance of products placed on the market.

14.2.2 Major Achievements and Perspectives

In 2024, the LSAHE achieved several significant milestones, contributing to public health, capacity building, and the improvement of water and food safety:

Public health:

- Active participation in investigations of collective foodborne infections (TIAC), enabling the identification of causes and prevention of further occurrences.
- Implementation in 2024 of an analysis to quantify endotoxins in dialysis water, providing dialysis centers with an essential tool for ensuring water quality and patient safety.

Education, training, and talent development:

- Supervision of four master's students and three bachelor's students, contributing to the training of future professionals in the fields of microbiology and chemistry.

Healthcare solutions and specialized laboratories:

- More than 40,000 analyses carried out for several hundred clients, demonstrating the sustained activity of the LSAHE and its contribution to water and food safety.
- These achievements underscore the LSAHE's commitment to providing quality services to protect public health and contribute to the training of future professionals.

Faced with a significant increase in activity in 2024 (+30%), the LSAHE is adapting its operations to maintain service quality, meet turnaround times, and ensure the renewal of its accreditation. The installation

of automated instruments in 2025 will further enhance analytical capacity. In addition, the laboratory plans to expand its service offerings by providing training and expertise in hygiene, manufacturing processes, and HACCP. A revision of the pricing structure is also planned.

14.3 Medical Biology Laboratory

14.3.1 Alignment with the 5 Strategic Pillars of the IPD

The Medical Biology Laboratory (LBM) plays an active role in advancing IPD's strategic pillar focused on healthcare solutions and specialized laboratory services. Through the provision of high-quality diagnostic services and the development of research and training activities, the LBM is fully aligned with and committed to this mission.

14.3.2 Major Achievements and Perspectives

The LBM had a successful year in 2024, with significant advances in several areas:

- **Creation of a cervical cancer screening unit:** The LBM has set up a unit dedicated to the detection of precancerous cervical lesions, using the standard liquid-based cervical smear (FCV) technique. This automated system optimizes throughput and reduces turnaround times for results, thereby contributing to the early detection of this widespread female cancer. As part of Pink October, LBM offered 100 free screenings at LISCA and the Djemoul District Hospital in Touba.
- **Opening of a new laboratory in Touba:** In July, the LBM opened a new laboratory in Touba, providing the city's population with access to high-quality multidisciplinary diagnostic services that comply with international standards and use cutting-edge technology.
- **Accreditation renewal:** The LBM successfully renewed its COFRAC accreditation in May 2024 and ensured the transfer of its accreditation to SOAC, a signatory to the ILAQ agreements. This dual recognition attests to the LBM's expertise in terms of organization, quality of services, and professionalism of its staff.
- **These achievements demonstrate LBM's commitment to continuing its development in 2025, with a particular focus on improving patient care, rolling out digital services, expanding occupational health partnerships, and gradually ramping up operations at the new laboratory in Touba.**

14.4 International Vaccination Center

14.4.1 Alignment with the 5 Strategic Pillars of the IPD

The International Vaccination Center (CVI) actively contributes to the IPD's strategic pillar dedicated to healthcare solutions and specialized laboratories. By offering pre-vaccination consultations, vaccination advice, and safe vaccine administration, the LBM is fully committed to this mission.

14.4.2 Major Achievements and Perspectives

The Center carries out public health and expert missions at the national level. As such, it participates as a member of various committees of the Ministry of Health and Social Action (MSAS) in the supervision of routine vaccination activities such as National Polio Vaccination Days and campaigns to introduce new vaccines into the national health system: measles, rubella, pneumococcus, and meningococcus A.

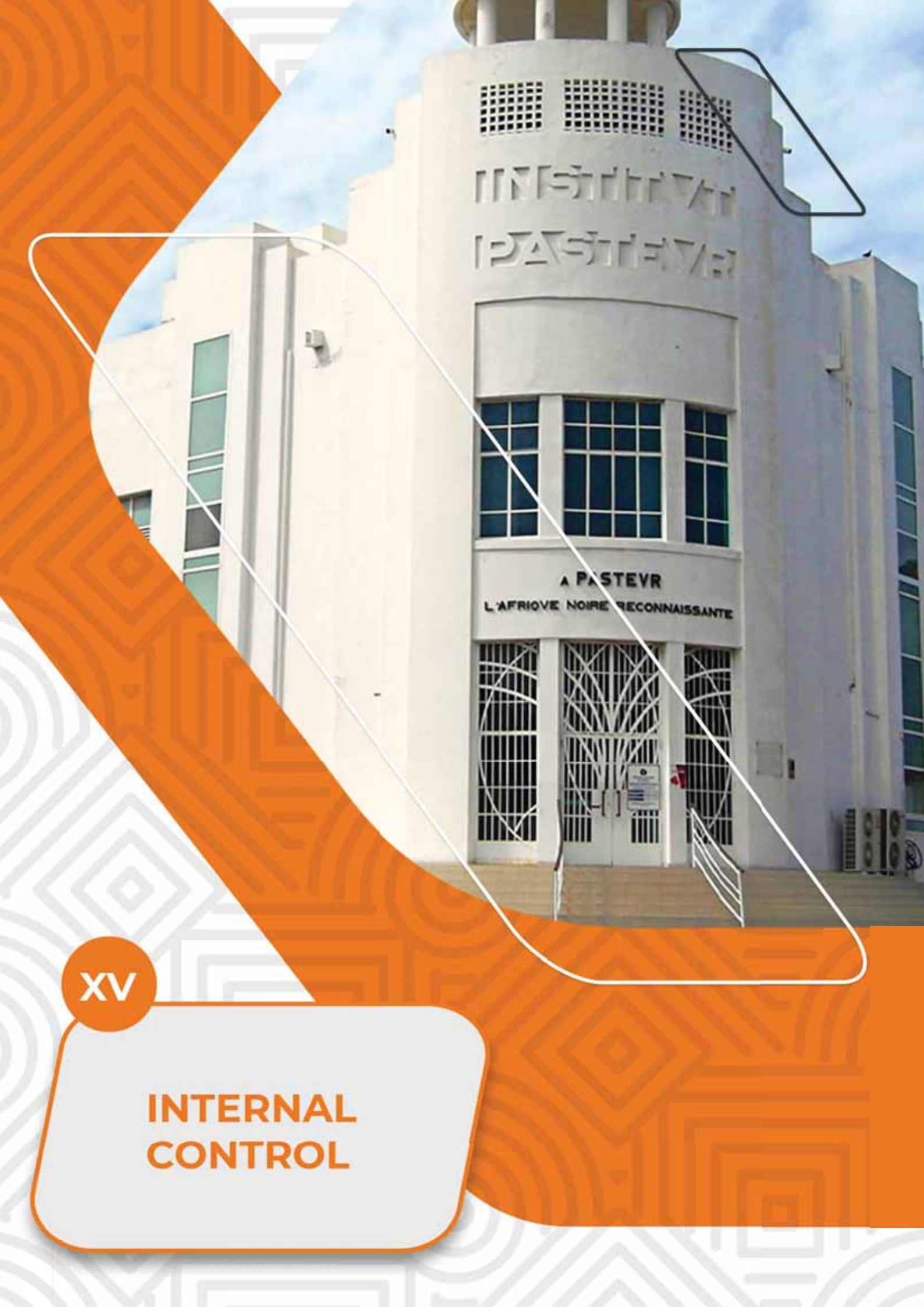
He is a member of the Technical Committee for Vaccine Pharmacovigilance and the National Integrated Committee for the Control of Rabies in Senegal.

It receives an average of just over 7,000 individual vaccination requests per year. It is also called upon by various local companies and international institutions to carry out vaccination campaigns and tuberculin tests for the screening of tuberculosis among personnel exposed in the workplace.

In 2025, the CVI aims to secure vaccine supplies and expand its services in terms of offerings, but also by getting closer to the needs of individual customers and institutions.







XV

**INTERNAL
CONTROL**

15 Internal Control

15.1 Background and Reminder of The Directorate Objectives

As part of the organizational transformation of the Institut Pasteur de Dakar (IPD) and in alignment with its new strategic directions, the Internal Control Department was established at the end of 2023. Its primary mission is to implement a comprehensive monitoring system built on a structured set of methods, rules, and procedures. This system aims to ensure efficiency and effectiveness, the reliability of financial information, and full compliance with legal and regulatory requirements. In collaboration with the General Administrator of the Institut Pasteur de Dakar Foundation, the Head of Internal Control has defined the department's strategic priorities as follows:

1. Risk assessment by criticality level based on a permanent control and reporting plan.
2. Establishment of a priority intervention area with key entities.
3. Development of a process reference framework.
4. Updating of the procedures manual.
5. Deployment of the internal control policy within the foundation.
6. Program for steering and monitoring activities and recommendations resulting from controls, with a risk reassessment once a year.
7. Support in drafting and implementing institutional policies.

15.2 Alignment with Strategic Priorities

Operational excellence

A complete overhaul of the procedure manual is underway with the active participation of stakeholders, notably through the organization of alignment workshops. A first set of HR procedures is currently being drafted and validated by the quality control department. The same principle will apply to procedures concerning the DCH, DAL, and DDSI. The internal control plan of the Institut Pasteur Foundation in Dakar provides for making the procedure manual available to all parties concerned. Training and awareness sessions on the principles of internal control are planned for the first half of 2025.

15.3 Directorate highlights for 2024

1. Risk assessment by level of criticality. A two-dimensional risk matrix (assessment of probability of occurrence and assessment of financial and reputational impacts) was developed based on interviews and audit assignments carried out within operational functions such as the Finance and Accounting Directorate, the Human Capital Directorate, the Supply Chain Directorate, and the IT Directorate.
2. Development of a risk and process framework
3. The Institut Pasteur de Dakar has adopted a bottom-up approach, which involves identifying risks by operational staff, i.e., those responsible for carrying out day-to-day activities.
4. Updating the procedures manual.
5. A complete overhaul of the procedures manual is underway with the active participation of stakeholders, notably through the organization of alignment workshops.
6. Program for steering and monitoring activities and recommendations.

Control ratios to assess adherence to the objectives of compliance, operational efficiency, and reliability of financial information set by senior management are currently being evaluated and will be fully integrated into the control plan for 2025.





 **INSTITUT
PASTEUR**
de Dakar

XVI

**PURCHASING
AND LOGISTICS
DIRECTORATE**

16 Purchasing and Logistics Directorate

16.1 Directorate

16.1.1 Background and Reminder of The Directorate Objectives

The Purchasing and Logistics Department (DAL) at the Institut Pasteur de Dakar (IPD) is committed to optimizing the performance of its supply chain by identifying and exploiting opportunities to improve current processes. To strengthen our team, we recruit and train new talent, while establishing clear job descriptions for each employee. Our supply chain strategy is aligned with the IPD's objectives, with a personalized training plan for each team member.

We are establishing a culture of planning and optimization by centralizing contract management via a contract repository, establishing inventory management rules, and using a centralized system (ERP) for storage spaces. We aim to reduce delivery times and purchasing costs through accurate planning and clear procedures.

To facilitate the adoption of new processes and tools, we ensure data and process reliability during ERP deployment. We establish long-term strategic relationships with key suppliers and streamline their number. We share best practices across the Pasteur network to identify synergies and strengthen supplier sourcing.

Finally, we aim to obtain ISO 9001 certification to improve the quality of purchasing and procedures. The creation of a control center for global supply chain management will enable us to centralize and optimize our operations, thereby ensuring better quality deliverables and strengthening stakeholder confidence.

16.1.2 Alignment with Strategic Priorities

The Supply Chain Department's activities are fully aligned with IPD's strategic priorities. By optimizing processes, strengthening skills, and modernizing our tools, it directly supports the production, distribution, and excellence necessary to achieve our ambitions for growth, autonomy, and regional leadership.

2. Increase own revenues through the production of priority diagnostics and vaccines:

- The Supply Chain Department optimizes inventory management, planning, and procurement to ensure continuous and rapid production of diagnostics and vaccines.
- Improved delivery times, optimized purchasing, reduced approach costs, and the implementation of clear procedures support competitiveness and revenue growth.
- Strategic and contractual relationships with key suppliers secure critical raw materials.

3. Create a regional hub for expertise and training:

- The Supply Chain strategy includes strengthening the team's skills through a training plan aligned with IPD requirements.
- The adoption of ERP and the centralization of supply chain processes contribute to better knowledge and flow management, which are essential for becoming a regional center of excellence.

4. Decentralize diagnosis and access to care in five regional hubs:

- The implementation of centralized inventory management and standardized supply chain procedures enables efficient and equitable distribution across regional hubs.
- Reduced order processing and delivery times facilitate rapid access to essential products in the regions.
- Operational excellence and digital transformation:
- The implementation of a reliable ERP system and data control ensure a data-driven organization, promoting digital transformation.
- ISO 9001 certification guarantees the quality of procedures and deliverables, reinforcing operational excellence.
- Contract management and supplier rationalization contribute to more efficient processes and strategic resource management.

16.1.3 Directorate highlights for 2024

1) Biomedical research and innovation

- Reduced lead times for raw materials and equipment needed for laboratories.

2) Production of vaccines and diagnostic products

- Improved planning through the implementation of a requirements template to anticipate, group, and schedule orders
- Improved logistics flows, reduced transit times, and overall lead times
- Simplification of purchasing procedures to optimize processing times and our internal processes through the implementation of new procedures

3) Public health, epidemiological intelligence, and epidemic response

- Optimization of international flows to respond effectively to epidemic emergencies. We successfully met extremely tight delivery deadlines for kits during the MPOX emergency.
- The central warehouse project will enable the centralization of stocks and the creation of

optimized storage spaces to support the availability of essential products in the event of a crisis.

4) Education, training, and talent development

- We worked to strengthen the team's skills by setting up a task force, notably by pairing experienced buyers with junior buyers and international buyers with local buyers, which enabled the teams to develop their skills. The teams also received training on purchasing tools, which enabled them to get to grips with the tool and speed up the validation process. A training plan aligned with the IPD's needs is also planned.

5) Sanitary solutions and specialized laboratories

- Steering committees are set up with laboratories to track their requests and shipments and strengthen planning in order to meet their requirements and delivery deadlines.

16.2 Logistics Directorate

16.2.1 Alignment with the 5 Strategic Pillars of the IPD

The Logistics Directorate plays a key role in achieving the IPD's strategic objectives. Its activities ensure the smooth and secure distribution of inputs, vaccines, and diagnostic products, while guaranteeing compliance with quality and safety standards.

- Pillars 2 & 3: Logistics ensures the rapid and efficient delivery of vaccines and diagnostic products to meet public health needs and epidemiological emergencies.
- **Pillar 4:** The Directorate contributes to the development of talent in Supply Chain by sharing best practices in logistics and integrating innovations into processes.
- **Pillar 5:** The Directorate works with specialized laboratories to ensure the supply of essential raw materials and equipment.

16.2.2 Major Achievements

The Logistics Directorate at the Institut Pasteur de Dakar had a busy 2024, marked by several strategic initiatives aimed at optimizing our production and distribution processes.

- Production of vaccines and diagnostic products: The project to set up a new central warehouse, launched in July 2024, represents a major step forward in optimizing product storage and distribution, enabling more efficient inventory management.
- Overhaul of logistics circuits: In January 2024, we reviewed our supply chain, replacing our long-standing freight forwarder with an international service provider. This change has significantly improved delivery times, enabling us to meet the demands of our business.

- Rapid response to health crises: One of the key moments of the year was the management of the MPOX outbreak. In August 2024, thanks to our team's responsiveness, we worked with the purchasing department to organize an emergency delivery within a week to provide kits to training participants from various African countries. This success strengthened our reputation in the region, with requests from other countries to centralize critical purchases.
- Strategic partnerships: The Logistics Directorate has also consolidated partnerships with carriers specializing in cold chain transportation, thereby guaranteeing the quality and safety of the products delivered.
- Training and talent development: In terms of human resources management, we have organized internal training courses focused on inventory management and crisis logistics. A continuing education program has also been set up in partnership with academic institutions to strengthen the skills of our teams.

16.2.3 Quantification of Impact and Results

The efforts of the Logistics Directorate have yielded concrete and measurable results that are directly linked to the performance of our operations.

- Critical inventory availability rate: We maintained consistent availability of essential inventory, ensuring continuity in production and distribution.
- Reduced delivery times: Improvements to our logistics channels have enabled us to reduce delivery times, thereby increasing our responsiveness and efficiency in meeting urgent needs.
- Cold chain shipment compliance rate: Thanks to our strategic partnerships, we have achieved an exceptional compliance rate for cold chain shipments, ensuring optimal management of sensitive products.





Notre vision du Capital Humain

Capital Humain est la
de l'Institut Pasteur
moteur de
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XVII

**HUMAN
CAPITAL
DIRECTORATE**

17 Human Capital Directorate

17.1 Directorate

17.1.1 Background and Reminder of the Directorate Objectives

Starting in 2022, the Directorate began implementing a new human resources (HR) reform strategy, symbolized by a shift from Human Resource Management to Human Capital Directorate.

In 2024, DCH represented one of the central challenges in the deployment of IPD's transformation strategy. Within this framework, the Directorate is responsible for the acquisition, administration, management, and development of human capital—the Institut Pasteur de Dakar's most valuable asset. Anchored in IPD's five strategic pillars and aligned with the vision of the Chief Executive Officer, human capital remained at the core of the institution's 2024 transformation strategy, which seeks to position IPD as a hub and ecosystem promoting equitable, sustainable, and affordable access to healthcare. With exceptional talent at its foundation, IPD aims to educate, innovate, and transform healthcare.

17.1.2 Alignment with Strategic Priorities

In line with the five strategic pillars of the Institut Pasteur de Dakar, the Human Capital Directorate (DCH) established itself in 2024 as a key driver of institutional transformation. By shifting from a resource management approach to one focused on human capital development, the DCH actively supports the vision of the Chief Executive Officer. It promotes talent, develops skills, and shapes an organizational culture conducive to innovation, serving an equitable, sustainable, and accessible healthcare ecosystem for all.

17.1.3 Directorate highlights for 2024

For DCH, 2024 was a year of acceleration, stabilization, and consolidation of transformation. By way of illustration, the following major projects were carried out:

- **Restructure the overall organization of the IPD:**

A new management organizational chart was presented internally and approved by the Foundation Board. It was rolled out operationally with directorate-specific organizational charts and associated framework documents related to the reorganization: organizational memo + job descriptions for each employee.

- **Address the staffing shortage:**

Across the entire institute, the quantity and quality of human resources has been strengthened through an effective and targeted talent acquisition strategy. The workforce has grown from 390 to 563 employees,

representing a total of nearly 173 new hires for 2024; the IPD has therefore surpassed the highly symbolic milestone of 500 permanent jobs.

- **Reform the compensation management system**

After benchmarking the market and analyzing the institute's job structure, management, with the support of the Human Resources Department, carried out a comprehensive review of the salary levels of the majority of employees. This review resulted in a 10% increase in the institute's payroll, taking into account the publication of the new salary scales set by the government. The new overall compensation policy was developed to incorporate the structure of the institute's new positions.

- **Develop an HRIS to improve human resources management processes**

Beyond the initial digitization measures concerning the payroll and recruitment processes, the HR department has focused primarily on compliance work with the HR module offered with SAP ERP: Success Factors.

- **Launch the mobility policy**

The increase in the number of work sites (nearly 12 geographical sites, including 6 in Dakar) has an impact on the operational implementation of the institute's mission. With this in mind, 3 bus lines are operational and cover the Dakar region geographically.

- **Reform the establishment agreement**

Negotiations on the Establishment Agreement have begun. The updated general provisions have already been shared with stakeholders.

- **Promote social life at the institute**

The lively social life helped to avoid any tension, particularly with the various employee representative bodies. Initiatives such as subsidizing social activities (catering, pilgrimage tickets, soccer tournaments, women's day celebrations, hiking trips, etc.), New Year's greetings ceremonies, HR coffee breaks, team building events, the annual DCH calendar, and HR webinars have helped to reinforce the calm internal atmosphere.

For DCH, 2024 was a year of acceleration, stabilization, and consolidation of the transformation that began in 2022. Alongside ongoing projects, there was a strong desire to continue investing in human capital and to build a cohesive, integrated, stimulating, and performance-oriented work ecosystem.

In addition, the Human Capital Directorate has launched a series of projects in the form of pilot initiatives. These various projects have had a real impact on the structural, organizational, and cultural transformation of the institute, keeping people at the heart of all internal discussions and actions.

17.2 Human Resources Development

17.2.1 Major Achievements

In 2024, the HR Department made significant progress in several areas:

- **Talent acquisition and onboarding:** More than 173 new hires were recruited, representing a 33% increase in headcount compared to the end of 2023. These hires were mainly for major IPD projects and were managed entirely in-house. The new onboarding and integration process has significantly improved the retention and engagement rates of new arrivals.
- **Internal mobility and promotion scheme:** 61 promotion, mobility, or revaluation measures were implemented, benefiting managers, scientists, and non-managers.
- **Women and scientific careers:** A focus group of 20 resource women helped define the program's direction. Training sessions, masterclasses, and a dedicated boot camp were organized to lay the foundations for the program.

17.2.2 Quantification of Impact and Results

- **Recruitment:** More than 173 employees recruited, representing a 33% increase in headcount, which helped reduce vacancy rates and accelerate project progress.
- **Training and skills development:** 520 employees were trained, representing nearly 85% of the permanent workforce. These training courses helped to boost employee performance and improve the support rate.
- **Mobility and promotions:** 61 promotion, mobility, or revaluation initiatives were implemented, helping to boost staff motivation and commitment.
- **Women and scientific careers:** 40 women benefited from the program's events, and all staff members were able to participate in masterclasses dedicated to the project's themes.

17.3 Controlling Performance

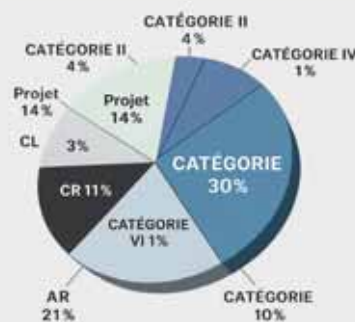
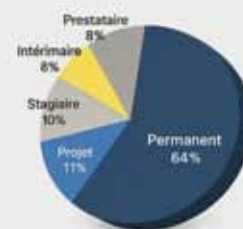
17.3.1 Major Achievements

In 2024, the Controlling Performance department played a pivotal role in modernizing human resources management at the Institut Pasteur de Dakar, in alignment with the institution's broader transformation strategy. A major milestone was the revision of the salary scale, which enhanced both internal equity and external competitiveness. The implementation of a job mapping tool further strengthened the consistency of recruitment, compensation, and career development practices by enabling a more accurate assessment of competencies. The department also advanced inclusive

policies through the rollout of a parenting policy and active support for the "Women and Scientific Careers" program, thereby promoting equal opportunities. In terms of social protection, a comparative assessment of health insurance options informed the strategic selection of OLE, which provides enhanced coverage for employees. The strengthening of internal communication was reflected in the introduction of Individual Social Reports, the signing of advantageous banking agreements, the regular organization of team-building events and "HR Cafés," as well as a staff satisfaction survey designed to better understand and respond to employee expectations. In addition, the rollout of the SAP SuccessFactors HRIS represented a key milestone in the digitization of HR processes. Finally, consolidated reports such as "IPD in Figures" have enhanced human resources management through more reliable and actionable data, further establishing the HR function as a strategic driver of organizational performance.

17.3.2 Quantification of Impact and Results

- The number of service providers is trending downward (8% vs. 14% in 2022).
- Category VI is the most represented, accounting for 30% of permanent contracts + projects. These are senior technicians.
- ARs come in second, generally comprising scientific executives and non-managerial CATs.
- 64% of IPD contracts (fixed-term and permanent contracts)



- The recruitment wave continues in 2023.
- With low turnover
- This leads to a decrease in the average age (39 vs. 41 in 2022) and average seniority (6 vs. 8 years in 2022)
- Improved feminization
- 63% of employees have less than 5 years of seniority

CDI / CDD / Projets	Temporaires	% de Cadres
440 27% vs. Année précédente	158 -26% vs. Année précédente	30%
65% de CDI chez les Permanents	31% de Temporaires dans l'effectif global	30% Femmes Cadres
Age moyen	Ancienneté moyenne	% de Femmes
39	6	42%



17.4 RHPAIE Operation

17.4.1 Major Achievements

As an essential pillar of our operational efficiency, the HRPAIE division implements the department's Strategic Objective No. 4 by coordinating all aspects of human resources management. Its actions are structured around five major strategic areas: rigorous management of HR operations, including personnel files, contracts, time and absence tracking, and access management; accurate payroll administration, including salaries, specific operations such as transfers and advances, bonuses and gratuities, as well as tax and social security declarations (IR, TRIMF); proactive management of social protection, ensuring declarations and contributions to IPRES, CSS, and supplementary pension and health insurance; a strong commitment to social welfare, fostering social relations through staff representatives, ATIP, and AFIP, and supporting social initiatives (pilgrimages, family events, religious celebrations) through subsidies; and finally, a modernization process with archiving and digitization, aimed at digitizing HR processes, digitally archiving documents, and optimizing remote declarations.

17.4.2 Quantification of Impact and Results

In 2024, the HR/PAYroll Operations division established itself as a key driver of operational efficiency at the Institut Pasteur de Dakar, structuring and optimizing the management of its human resources. In terms of HR Operations, the rigorous management of 592 permanent staff files demonstrates the strength of the human resources administration. The rapid integration of new recruits was reflected in the signing of 188 contracts within an optimal timeframe of 1 to 10 days, accompanied by proactive management of pre-employment medical examinations and the distribution of welcome kits. The responsiveness of the department is illustrated by the processing of 1,145 requests and the sending of 1,558 responses within an average of three days, ensuring smooth and effective communication. The year 2024 also saw the implementation of a new travel policy and the strengthening of internal skills through the training of two entities on Moovapps, in collaboration with the DDSI.

In the crucial area of payroll, the division ensured the monthly production and distribution of 592 pay slips as of December 31, 2024, guaranteeing the reliability and punctuality of remuneration. The provision of transfer statements before the 18th of each month and the payroll book between the 25th and 30th is testament to its methodical organization. Similarly, its proactive approach to providing IR and TRIMF statements before the 5th of the month preceding payroll underscores the division's commitment to complying with legal obligations and facilitating administrative procedures.

In terms of social protection, the division managed the affiliations of 592 employees to IPRES and CSS, while providing health insurance coverage for 1,768 beneficiaries, including employees' families. In addition, 212 employees benefited from supplementary pension insurance, underscoring IPD's commitment to the well-being of its staff.

The involvement of the HRPAIE division in social welfare initiatives has resulted in its participation in the negotiation of the Establishment Agreement, with regular meetings leading to the approval of 41 chapters. The coordination of social activities with ATIP and AFIP strengthens the social fabric within the institute. Finally, the ongoing effort to archive and digitize personnel files since 2022 demonstrates a commitment to modernizing and optimizing processes, contributing to better document management and increased efficiency in HR operations in the long term.







XVIII

**DIGITAL AND
INFORMATION
SYSTEMS
DIRECTORATE
(DDSI)**

18 Digital and Information Systems Directorate (DDSI)

18.1 Background and Reminder of The Directorate Objectives Background and Reminder of The Directorate Objectives

The Institut Pasteur de Dakar has launched new strategic initiatives in the areas of vaccine manufacturing and diagnostic testing, innovation, research, disease control, and education. The digital transformation of the Institut Pasteur de Dakar is a major challenge in meeting these strategic objectives.

In line with the IPD's strategic objectives, the DDSI has set itself the following objectives:

- Introduce innovation
- Improve operational efficiency
- Enhance data security and regulatory compliance

18.2 Directorate highlights for 2024

In 2024, the DDSI made significant progress in several areas:

Major projects:

- Continued implementation of SAP ERP (Enterprise Resource Planning): More than 150 people involved, more than 90 workshops, more than 80 business processes modeled.
- Continued eQMS project (quality document management system): 22 employees trained.

Deployment of solutions:

- Modulbio (biobank sample management).
- Zoho Projects (project management for various departments).
- Zoho CRM (customer relationship management for various departments).

Infrastructures:

- Launch of an HPC (high-performance computing for genomics).
- Launch of eLabJournal (electronic lab notebook): Training of more than 36 lab technicians.

Applications:

- Finalization of the design thinking phases for SuperApp and 4S Digital.
- Development of MVP (Minimum Viable Product) versions of SuperApp and 4S Digital.
- Deployment of the Teranga solution in five countries (Mali, Niger, Togo, Guinea Conakry, and Guinea-Bissau).

Strategic planning:

Development of the 2025-2030 Digital Master Plan (SDN 2025-2030): Identification of 34 projects, recommendation of 25 certified training courses, and proposal for 26 FTEs (full-time equivalents).





 **INSTITUT
PASTEUR**
de Dakar

XIX

**FINANCE AND
ACCOUNTING
DIRECTORATE
(DFC)**

19 Finance and Accounting Directorate (DFC)

19.1 Background and Reminder of The Directorate Objectives

- Implementing the financial policy decided by the Chief Administrative Officer;
- Coordinating financial strategy with the various departments and monitoring project finances;
- Supporting the Institute's development by securing sources of funding and ensuring its medium- and long-term sustainability;
- Oversee accounting, cash flow, and management control;
- Prepare budgets and reports, determine relevant indicators with the various departments, and implement budget management;
- Manage cash flow (cash flow, collections, etc.);
- Ensure ongoing legal and tax monitoring;
- Ensure the digital transformation is carried out and the new ERP system is successfully implemented.

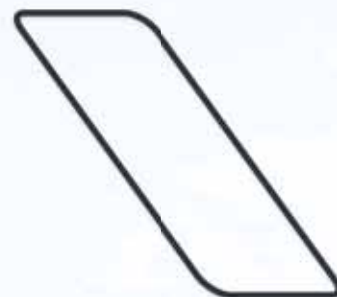
19.2 Alignment with Strategic Priorities

1. Strengthen research to help reduce the impact of five priority infectious and non-infectious diseases in Africa
2. Increase own revenues tenfold over the next five years through the production of diagnostics and vaccines for priority epidemic and endemic diseases in Africa to ensure the autonomy of the IPD
3. Create a regional hub of expertise and training for epidemic preparedness and response (CARE, Biosecurity, RTH)
4. Decentralize diagnosis, access to care, and services for patients in five regional hubs
5. Operational excellence: Strengthen processes and digital transformation for a data-driven organization

19.3 Directorate highlights for 2024

- Implementation of a new organization in preparation for ERP migration
- Preparation of the 2024 budget





XX

**OPERATIONAL
RESOURCES
DIRECTORATE**

20 Operational Resources Directorate

20.1 Background and Reminder of The Directorate Objectives

The Operational Resources Directorate (DRO), as the support directorate for IPD entities, has the following mission: “To help profit and service centers deliver quality products and services in compliant and controlled environments and with compliant and controlled equipment.”

20.2 Alignment with Strategic Priorities

In line with the IPD’s objectives, particularly objective 5: “Operational excellence: Strengthening processes and digital transformation for a data-driven organization,” the DRO has defined the following areas of focus:

- Compliance and Quality Recognition
- Capacity Building/Training
- Infrastructure and Security
- Financial Optimization

20.3 Alignment with the strategic pillars of the IPD In support of the Strategic Pillars of the IPD

- Biomedical research and innovation
- Production of vaccines and diagnostic products
- Public health, epidemiological intelligence, and epidemic response
- Education, training, and talent development
- Healthcare solutions and specialized laboratories]

The DRO has defined its objectives in line with the IPD’s strategic priorities.

- Maintain and expand areas of quality recognition (certification, accreditation, and prequalification) at the laboratory and service levels, including metrology.

- Develop and implement a training and certification program in the areas of QHSE, maintenance and metrology, risk prevention, and biosafety/biosecurity.
- Strengthen compliance, facility sustainability, and safety at all IPD sites.
- Implement analytical management of technical services.

20.4 Directorate highlights for the year 2024

The year 2024 was marked in the various areas or sectors of the DRO by the following achievements or events:

- Quality: Maintaining quality certifications, setting up a Quality Committee, applying for Senegal’s National Quality Award; digital quality tool
- Risk prevention: Inspections, safety visits, risk prevention plan, digital HSE tool
- Biosecurity - Biosafety: Launch of training activities at the Center of Excellence, training and awareness sessions
- Technical maintenance: Strengthening preventive maintenance
- Infrastructure: More than 8 infrastructure projects carried out
- Metrology: Maintaining accreditation, plan to strengthen the platform
- At the overall DRO level: Customer satisfaction survey, DRO integration party



XXI

OUR
PARTNERS

21.1 10 new partners in 2024

In 2024, the Institut Pasteur de Dakar (IPD) established 10 new partnerships, bringing the total number of its partners to over 100. These are promising collaborations that strengthen its network and broaden its areas of intervention.

The IPD has established six promising new collaborations, strengthening its network and expanding its areas of intervention:



- **FCDO (Foreign, Commonwealth & Development Office):** A new partnership has been established to support the strategic pillars of the IPD, particularly in the areas of research, training, and capacity building.



- **Bio Usawa:** A partnership has been announced to jointly develop monoclonal antibodies against infectious diseases, opening up new prospects in the fight against these diseases.



- **National Institute for Bioprocessing Research and Training (NIBRT) signed in May 2024:** A key element of the partnership with NIBRT is access to expertise in training and education in the biopharmaceutical field. The partnership with NIBRT will provide access to over 15 years of proven teaching materials and a virtual academy offering a comprehensive library of training in biomanufacturing.



- **Rose Dieng University France Senegal signed in November 2024:** The partnership with URD FS aims to establish a certificate in biomanufacturing that includes a hands-on component and will train technicians ready for employment.



- **The IPD and IAVI strengthen their collaboration for vaccine development and manufacturing in Africa:** As part of its centennial celebrations, the Institut Pasteur de Dakar and the International AIDS Vaccine Initiative (IAVI), a nonprofit scientific research organization, signed a historic agreement on December 13, 2024, formalizing their collaboration to develop, manufacture, and ensure access to vaccines in Africa. This agreement marks an important step in the fight against global health threats, particularly those that disproportionately affect Africa.



- **Pasteur Network:** A memorandum of understanding was signed between network members (IP, Fiocruz, IP Tunis, IP Korea, IPD) for research into mRNA vaccine candidates, strengthening international collaboration in this crucial field.



21.2 The Partners Forum

The Partners Forum, held on December 13, 2024, as part of the IPD's centenary celebrations, was a key moment of the year. This event brought together the IPD's partners, ranging from government institutions to international organizations, foundations, and private companies.

This forum made it possible to:

- Thank partners for their support and commitment to the IPD.
- Present the IPD's achievements and prospects.
- Discuss public health issues and challenges.
- Strengthen ties between partners and explore new collaborations.
- The Partner Forum was a success, demonstrating the richness and diversity of the IPD network, as well as the importance of partnerships in achieving the institution's public health objectives.





XXII

MEDIA AND SOCIAL MEDIA ENGAGEMENT



+8

22 Media and Social Media Engagement

22.1 Review of our media visibility in 2024

During this period, we significantly increased the visibility of the IPD and its projects through a series of strategic communication initiatives. We organized five high-level media visits, including interviews with major international media outlets such as Al Jazeera, Reuters, RFI, Le Monde, and CNN, reaching a wide global audience. At the same time, we drafted and distributed 15 press releases and media pitches, promoting the IPD and its projects through various information channels. In order to monitor media impact, 15 media reports were produced and shared with our staff to ensure continuous analysis of our coverage. We also organized 10 high-profile media coverage events, contributing to the visibility of our initiatives.

In total, more than 900 media collaborations, articles, and media publications were produced, thereby consolidating the IPD's international presence and reputation.

22.2 Summary of our presence on social media in 2024

This chapter will analyze the growth and engagement of the IPD on its main social media platforms: LinkedIn, X (formerly Twitter), Facebook, and Instagram, as well as on the video platform YouTube.

- **LinkedIn:** It is our most followed page. In December 2024, the IPD had over 25,000 followers on LinkedIn. The post that generated the most impressions in 2024 was published in March 2024 and totaled over 16,000 impressions.
- **X (Twitter):** In December 2024, the IPD had 2,739 followers on X. The tweet that generated the most impressions in 2024 was published in September 2024 and totaled 7,000 impressions.
- **Facebook:** In December 2024, the IPD Facebook page had 20,892 followers. The Facebook post that generated the most impressions in 2024 was published in December 2024 and totaled 24,744 impressions.
- **Instagram:** In December 2024, the IPD's Instagram account had 4,413 followers. The Instagram post that generated the most impressions in 2024 was published in December 2024 and totaled 977 impressions.
- **YouTube:** In December 2024, the IPD had 250 subscribers on YouTube. The post that generated the most impressions in 2024 was published in December 2024 and totaled 2,100 impressions.





**INSTITUT
PASTEUR**
de Dakar

XXIII

**IPD GOVERNANCE
COUNCIL IN 2024**

IPD GOVERNANCE COUNCIL IN 2024



THE IPD SCIENTIFIC ADVISORY GROUP IN 2024

Title, First name, Surname	Organisation
Prof. Peter Piot	London School of Hygiene & Tropical Medicine, United Kingdom
Dr. Marie-Paule Kieny	Swiss Medicines Patent Pool Foundation (formerly WHO)
Prof. Christophe Peyrefitte	Institut Pasteur de Guyane
Dr. Rebecca F. Grais	Pasteur Network, Paris
Prof. Momar Ndao	McGill University, Canada
Pr. Cheikh Saad Bouh Boye	Cheikh Anta Diop University, Senegal
Prof. Gary Kobinger	Laval University, Canada
Prof. Jorge Kalil	Harvard Medical School, United States

THE IPD MANAGEMENT TEAM IN 2024



Dr Amadou Sall

Chief Executive Officer

01



Mrs Rama Ka Ndoye

Director of Finance & Accounting

02



Mr Abdoulaye Fall

Director of Human Capital

03



Dr Xavier Berthet

Director of Research, Education, and Innovation

04



Mr Brandon Brega

Director of Industrial Operations

05



Dr Abdourahmane Sow

Director of Public Health

06



Mrs Sophie N. Diouf

Commercial Director

07



Mr Baba Sakho Sy

Internal Auditor

08



Mr Mohamed P. NDIAYE

Delivery Unit Director

09



Mrs Khady Kébé

Supply Chain Director

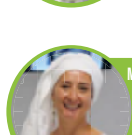
10



Mr Moussa Traoré

Director of Digital Transformation and Information Technology

11



Mrs Karine BELONDRADE

Director of Partnerships and Communication

12



Mr Babacar Gning

Director of Operational Resources

13

Annals of the Institut Pasteur (1888)



Magazine

Great design, faster

"Neque porro quisquam est qui
dolorem ipsum quia dolor sit

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean
rutrum erat massa, pulvinar dignissim mi accumsan eu. Nunc
suscipit quam quis fella bibendum, nec sagittis dolor tempus.

Quisque ac libero faucibus enim euismod ullamcorper. Class
aptent taciti sociisqui aditora torquent per conubia nostra, per
inceptos himenaeos. Phasellus vitae accumsan lorem. Pellentes-
que convallis ante sed lectus facilisis, sed mattis ante semper.
Alio vel molestie erat. Suspendisse at pellentesque eros.

Nulla et feugiat ex. Mauris volutpat, dui sit amet pulvinar vulputate,
felis tortor viverra sem, fermentum dapibus tellus arcu sit amet
magna, dapibus auctor.

Lorem ipsum dolor sit amet, consectetur
odio sem, placerat a rutrum eget, lac-
quet erat semper auctor. Maecenas
justo tempus at. Fusce ut dictum nisi.

Fusce non sagittis sem. Donec sed tellus
pat in nec ex. Nulla laculis dapibus arcu,
molestie sed. Quisque sit amet velit justo.
lectus vehicula, tempor accumsan nulla
tortor nec libero faucibus dapibus. Donec
dictum facilisis, erat mi hendrerit tortor, ma-
vat nisi eu ex.

Curabitur porta nisi ut nisi dignissim mollis. Morb
neque, at mollis erat consequat congue. Phasellus
lobortis.

XXIV

MORE THAN 100
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INSTITUT PASTEUR

de **Dakar**



CONTACTS INSTITUT PASTEUR DE DAKAR

Diatropix Mbao

+221 33 839 92 40

diatropix.info@pasteur.sn

**Hub Regional de Formation
en Bioproduction de l'Afrique**

+221 77 835 47 27

madiba.wdp@pasteur.sn

**Laboratoire de Biologie
Médicale (Centre de
Prélèvement VDN)**

+221 33 859 28 51

cp.vdn.ipd@pasteur.sn

Touba Institut Pasteur

+221 78 791 03 10

Lbmtouba@pasteur.sn

**Centre de Vaccinations
Internationales****Centre de Traitement
Antirabique**

+221 33 839 92 11

cvi@pasteur.sn

**Centre Africain de Résilience
aux Épidémies (CARE)**

+221 33 924 15 00

care@pasteur.sn

**Laboratoire de Biologie
Médicale (Plateau)**

+221 33 839 92 32

biomedsec@pasteur@pasteur.sn

**Laboratoire de Sécurité
Alimentaire et d'Hygiène de
l'Environnement (LSAHE)**

+221 77 090 51 73

lsahe@pasteur.sn

Campus Dakar

36, Avenue Pasteur - BP 220 – DAKAR

+221 33 839 92 00

www.institutpasteurdakar.sn



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