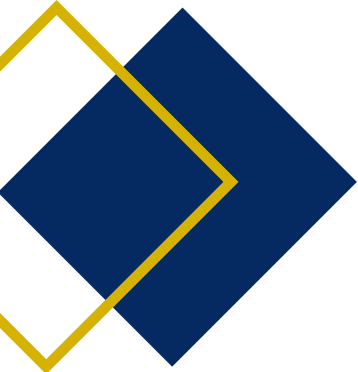




INSTITUT PASTEUR DE DAKAR

2023 ANNUAL REPORT





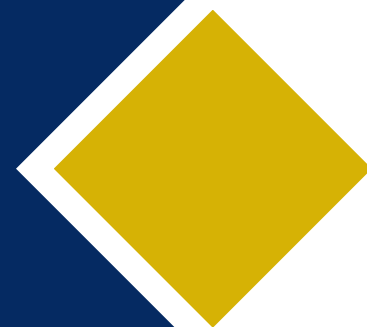
Abbreviations

Abbreviation	Full Term
AFRIGEN	Afrigen Biologics
AFNOR	Association Française de Normalisation
AI	Artificial Intelligence
AMR	Antimicrobial Resistance
ASYMALE	Asymptomatic Malaria Infection Study
ATOS	ATOS SE
BMGF	Bill and Melinda Gates Foundation
CAF	Comité Africain de l'Accréditation
CEPI	Coalition for Epidemic Preparedness Innovations
CPF	Center for Public Health
CPHIA	International Conference on Public Health in Africa
CRM	Customer Relationship Management
COVID-19	Coronavirus Disease 2019
DAVAX	Dakar Vaccine Accelerator
DREI	Department of Research, Education, and Innovation
DTX	Diatropix
EDCTP	European & Developing Countries Clinical Trials Partnership
EED	Environmental Enteric Dysfunction
EPI	Expanded Programme on Immunization
EQA	External Quality Assessment

Abbreviation	Full Term
ERCSD	Epidemiology, Clinical Research, and Data Science Division
ERP	Enterprise Resource Planning
eQMS	Electronic Quality Management System
FIND	Foundation for Innovative New Diagnostics
GCS	Grand Challenges Sénégal
GIISER	Global Immunology and Immunogenomics for SARS-CoV-2 Response
GMP	Good Manufacturing Practices
GCC	Grand Challenges Canada
HSS	Health System Strengthening
HPC	High-Performance Computing
HRIS	Human Resources Information System
IDRt	Tuberculin Skin Test
IMI	Immunophysiopathology and Infectious Diseases Division
IPD	Institut Pasteur de Dakar
IVI	International Vaccine Institute
LMIC	Low and Middle-Income Countries
LSAHE	Food Safety and Environmental Hygiene Laboratory
MBA	Multiplex Bead-based Assays
MBS-Lab	Mobile Biosafety Laboratory
MESRI	Ministry of Higher Education, Research, and Innovation
MSAS	Ministry of Health and Social Action
MSF	Médecins Sans Frontières
MR	Measles and Rubella
NCDs	Non-Communicable Diseases

Abbreviation	Full Term
OHS	Occupational Health Service
PAVM	Partnership for Africa Vaccine Manufacturing
POI	Internal Operational Plan
PRNT	Plaque Reduction Neutralization Test
QHSE	Quality Hygiene Safety and Environment
R&D	Research and Development
RVF	Rift Valley Fever
SAMRC	South African Medical Research Council
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SMTI	Technical Maintenance and Infrastructure Service
SOAC	Système Ouest Africain d'Accréditation
TB	Tuberculosis
UNICEF	United Nations Children's Fund
WAHO	West African Health Organization
WHO	World Health Organization

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Foreword

Dr Mame Thierno Sy and Dr Amadou Alpha Sall

As we reflect on the past year, it is with great pride and gratitude that we present the 2023 Annual Report of the Institut Pasteur de Dakar. Our commitment to advancing public health in Senegal and beyond remains unwavering, and we are thrilled to share the remarkable progress and achievements made by our dedicated team.

Throughout the challenges and uncertainties of the past year, our staff and partners have worked tirelessly to uphold the IPD's mission of excellence in research, training, and public health interventions. In 2023, our dedicated team of scientists and researchers have been relentless in their efforts to advance knowledge and innovation across various fields. Significant strides have also been made in addressing the pressing issue of vaccine access and pharmaceutical sovereignty for the African continent.

Our achievements this year are a testament to the strength and resilience of our team and the robust partnerships we have cultivated. The signing of a 10-year partnership agreement with CEPI for the development and production of outbreak vaccines, the initiation of construction on a new semi-automated production site by Diatropix in Mbaou, and the launch of Africa's first MR vaccine technology transfer are just a few examples of the milestones reached this year. Additionally, the launch of the KWAME programme to enhance human capital development for Africa Vaccine Manufacturing highlights our commitment to strengthening

the workforce necessary for sustainable vaccine production on the continent. Our collective efforts have not only contributed to the fight against infectious diseases but have also solidified our position as a leader in the global health community. The expansion of our syndromic sentinel site network and notable investigations into outbreaks of Dengue, Chikungunya, Crimean-Congo Hemorrhagic Fever, Yellow fever, Zika, Rift Valley Fever, West Nile, and Marburg demonstrate our dedication to mitigating the impact of infectious diseases and safeguarding public health.

We acknowledge that all our achievements are only possible through strong partnerships and collaboration. Governments, academia, international organizations, experts, NGOs, researchers, the pharmaceutical industry, and other stakeholders have all played crucial roles in our work. Together with our Governance Board, expert advisors, and funders, we are committed to making a significant impact and delivering positive health outcomes for communities around the world.

As we look to the future, we remain dedicated to driving innovation, building capacity, and strengthening public health systems. We are confident that with the continued support of our partners and stakeholders, we will achieve even greater milestones in the years to come.



Dr Mame Thierno Sy
Chair of IPD's Board



Dr Amadou Alpha Sall
Chief Executive Officer

Vision and Mission

VISION

Our vision is to save and protect lives.

MISSION

Our mission is to accelerate equitable, sustainable and affordable access to healthcare in Senegal, Africa and the world.





IPD 2023 Impact Figures



IPD TO THE WORLD!

IPD collaborates with over 100 strategic partners across Academia, Governments and Government Agencies, Foundations and Corporate Philanthropy, Non-profit public health organisations and alliances, Financial Institutions and Industry.



YELLOW FEVER VACCINE

IPD has produced over 395 million doses of the yellow fever vaccine over the past 87 years of production.



REFERENCE LABORATORIES

IPD hosts 12 reference laboratories, including for the WHO as its Collaborating Centre for Arboviruses and Viral Hemorrhagic Fevers, for the Africa CDC, and for ECOWAS.



SUPPORTING AFRICA

IPD has supported over 20 African countries in epidemic outbreak detection and management this year alone.



EXPANDING HORIZONS

IPD' Syndromic Sentinel Surveillance operates 35 sites across each of the 14 regions of Senegal and 2 in each neighbouring countries' such as The Gambia, Cape Verde, and Mauritania.



ADVANCING KNOWLEDGE

71 Research Papers Published in 2023 alone.

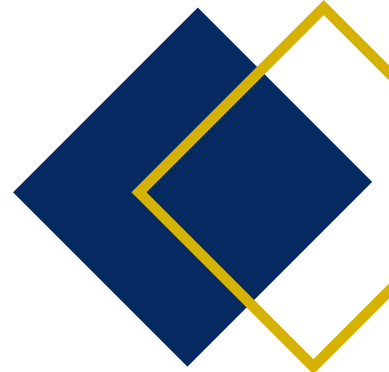


BUILDING FUTURE LEADERS

The team is currently made of 440 Staff, of which 42% are women. IPD also hosts a total of 80 Masters and PHD students.

2023 At A Glance

Highlighting Key Achievements



YEAR START

JANUARY

IPD and CEPI signed a 10-year partnering agreement for the development and production of outbreak vaccines.

Diatropix initiated the construction of a new semi-automated production site in Mbao, near Dakar, anticipated to manufacture a minimum of 50 million rapid tests annually.

IPD signed a pivotal mRNA Vaccine Technology Transfer Agreement with the Medicines Patent Pool.



FEBRUARY

Launch of the technology transfer for Africa's first MR vaccine.

Support from Luxembourg to strengthen the Senegalese and West African surveillance system, reinforce the cold chain infrastructure at IPD, and promote innovation within the scientific community.

IPD confirmed the first report of MARV human infection in Equatorial Guinea and organizes a training on Molecular Diagnosis of Marburg Virus in collaboration with Africa CDC.



APRIL

IPD established the Health System Strengthening division within the Public Health department.



MAY

IPD joined CEPI's Centralized Laboratory Network.

IPD and KU Leuven joined forces for local vaccine production in Africa.



JULY

Investment from the Skoll Foundation to support public health and community surveillance activities.

Diatropix announced a partnership with Boston-based Satio on a BARDA-funded project to develop a novel, single-use ebolavirus diagnostic test.



JUNE

IPD and the International Vaccine Institute established a new partnership for vaccine R&D and biomanufacturing training.

IPD and the Mastercard Foundation established a new partnership to enhance human capital development for Africa Vaccine Manufacturing.



SEPTEMBER

IPD and the Susan Thompson Buffett Foundation initiated a new partnership focusing on championing sexual and reproductive health in Senegal.

OCTOBER

IPD and the Global Health Innovative Technology Fund established a new partnership to advance research and development for new diagnostics and vaccines in LMICs.

First meeting of the Dakar Vaccine Accelerator (DAVAX) Scientific Advisory Board.

Launch of Grand Challenges Senegal's second call "Catalyzing the equitable use of AI to improve global health."



NOVEMBER

Investment from the Bill and Melinda Gates Foundation to support the development of automated mRNA capacity at IPD.

IPD established a collaboration with the Université Rose Dieng France (former Campus Franco Sénégalais), focusing on training skilled professionals capable of addressing emerging public health challenges in Senegal and Africa as a whole.

YEAR END

THROUGHOUT JANUARY TO DECEMBER 2023

Expansion of IPD's syndromic sentinel site network by establishing 11 additional sites across key regions, totaling 35 sites. This includes setting up a comprehensive One Health site in northern Senegal and expanding into neighboring countries such as The Gambia, Cape Verde, and Mauritania, enhancing cross-border collaboration for disease surveillance and response in the region.

Notable investigations by IPD included addressing outbreaks of Dengue, Chikungunya, Crimean-Congo Hemorrhagic Fever (CCHF), Yellow fever, Zika, Rift Valley Fever, West Nile, and Marburg in various regions, with a primary focus on response efforts in Senegal. These research initiatives underscore our dedication to mitigating the impact of infectious diseases and safeguarding public health in the region.

IPD Strategic Pillars:

Biomedical Research & Innovation



As part of its ten-year strategy, IPD established two new departments: the Public Health Department and the Department of Research, Education, and Innovation (DREI). The DREI's mission is to transform the study of infectious and chronic diseases into engines of social well-being by focusing on thematic research, education, and innovation.



As we reflect on the accomplishments of the Research Department in 2023, it is evident that our dedicated team of scientists and researchers have been working tirelessly to advance knowledge and innovation in various fields of study. IPD is proud to host five research divisions within its premises, each specializing in a specific area of research: Virology, Immunopathology and Infectious Diseases, Epidemiology, Clinical Research, and Data

Science, Medical Zoology, and Microbiology. One of the key strengths of the DREI is the close collaboration and synergy among these research divisions. Our scientists regularly come together to exchange ideas, share resources, and collaborate on a number of research subjects. This collaborative approach not only enhances the quality and impact of our research but also fosters a dynamic and innovative research environment.

In addition to conducting groundbreaking research, the DREI is also committed to nurturing and mentoring the next generation of scientists. Each year, we provide guidance and training to a significant number of students and interns, helping them develop the skills and expertise necessary to excel in their future careers.

As we move forward in 2023, the DREI is actively engaged in several key research projects that hold great promise for advancing scientific understanding and improving public health. It remains committed to driving progress in health science through research, education, and innovation. With a strong foundation of achievements in 2023 and a clear vision for the future, the DREI is well-positioned to continue its pivotal role in addressing the health challenges of Senegal and the broader African region.

VIROLOGY DIVISION

The Virology Division has continued to make significant contributions to public health through its extensive research, surveillance, diagnostic innovation, and capacity-building efforts across Africa. Under the leadership of Dr. Ndongo Dia, the division aligns its activities with IPD's strategic priorities, focusing on health, research, education, and expert services. Key projects were undertaken in 2023 and a number of achievements realised, emphasizing its contributions to combating viral diseases.



Key Research Areas

The division research spans several critical areas, each addressing significant public health challenges:

1. Arboviruses and Hemorrhagic Fevers (AVHF)
2. Enteric Viruses
3. Respiratory Viruses
4. Rabies and Encephalitic Viruses
5. Virus-Induced Cancers

Major Projects and Achievements

1. Development and Evaluation of Diagnostic Tools

Africa Suitcaselab Project

Funded by the EDCTP, this project evaluated three Point-of-Care (PoC) tests for the rapid detection of SARS-CoV-2. The goal was to validate these diagnostic tools for use in resource-limited settings. The evaluated tests included rapid antigen tests with visual and photochromic readings. Preliminary analyses indicated promising results, suggesting these tools could be pivotal in managing and controlling COVID-19 in under-resourced regions.

External Quality Control for Molecular Diagnostics

This project, in collaboration with the Emerging Virus Unit (UVE) in Marseille, aimed to assess the molecular diagnostic capabilities for SARS-CoV-2 across multiple African laboratories. Encapsidated RNA containing SARS-CoV-2 targets was distributed to 26 labs.

The results were impressive, with 20 out of 22 labs achieving a 100% success rate. This project highlighted the importance of regional quality control platforms for various pathogens, including dengue and yellow fever, ensuring high diagnostic standards across the continent.

Mobile Laboratory for Infectious Disease Diagnostics (Praesens Foundation Collaboration)

The partnership with Praesens Foundation led to the development and field evaluation of a MBS-Lab. This initiative was crucial for providing rapid diagnostics during outbreaks, addressing the need for timely patient management and epidemic control. The MBS-Lab proved robust and effective across diverse Senegalese climates, confirming its utility in detecting pathogens like arboviruses and respiratory viruses in real-time during field operations.

2. COVID-19 Immunity, Variants, and Vaccine Efficacy (GIISER Project)

This project, funded by BMGF and conducted in collaboration with the Immunology Department, aimed to study immune responses in individuals infected with or vaccinated against SARS-CoV-2. Utilizing samples from national surveillance and cohort studies, the project assessed the impact of genetic variations of the virus on immunity. Comprehensive analyses using ELISA and PRNT methods are ongoing to evaluate serum neutralization against various SARS-CoV-2 strains, including Delta and Omicron. These studies are crucial for understanding vaccine efficacy and guiding public health policies.

3. Surveillance and Response to Viral Outbreaks

Arbovirus Surveillance:

The Virology Division continued its long-standing surveillance of arboviruses, including dengue, Zika, and chikungunya. The team, led by Dr. Amadou Sall, implemented enhanced surveillance systems in collaboration with national health authorities and international partners. The integration of real-time PCR and serological assays enabled the rapid detection and characterization of arboviral outbreaks, contributing to timely public health interventions.

Enteric Virus Monitoring:

Led by Dr. Papa Sow, the division's work on enteric viruses focused on rotavirus and norovirus surveillance. The team conducted extensive field studies to monitor the prevalence and genetic diversity of these viruses. Findings indicated significant shifts in rotavirus genotypes post-vaccine introduction, highlighting the need for ongoing vaccine effectiveness studies and potential updates to vaccination strategies.

4. Research on Respiratory Viruses

Influenza and RSV Surveillance:

Under the direction of Dr. Khady Sow, the division maintained robust





surveillance of influenza and respiratory syncytial virus (RSV). The team utilized advanced molecular techniques to track viral mutations and transmission patterns. The data generated informed national influenza vaccination campaigns and contributed to the global influenza surveillance network.

Impact of COVID-19 on Respiratory Virus Dynamics:

Research led by Dr. El Hadji Oumar Faye investigated the impact of COVID-19 on the epidemiology of other respiratory viruses. The studies revealed significant disruptions in the circulation patterns of influenza and RSV, with implications for public health planning and response during the ongoing pandemic.

5. Rabies and Encephalitic Viruses

Rabies Control Programs:

The department's work on rabies, led by Dr. Ousmane Faye, focused on enhancing rabies control programs through improved diagnostics and vaccination strategies. Collaborations with veterinary and public health authorities facilitated the implementation of mass vaccination campaigns and public awareness initiatives, significantly reducing the incidence of rabies in high-risk areas.

Research on Encephalitic Viruses:

The team conducted comprehensive studies on encephalitic viruses, including West Nile virus and Japanese encephalitis virus. These studies, led by Dr. Cheikh Loucoubar, aimed to understand the epidemiology and transmission dynamics of these viruses, providing critical insights for developing targeted prevention and control measures.

6. Virus-Induced Cancers

Human Papillomavirus (HPV) Research:

Led by Dr. Moussa Dia, the division continued its research on HPV and its role in cervical cancer. The team conducted large-scale epidemiological studies to assess the prevalence of different HPV genotypes and their association with cervical cancer in Senegal. Findings from these studies informed national cervical cancer screening and vaccination programs.

Hepatitis B and C Research:

The division also focused on hepatitis B and C, investigating the virology, epidemiology, and clinical outcomes of these infections. Research efforts aimed to identify high-risk populations and improve access to diagnostics and treatment, contributing to the national hepatitis elimination strategy.

Capacity Building and Training

The Virology Division has been instrumental in enhancing diagnostic and research capacities across Africa. By conducting external quality assessments and providing training in advanced diagnostic techniques, the division has significantly contributed to improving laboratory standards and expertise in the region. Key initiatives included:

Training Workshops:

The division organized multiple training workshops on molecular diagnostics, biosafety practices, and outbreak response. These workshops targeted laboratory personnel from various African countries, fostering a network of skilled professionals capable of responding to viral outbreaks.

Collaborative Research Programs:

The division engaged in numerous collaborative research programs with regional and international partners. These collaborations facilitated knowledge exchange, resource sharing, and capacity building, enhancing the overall research infrastructure in Africa.

In conclusion, the Virology Division has demonstrated an exceptional commitment to addressing public health challenges through innovative research and diagnostic advancements. The projects undertaken in 2023 reflect the department's strategic focus on improving health outcomes and building resilient health systems in Africa. As the division continues to expand its research horizons and strengthen collaborations, it remains a cornerstone of IPD's mission to promote health and prevent diseases.



IMMUNOPHYSIOPATHOLOGY AND INFECTIOUS DISEASES DIVISION

The IMI Division has made significant strides in its mission to enhance the understanding and management of major infectious diseases affecting Africa, particularly Senegal. Under the leadership of Dr. Inès Vigan-Womas, IMI has focused on fundamental and operational research in immunophysiopathology and genomics, addressing diseases such as malaria, neglected tropical diseases, gynecological cancers, and emerging infectious diseases with epidemic or pandemic potential, including COVID-19.

Established in January 2020 through the merger of the former Immunology and Immunogenetics Divisions, IMI has expanded its research on malaria with the inclusion of the G4-MEGA Vaccines group in January 2023. This integration aligns with the strategic priorities of IPD in public health, education, and expertise. IMI collaborates closely with other IPD departments, local and regional partners, the Pasteur Network, and international research organizations. The vision of IMI is to be a national, regional, and international reference in immunophysiopathology and infectious disease research, focusing on both endemic and emerging diseases affecting human and animal health.

Key Missions

1. Developing high-level, innovative research in immunophysiopathology and infectious diseases.
2. Conducting public health activities and providing expertise in collaboration with health authorities and international organizations.
3. Training the next generation of scientists in immunology, cell biology, molecular biology, and parasitology.
4. Promoting research findings to accelerate the development and implementation of new diagnostic tests, therapeutic strategies, and vaccines.

Research Themes and Achievements

IMI's research is organized into two main axes:

1. Immunology of Infectious Diseases and Cancers

Lead: Dr. Inès Vigan-Womas

Infectious diseases remain a leading cause of mortality and morbidity in sub-Saharan Africa. IMI's research in immunology aims to understand the immune responses against various pathogens, including viruses, bacteria, parasites, and fungi. This understanding is crucial for developing better patient care, diagnostic tests, and therapeutic strategies.

In 2023, significant progress was made in several areas:

- **COVID-19 Response:** Participation in the GIIER program, funded by BMGF, allowed IMI to enhance its capabilities in immunological characterization and monoclonal antibody generation. This has been pivotal in understanding SARS CoV-2 transmission and immune responses in Senegal.
- **Serological Surveillance:** IMI has advanced serological testing using ELISA and MBA, crucial for tracking disease exposure, vaccination coverage, and immune status across populations.

- Collaborations: Partnerships with institutions like the Institut Pasteur Paris have bolstered IMI's research through mathematical modeling and multi-center studies on arboviruses and other pathogens.

Lead: Pr. Gora Diop

IMI's work on the immunogenetics and "omics" of gynecological cancers focuses on identifying genetic markers associated with these cancers within the Senegalese population. Transcriptomic analyses have highlighted the role of immune-related genes and metabolic reprogramming in cervical cancer. The evaluation of HPV genotypes associated with cervical cancer has informed potential updates to vaccination programs.

2. Malaria Research

Leads: Dr. Makhtar Niang, Dr. Alassane Mbengue, and Pr. Amy Kristine Bei

Malaria remains a critical public health issue in sub-Saharan Africa. IMI's research aims to innovate strategies for malaria control and elimination by focusing on:

- Integrated Surveillance:** Implementation of the MultiSeroSurv project in Kédougou has enhanced the surveillance of malaria and neglected tropical diseases.
- Asymptomatic Infections:** The ASYMALE project has deepened understanding of asymptomatic *Plasmodium falciparum* infections and the need for targeted interventions.
- Drug Resistance:** Continued surveillance of antimalarial drug resistance and efforts to identify new therapeutic targets are ongoing priorities.
- Vaccine Development:** The G4-MEGA Vaccines group focuses on developing and testing new malaria vaccines.

Public Health Impact and Future Directions

IMI's research contributes directly to public health policy and intervention strategies. For instance, the serological surveillance data has been instrumental in guiding COVID-19 response measures and vaccination campaigns. The advancements in understanding malaria transmission and drug resistance are informing national malaria control programs.

Looking forward, IMI aims to expand its research scope, enhance its technological capabilities, and strengthen collaborations within the Pasteur Network and beyond. The integration of new diagnostic and therapeutic approaches, coupled with robust public health strategies, will be pivotal in addressing current and future health challenges in Africa.



EPIDEMIOLOGY, CLINICAL RESEARCH, AND DATA SCIENCE DIVISION

The ERCSD has had a transformative year in 2023, marked by significant achievements in epidemiological research, clinical trials, data science, and public health support. Under the leadership of Dr. Cheikh Loucoubar, the ERCSD has strategically aligned its projects with IPD's broader priorities, thereby contributing to public health initiatives and advancing the understanding of infectious diseases through innovative research and data analysis.

Key Focus Areas and Achievements

The ERCSD's efforts in 2023 centered around three major themes: identifying risk factors associated with infectious diseases, mathematical modeling and bioinformatics, and supporting public health initiatives with data expertise. The team, consisting of data scientists, epidemiologists, IT specialists, and field investigators, has executed 21 research projects, with 17 ongoing.

1. Surveillance and Data Sharing

- Regional Data Sharing Platform: ERCSD established a regional platform for sharing data from reference laboratories. This initiative has been crucial in enhancing the transparency and availability of epidemiological data across the region, enabling timely public health responses and facilitating collaborative research.
- Digitalization of Sentinel Surveillance: The digital transformation of Senegal's sentinel surveillance system has been a significant milestone. By implementing digital tools, the ERCSD has improved the accuracy and efficiency of data collection and reporting, which is essential for early detection and response to infectious disease outbreaks.
- Data Visualization Platforms: To support decision-making, ERCSD developed data visualization platforms accessible to policymakers. These tools have been instrumental in enabling immediate action upon the detection of new cases, thereby improving public health interventions.

2. Genomic Surveillance

- Enhanced Disease Surveillance: Genomic surveillance activities have strengthened disease monitoring and collaboration in public health through an integrated, transcontinental network of laboratories. This network, equipped with the necessary training and data infrastructure, maximizes the potential of genomic sequencing technologies.
- GISAID Hub: As a GISAID hub, ERCSD has bolstered the genomic data-sharing platform through local and regional surveillance. This has significantly contributed to the quality management of genomic data, essential for tracking viral mutations and informing vaccine strategies.

3. Capacity Building and Regulatory Support

- Ethics and Regulatory Training: ERCSD has enhanced the capacities of various stakeholders in five African countries concerning the ethics and regulations governing clinical trials

and investigational products. This initiative ensures that research activities comply with international standards and fosters ethical practices in clinical research.

- **Evidence-Based Policy Advocacy:** The team is dedicated to translating research findings into actionable policies and advocating for health policies based on robust evidence. This approach ensures that public health strategies are informed by the latest scientific insights.

4. Research Projects and Epidemiological Studies

- **Sero-prevalence Studies:** ERCSD conducted studies on the sero-prevalence of Rift Valley Fever (RVF) and Crimean-Congo Hemorrhagic Fever (CCHF) viruses. These studies provide critical data on the spread and impact of these viruses, informing public health strategies and vaccine development.
- **COVID-19 Vaccine Efficacy and Diagnostic Tool Evaluations:** The division carried out evaluations of COVID-19 vaccines and diagnostic tools. These assessments are crucial for understanding the effectiveness of vaccines and improving diagnostic accuracy, which is essential for managing the pandemic.

5. Data Analysis and Predictive Modeling

- **Comprehensive Data Analysis:** The team analyzed extensive datasets from surveillance and research projects to describe studied populations and identify factors linked to specific characteristics. This analysis supports targeted interventions and enhances the understanding of disease dynamics.
- **COVID-19 Predictions:** Regular predictive modeling related to COVID-19 has been a key activity. These predictions, shared with the MSAS, have been critical in shaping national response strategies and mitigating the pandemic's impact.

6. Education and Training

- **Training Programs:** Consistent with IPD's vision, ERCSD has provided extensive training programs both internally and externally. These programs include workshops, seminars, and mentorship for students at the end of their academic cycles, ensuring the next generation of scientists is well-prepared for future challenges.

Impact and Results

The impact of ERCSD's work in 2023 is evidenced by several key outcomes:

- **Improved COVID-19 Response:** Predictive modeling and data analysis have significantly enhanced the COVID-19 response in Senegal. The early detection and effective management of cases have helped limit epidemic outbreaks.
- **Strengthened Surveillance Systems:** The digitalization and data-sharing initiatives have improved the overall surveillance system's efficiency and accuracy, leading to more effective public health interventions.
- **Enhanced Research Capacity:** Through extensive training and capacity-building efforts, ERCSD has strengthened the research capabilities of numerous laboratories and health institutions across Africa, fostering a robust and collaborative research environment.

Future Directions

Looking ahead, ERCSD plans to expand its research scope and improve its methodologies:

NCDs: The team aims to extend its research to include risk factors associated with NCDs, recognizing the growing burden of these diseases in Africa.

Enhanced Predictive Approaches: ERCSD will refine its predictive models by incorporating spatial dimensions into the traditionally used temporal models. This will provide a more comprehensive understanding of disease spread and risk factors.

Impact Measurement: Intensifying approaches to measure the impact of interventions, such as vaccination and epidemic response measures, will be a priority. This will help evaluate the effectiveness of public health strategies and guide future actions.

AI Integration: The team plans to develop AI-driven approaches in statistical analyses to better understand the mechanisms of disease coexistence and interactions between diseases and populations.

In conclusion, the ERCSD has had a remarkable year in 2023, marked by substantial contributions to public health through innovative research, advanced data analysis, and capacity building. The division has not only enhanced the understanding of infectious diseases but also provided critical support to public health initiatives across Africa.

Moving forward, ERCSD is well-positioned to continue its impactful work, leveraging advanced methodologies and robust partnerships to address both current and emerging health challenges.

MEDICAL ZOOLOGY DIVISION

In 2023, the Medical Zoology Division made significant strides in advancing research, public health, education, and technical expertise. Under the dedicated leadership of Dr. Mawlouth Diallo, the division has strategically aligned its efforts with IPD's overarching goals. The department's work encompasses investigating disease vectors, providing crucial support to health authorities, and nurturing educational initiatives. The division's key projects and notable achievements throughout the year highlight its critical role in addressing vector-borne diseases in Senegal and beyond.

The division's comprehensive research agenda covers various fields, including bioecology, vector control, population genetics, virus-vector-vertebrate interactions, and the impacts of climate change. These efforts aim to improve decision-making through advanced spatial-temporal risk modelling.

The division's work is systematically structured around two primary areas:

1. Research on Disease Vectors:

- Focus on malaria vector transmission and the ecology of arbovirus vectors.
- Investigate vector-borne diseases of medical and veterinary importance in Senegal and Africa.

2. Public Health Services:

- Support Senegalese and regional health authorities in epidemic risk assessment, investigation, and control.
- Collaborate with international organizations for effective epidemic management.

Key Achievements in 2023 include:

Malaria Vector Transmission

1. Global Changes and Mosquito Adaptation:

In 2023, the division undertook the MoVe=>ADAPT and ANORHYTHM projects, funded by the Agence Nationale de la Recherche (ANR), to understand how mosquitoes adapt to environmental changes and the implications for vector capacity. Extensive field studies and genetic analyses were conducted to assess the impact of these changes on mosquito populations. The research revealed limited hybridization, suggesting ongoing speciation within *Anopheles gambiae* populations in Senegal's southwest coastal region. The team also found distinct nocturnal activity patterns between the urban and rural populations, influenced by light exposure. These insights are crucial for developing targeted control strategies tailored to the specific ecological adaptations of mosquito populations.

2. Residual Transmission and Determinants:

The ASYMALE and MESRI-CRDI projects, funded by the EDCTP and the Senegalese MESRI, focused on characterizing the extent and determinants of residual malaria transmission. Researchers conducted entomological surveys, insecticide resistance testing, and behavioral analysis of mosquito vectors. The findings highlighted that vectors were predominantly zoophagic, exophagic, and exophilic, with high insecticide resistance posing a significant threat to malaria elimination efforts. This research underscored the necessity for alternative control measures and continuous monitoring of vector behavior and resistance patterns.

3. Inhibitory Molecules Targeting Reproductive Proteins:

In collaboration with the Medical Research Council Unit The Gambia, the division evaluated small molecules that inhibit reproductive proteins in *Anopheles gambiae* to reduce malaria transmission. Laboratory experiments focused on the HPX15 protein, a key factor in mosquito reproduction. Initial results suggested the potential role of HPX15 in mosquito reproduction, with further studies underway. This innovative approach opens new avenues for vector control strategies by targeting mosquito reproduction at the molecular level.

Arbovirus Vector Ecology

1. West African Center for Emerging Infectious Diseases (WAC-EID):

Funded by the National Institutes of Health (NIH), this project, in collaboration with multiple institutions, aims to study the mechanisms of zoonotic virus emergence, spread, and maintenance. In 2023, the division's activities included characterizing mosquito vectors, analyzing their microbiomes, conducting high-altitude sampling, and identifying reservoir hosts. The detection of multiple arboviruses in mosquitoes, significant microbiome changes affecting vector competence, and virus dispersal through high-altitude mosquito sampling were key findings. These insights are critical for understanding how arboviruses are maintained and transmitted in the environment.

2. Inter-regional Study of Pandemic-Potential Viruses (ARBOSEN):

This NIH-funded project, in collaboration with the Institut Pasteur network, analyzed the distribution of Rift Valley Fever Virus (RVFV) and Crimean-Congo Hemorrhagic Fever Virus (CCHFV) in ruminants and vectors. Field sampling, serological testing, and molecular analyses provided valuable data on virus distribution and transmission dynamics. High seroprevalence in transhumant herds and multiple viral detections in mosquitoes and ticks underscored the need for ongoing monitoring and management of these diseases.

3. Mapping Arbovirus Transmission Risk:

Funded by the US-Navy, this project studied the bioecology and insecticide sensitivity of *Aedes aegypti*. Longitudinal studies and resistance testing across different regions and seasons revealed year-round vector activity with seasonal peaks, marked insecticide resistance, and the presence of multiple viruses, including dengue serotype 3. This comprehensive data set is essential for developing targeted interventions that control arbovirus transmission.

Epidemic Investigation and Risk Assessment

Throughout 2023, the Medical Zoology Division conducted eight epidemic investigations across Senegal, collaborating closely with the MSAS and WHO. These investigations focused on outbreaks of chikungunya, dengue, Crimean-Congo Hemorrhagic Fever, and Zika in the regions of Kédougou, Fatick, Matam, and Dakar. The division's rapid response teams executed field investigations, collected samples, and provided critical recommendations for outbreak control. These efforts significantly enhanced the understanding of disease dynamics and informed strategic public health interventions.



Future Perspectives

1. Wolbachia-based Dengue Prevention:

In collaboration with the World Mosquito Programme and the Senegalese MSAS, the division aims to establish a mass production unit for Wolbachia-infected mosquitoes. This innovative method involves releasing mosquitoes carrying Wolbachia bacteria, which are incapable of transmitting dengue and other arboviruses. The goal is to prevent epidemics and reduce the incidence of these diseases in Senegal and the broader region.

2. VectorSphere Project:

This project focuses on developing semi-controlled environments to study innovative vector control strategies. By creating natural ecosystems conducive to mosquito life cycles, researchers can maintain continuous generations of vectors. This approach enhances the understanding of vector ecology and behavior, providing a foundation for evaluating and implementing novel control strategies before large-scale releases .

3. West African Aedes Surveillance Network (WAASuN):

The division will organize the 4th annual WAASuN meeting in Dakar in June 2024. This network aims to strengthen surveillance and control capacities for Aedes vectors in West Africa. The meeting will bring together entomologists and public health professionals to share knowledge, discuss challenges, and develop coordinated strategies for controlling Aedes-borne diseases in the region.

The Medical Zoology Division continues to advance scientific knowledge and public health initiatives through its comprehensive research, public health service, and educational programs. These efforts significantly contribute to the control and prevention of vector-borne diseases in Senegal and the broader African region. With a strong foundation of achievements in 2023 and ambitious future projects, the division remains at the forefront of combating emerging and re-emerging infectious diseases.



MICROBIOLOGY DIVISION

The Microbiology Division has continued to play a pivotal role in addressing significant public health challenges in Senegal and the broader West African region. Throughout 2023, the division has been involved in a wide range of activities, from monitoring AMR and bacterial pathogens to conducting advanced microbiome research and capacity-building initiatives. Here, we provide an overview of the division's key projects and achievements, highlighting its critical contributions to public health innovation and scientific research.



Surveillance of AMR

SARA and Tricycle Projects:

In 2023, the SARA project and the WHO Tricycle program were instrumental in monitoring AMR across several African countries, including Benin, Cameroon, Madagascar, Morocco, Central African Republic, and Senegal. These projects aimed to analyze the prevalence of extended-spectrum β -lactamase-producing (ESBL) *Escherichia coli* in humans, chickens, and the environment, using a One Health approach.

A dedicated network for AMR surveillance was established, with over 400 *E. coli* and *K. pneumoniae* isolates collected and characterized. The project also involved retrieving and analyzing resistance profiles from over 10,000 clinical isolates and organizing capacity-building workshops in Paris and Dakar, enhancing the skills of participating microbiologists. These efforts have significantly contributed to generating high-quality data on AMR in Senegal, offering invaluable insights into the prevalence and distribution of resistant bacteria across various settings.

AMR Surveillance in Northern Senegal:

In a previously unstudied region, the AMR surveillance project in Northern Senegal adopted a One Health approach to monitor AMR. Extensive field trips were conducted, collecting samples from diverse sources, including human fecal samples, cattle nasal and rectal swabs, and environmental samples from market and hospital wastewater, soil, and the Senegal River.

This project identified and characterized important pathogens such as ESBL-producing Enterobacterales, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*. The critical data generated on AMR will inform future surveillance and intervention strategies, representing a significant step towards understanding the burden of AMR in rural and under-researched areas of Senegal.

Pathogen Surveillance

Surveillance of Diarrheal Diseases in Dakar:

In 2023, the division conducted surveillance of bacterial pathogens associated with diarrheal diseases in Dakar, analyzing 113 stool samples from various sites, including Pikine and Yeumbeul. The most frequently isolated pathogens were *Salmonella* spp., followed by pathogenic *Escherichia coli* (EAEC, EPEC, ETEC, and serotype O157) and *Shigella* spp. Ongoing surveillance at sentinel sites was implemented, enhancing the department's ability to detect and respond to outbreaks promptly. This work provided essential data to support the Senegalese MSAS in managing diarrheal disease outbreaks.

Surveillance of Carbapenemase-Producing Enterobacterales:

A comprehensive investigation of carbapenemase-producing Enterobacterales (CPE) in Dakar revealed a rising prevalence of these resistant strains in clinical and environmental samples. Over 1,000 clinical strains and 250 environmental isolates, including samples from wastewater and chickens, were analyzed. The identification of key CPE species and ongoing genomic analysis have provided crucial information on the prevalence and resistance mechanisms of CPE, guiding future research and public health interventions.

Fecal Carriage of ESBL Enterobacterales in Bangui:

A study on the fecal carriage of ESBL-producing Enterobacterales in children in Bangui, Central African Republic, highlighted a high prevalence of these resistant bacteria in the community. The study collected and analyzed 278 fecal samples from children aged 0-5 years admitted to the Pediatric University Hospital Complex, identifying ESBL-producing *E. coli* and *Klebsiella* species with high rates of antibiotic resistance. The results were published in the journal *Bacteria*, underscoring the need for targeted interventions to control the spread of resistant bacteria.

Environmental ESBL *E. coli* and *Klebsiella* from Ouagadougou:

This project focused on isolating and characterizing ESBL-producing *E. coli* and *Klebsiella pneumoniae* from environmental sources in Ouagadougou, Burkina Faso. Analyzing 264 environmental samples revealed a significant prevalence of ESBL bacteria in wastewater and manure. The AMR profiles of these isolates provided insights into the potential health risks posed by these environmental pathogens.

Surveillance of Vegetables Sold in Markets in Senegal:

The division conducted a study on the contamination of vegetables by *Salmonella* in supermarkets and open markets in the Niayes zone of Senegal. A total of 742 vegetable samples were collected from multiple cities, including Dakar, Rufisque, Thies, Mboro, and Louga. Significant contamination rates were found, particularly in mint leaves, parsley, and lettuce, highlighting the public health risks associated with consuming these raw vegetables. The study provided recommendations for improving food safety and reducing the risk of *Salmonella* infections.

Capacity Building and External Quality Assessment

EQUAFRICA Project:

The EQUAFRICA project aims to establish an EQA program for AMR in sub-Saharan Africa. The division was selected as a center of excellence for this initiative. In 2023, three EQA cycles were conducted, evaluating laboratories from Cameroon, Ghana, Nigeria, Senegal, and Sierra Leone. Proficiency test panels were developed, and comprehensive performance reports were provided to participating laboratories. These efforts have enhanced the capabilities of microbiology laboratories in West and Central Africa, promoting accurate bacterial identification and antimicrobial susceptibility testing.

Building on the successes of EQUAFRICA, plans are underway to expand EQA activities to cover additional countries with support from the Global Fund and WAHO. The expanded program will involve organizing proficiency tests for human and veterinary laboratories in 12 countries, aiming to establish a robust network for integrated AMR surveillance.

Clinical Research and Microbiome Studies

ProFeSen Clinical Trial:

The ProFeSen clinical trial, conducted in collaboration with international partners, focuses on improving EED in pregnant women using a probiotic mixture. In 2023, the infrastructure for clinical trials was established at the Wakhinane healthcare center, and critical equipment for microbiome analysis and other clinical investigations was acquired. Preparations were made for the trial's commencement in the first half of 2024, with the goal of testing interventions to improve maternal and child health outcomes.

Applied Research: HOLICARE Project

The HOLICARE project aims to enhance healthcare delivery by developing innovative diagnostic solutions for lower respiratory infections in sub-Saharan Africa. In 2023, the project developed multiplexed lateral flow tests and a Point-of-Care instrument for pathogen identification and host biomarker quantification. Quality-controlled biobanks were established to support robust clinical studies, and ethical approvals for clinical trials in Senegal, Uganda, and Ethiopia were secured, with preparations for patient recruitment underway.



Basic Research: Salmonella Genomics and Pathogenesis

Genomics of Salmonella:

The division conducted whole-genome sequencing of Salmonella isolates from various outbreaks, revealing genetic similarities and differences among strains. The genomic analysis provided insights into the circulation and evolution of Salmonella strains, informing public health strategies and contributing to a better understanding of Salmonella pathogenicity.

Phage Therapy for Salmonella:

Exploring the potential of phage therapy as an alternative to antimicrobials for treating Salmonella infections, the division identified virulent and protective Salmonella strains using a Swiss Webster Mouse Model. Investigations into the molecular mechanisms of Salmonella virulence contributed to the development of phage therapy and recombinant vaccine delivery systems.

In conclusion, in 2023, the Microbiology Division made substantial progress in its mission to tackle critical public health challenges. Through its diverse projects and research initiatives, the division has generated invaluable data, enhanced capacity building, and fostered international collaborations. These efforts have not only advanced scientific knowledge but also significantly improved public health outcomes in Senegal and the broader West African region. As the division looks to the future, it remains committed to driving innovation, building capacity, and strengthening public health.



ADVANCED VACCINE BIOPROCESSING LABORATORY

In 2023, IPD launched the AVBL, marking a transformative step in vaccine development and public health innovation. The AVBL, dedicated to optimizing vaccine technology transfer and production at the MADIBA facility, symbolizes a new era of scientific advancement at the institute.



Building Expertise and Capacity

One of the most significant achievements of the year was the successful recruitment of 27 expert scientists, who brought a wealth of knowledge and experience to the AVBL. This influx of talent was complemented by comprehensive training programs designed to ensure the team was well-versed in cutting-edge vaccine technologies. Training sessions included an intensive mRNA technology course at AFRIGEN and hands-on mRNA production training at the National Center for Therapeutics Manufacturing at the University of Texas. These initiatives have equipped the team with the skills necessary to drive the programme forward effectively.

Advancing Technology Transfers

The AVBL made substantial progress in technology transfers, particularly for Africa's first MR vaccine. This endeavor showcased IPD's commitment to addressing critical public health needs on the continent. The successful initiation of this technology transfer represents a milestone in the region's capacity to produce vital vaccines locally. Additionally, the mRNA technology access project, supported by CEPI and BMGF, aimed at developing mRNA vaccines for Rift Valley Fever (RVF) and other significant pathogens. The lab integrated introductory and technology transfer packages, conducted a successful site assessment, and received the Quantoom Biosciences Ntensify Mini, a crucial piece of equipment for mRNA production.

Facility and Scientific Progress

A key milestone was the finalization and validation of the facility layout plan, ensuring a well-organized and efficient lab environment. This foundational work enabled the commencement of initial antigen design for vaccine candidates, laying the groundwork for future advancements in vaccine development.

mRNA Programme

In addition to the M/R vaccine efforts, the AVBL made significant strides in mRNA vaccine technology, focusing on vaccines for RVF and other critical pathogens. The team not only acquired the necessary equipment but also developed strong collaborations and received extensive training to ensure the successful implementation of mRNA technologies.

In conclusion, the establishment of the AVBL in 2023 represents a significant leap forward in vaccine development. Through strategic recruitment, comprehensive training, and robust partnerships, the AVBL has made substantial progress in both traditional and mRNA vaccine technologies. This progress underscores the Institute's commitment to scientific excellence and innovation in vaccine bioprocessing. As a result, the AVBL is well-positioned to make significant contributions to global health, particularly in developing vaccines for Rift Valley Fever, measles, rubella, and other high-priority diseases. The achievements of 2023 mark the beginning of a new era of public health advancement in Africa.

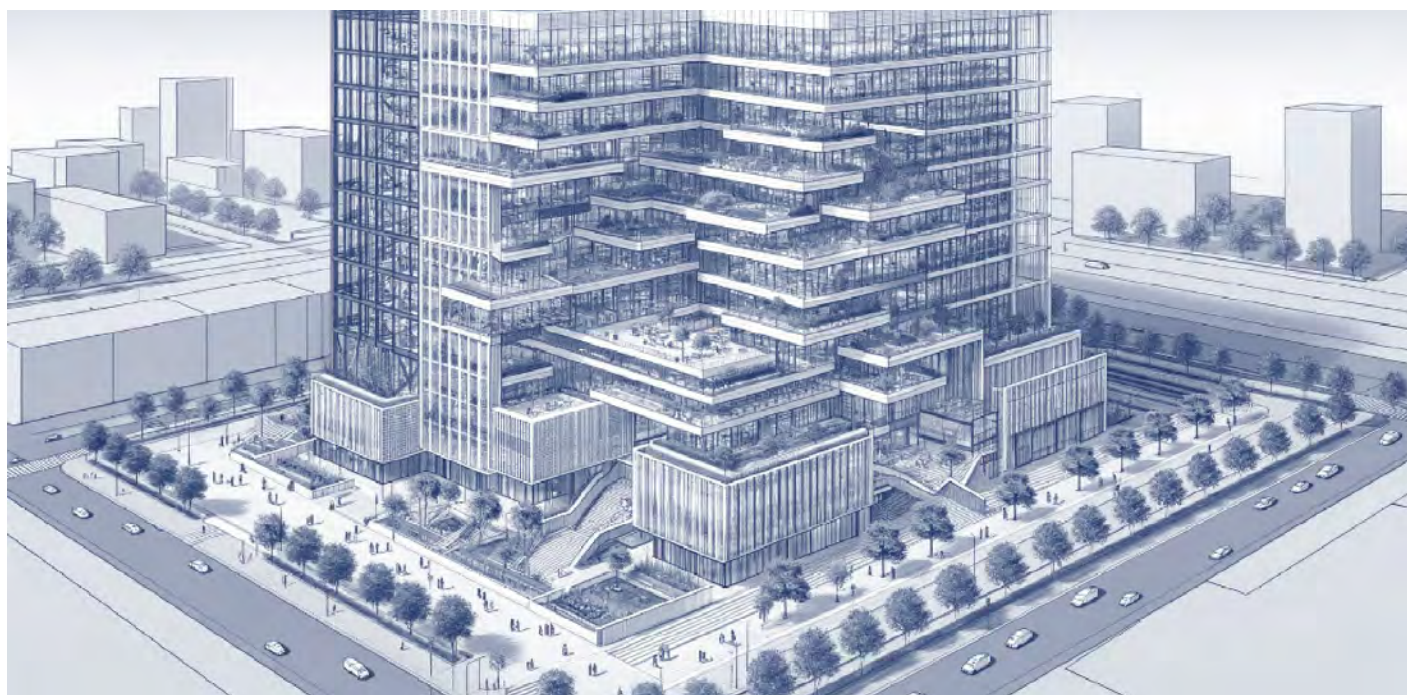
DAVAX

In October 2023, IPD convened the inaugural meeting of the DAVAX Scientific Advisory Board in preparation for the establishment of this center. IPD has envisioned the creation of the DAVAX Centre with two primary goals in mind:

1. Mobilize essential expertise and infrastructure to develop regionally relevant vaccines, from antigen discovery and design to development of vaccine candidates ready for transfer to GMP manufacturing.
2. Establish a unit to design and develop the IPD vaccine pipeline that complements IPD's ability to acquire and transfer new technology.



This initiative aims to fulfill IPD's vision of enhancing internal capabilities for accelerated development and commercialization of in-house vaccines, by strategically advancing up the vaccine development R&D value chain.



GRAND CHALLENGES SÉNÉGAL: PIONEERING HEALTH INNOVATION IN AFRICA



In 2022, IPD launched GCS, an ambitious initiative aimed at transforming the public health landscape in Africa. This non-profit innovation fund, supported by BMGF and GCC, seeks to drive forward cutting-edge solutions that address critical health challenges.

The first call for proposals, initiated amidst the COVID-19 pandemic, targeted interventions to enhance epidemiological surveillance and epidemic response. Out of 182 submissions, 56 were evaluated, and 8 projects received \$50,000 each, amounting to a total funding of \$400,000. These projects focused on areas such as data digitization, rapid molecular diagnostics, and the discovery of emerging viruses.

Following this, the second call for proposals launched in 2023 aimed to harness the potential of AI to improve global health outcomes. With 75 submissions and 40 evaluated, 10 projects were selected, each receiving \$100,000, mobilizing \$1.2 million in total. The selected projects emphasized clinical decision support, health communication, and strengthening health systems.

GCS has not only funded innovative projects but also actively engaged in the Grand Challenges network's annual learning and evaluation meetings. This participation has sparked new collaborations and partnerships, enhancing the program's impact and reach.



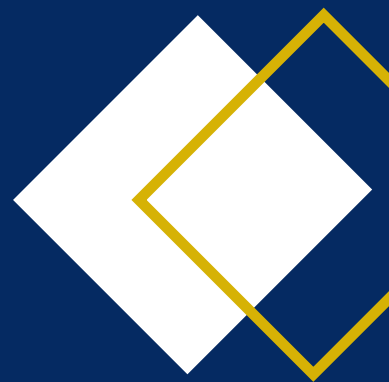
Looking ahead, GCS plans to launch a third call for proposals early next year. The focus will be on fostering new collaborations through joint calls with other Grand Challenges partners and securing additional funding to ensure the project's sustainability.

Grands Challenges Sénégal stands as a beacon of hope and innovation, driving transformative changes in public health across Africa. By nurturing groundbreaking ideas and fostering collaboration, GCS is building a resilient and responsive health innovation ecosystem that promises a healthier future for all.



IPD Strategic Pillars:

Vaccine and Diagnostics Manufacturing



YELLOW FEVER VACCINE PRODUCTION: A LEGACY OF EXCELLENCE

The Yellow Fever Vaccine is a cornerstone of our legacy, with over 395 million doses produced in the past 87 years by IPD. It has been, and will continue to be, crucial in our mission. In 2023, IPD remained the only WHO prequalified manufacturer of vaccines in Africa and one of only four facilities worldwide producing stabilized yellow fever vaccines.

GARAP represents IPD's historical yellow fever vaccine factory, located on our original campus in the heart of Dakar, with a capacity of 5-8 million doses per year. AfricAmaril, our new, state-of-the-art facility at the Vaccinopole in Diamniadio, has a scaled-up capacity of 30 million doses annually.

In 2023, significant upgrades were successfully completed at the GARAP site, including facility enhancements, process improvements, and equipment modernization to enable the production of new vaccine batches. These enhancements included bringing the filling line into compliance with current good manufacturing practices. Throughout the year, the GARAP team dedicated substantial time to preparing for the resumption of operations. Two main challenges needed to be addressed to reintroduce vaccine supply in 2024.



The first challenge was qualifying a new diluent supplier, achieved through a new partnership with Sovereign Pharma. The second challenge was qualifying new test methods as part of IPD's commitments to the WHO. These methods are on track for completion and are expected to be delivered on schedule. Additionally, the team conducted necessary engineering and validation batches in 2023, with plans to commence drug substance and drug product manufacturing for vaccine delivery to UNICEF by mid-2024.

At AfricAmaril, civil engineering work was successfully completed in 2023. All key industrial equipment has been installed, and the filling line will be ready for initial production runs expected in 2024. Twelve new staff members have been recruited in operations, quality, and maintenance to support ongoing manufacturing efforts, and their addition to the team is greatly welcomed.

MADIBA: MANUFACTURING IN AFRICA FOR DISEASE IMMUNIZATION AND BUILDING AUTONOMY

The MADIBA project, which stands for Manufacturing in Africa for Disease Immunization and Building Autonomy, aims to produce EPI vaccines and combat epidemic and pandemic threats in Africa. The construction of this state-of-the-art facility began in 2021, in the wake of the COVID-19 pandemic, highlighting the glaring inequity in vaccine access across the continent. IPD took the initiative to establish MADIBA to bolster Africa's vaccine sovereignty.

MADIBA has been strategically designed to facilitate the production and filling of regionally relevant vaccines within Africa. The facility is equipped with cutting-edge filling equipment and a supply chain that can accommodate various vaccine types, including live viral vaccines, mRNA vaccines, and protein-subunit vaccines. The target capacity of MADIBA is to produce over 300 million doses of vaccines annually.



In 2023, significant progress was made towards the completion and equipping of its two production units. This progress includes the installation of key modules and equipment, the design of prototypes for single-use filtration kits, essential training sessions, and advancements in the development of production documents and Standard Operating Procedures (SOPs).

Looking ahead, the vision for MADIBA includes expanding its vaccine portfolio to include vaccines for MR, polio, rotavirus, and the development of a cell-culture yellow fever candidate. As the preferred manufacturer in Africa by CEPI, IPD will also be responsible for producing the Lassa fever vaccine candidate.

DIATROPIX: LEADING RAPID DIAGNOSTICS FOR EPIDEMICS IN AFRICA



Diatropix (DTX) is the only non-profit manufacturing facility in Africa dedicated to producing rapid diagnostics for epidemics. Established in 2020 during the COVID-19 lockdown, DTX is located on IPD's historic campus and became the first ISO 13485 certified facility in a low-income country. This certification, awarded by the British Standards Institution in November 2020, enabled DTX to produce 2 million rapid tests annually.

During 2023, DTX began construction on a new semi-automated production site in Mbaou, just outside of Dakar, with support from FIND and Unitaïd. This new site will have the capacity to produce at least 50 million rapid tests per year. DTX successfully maintained its ISO 13485:2016 certification through a recent audit and expanded its certification scope to include a storage facility near the future DTX site in Mbaou.

Collaborating with key strategic partners such as BMGF, MSF, and FIND, DTX is working on the development and commercialization of four GAVI surveillance diagnostics for measles, meningitis, yellow fever, and rubella. Additionally, DTX, alongside FIND and Unitaïd, is revising its business model to enhance sustainability and expand its manufacturing capabilities.

IPD Strategic Pillars:

Public Health, Epidemic Intelligence and Outbreak Response



Centered on strengthening the healthcare system for a resilient African population during health crises, the Public Health Department is strategically structured around three core pillars: the Health System Strengthening (HSS) division, the Surveillance and Epidemic division, and the Clinical Research team.

Strengthening the healthcare system for a resilient African population during health crises
A pivotal event marked the establishment of the Health System Strengthening (HSS) division in April 2023, signaling a new chapter in the IPD's commitment to public health. This milestone was further bolstered by the recruitment of a dedicated head to lead the division and drive impactful initiatives forward.

One of the division's key programs focused on tackling vaccine hesitancy across various stages of life. Securing funding from prominent organizations like the Susan Thompson Buffett Foundation, Pfizer Inc., and MEAE/FSPI, this initiative aimed to address critical challenges in vaccine acceptance and uptake within the African context.

The division actively participated in the Consortium Alliance SHS Africa, a collaborative platform dedicated to enhancing the response capacity of African health institutions during crises. Through engaging in this consortium, the division reinforced its commitment to proactive and coordinated efforts in safeguarding public health.



Moreover, a program centered on building community resilience to health crises through comprehensive surveillance and situational analysis was launched in Senegal. Supported by the Skoll Foundation and Susan Thompson Buffett Foundation, this endeavor sought to empower communities to respond effectively to emerging health threats and crises.

Throughout the year, the team engaged in knowledge-sharing and capacity-building activities. This included presenting at the 1st Congress of the African Public Health Society on integrating clinical care and health security algorithms at the primary health facility level in Senegal. Additionally, participation in initiatives like the “implementation laboratory for universal health coverage in Senegal” and a specialized course on “The social dimensions of epidemics” further enriched the division’s expertise and readiness to address complex public health challenges. Integrated surveillance for early detection and response to epidemics in West Africa.

In 2023, the Surveillance and Epidemic division made significant progress in integrated surveillance efforts for early detection and response to epidemics in West Africa. The establishment of 11 syndromic sentinel sites across key regions marked a critical milestone, including five sites in Senegal and two each in neighbouring countries such as The Gambia, Cape Verde, and Mauritania.

A noteworthy achievement was the setup of a comprehensive One Health site in northern Senegal, specifically in the Agnam Civol health district. This pioneering site integrated multiple surveillance components, including syndromic surveillance (4S), entomological surveillance, integrated AMR surveillance following the One Health approach, and animal cohort tracking. The consolidation of these surveillance activities at a central location bolstered the division’s capacity to detect and respond swiftly to emerging health threats.

Moreover, the division conducted supervisory visits to monitor and enhance the performance of the syndromic surveillance 4S sites in Senegal. An annual coordination meeting was convened, bringing together all stakeholders involved in the 4S network to review progress, exchange insights, and streamline collaborative efforts.

Throughout the year, the division responded to and investigated ten outbreaks of arboviruses and hemorrhagic fevers, underscoring its proactive approach to epidemic management. Noteworthy investigations included outbreaks of Dengue, Chikungunya, Crimean-Congo Hemorrhagic Fever (CCHF), and Measles in different regions, with research and response efforts primarily focused in Senegal.



Clinical Research

In 2023, the Clinical Research team spearheaded impactful initiatives to advance medical research and enhance healthcare outcomes. A key achievement was formulating a strategic plan for clinical research spanning 2024–2028, outlining the team's objectives and guiding principles for future endeavors.

The team successfully obtained ethical approval for two research protocols, laying the groundwork for ethically sound and scientifically robust research investigations. Subsequently, the recruitment of 200 participants for a vaccine efficacy study demonstrated the team's commitment to conducting high-quality clinical research with real-world impact.

In an effort to promote ethical best practices in biomedical research, the team organized three workshops focused on ethical considerations. Further fostering capacity-building in ethical research practices, the team organized three webinars addressing diverse ethical aspects. Topics covered included gender perspectives, public health ethics, and issues related to vulnerability, offering valuable insights and guidance to researchers and stakeholders.

The team also prioritized education and training initiatives, exemplified by developing two videos in French and English elucidating the crucial role of ethical committees in clinical research. Additionally, two team members received certified training in clinical trial operations in Addis Ababa, enhancing their expertise and proficiency in conducting clinical research effectively.

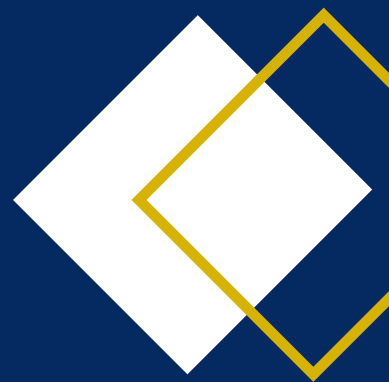


Finally, to fortify the team's capabilities and skills, a training program in Clinical Research Associate was conducted, equipping team members with essential competencies for research coordination and management. All team members received certification training on the ISO14155 standard, ensuring adherence to international quality standards in clinical research practices.



IPD Strategic Pillars:

Education, Training and Talent Development



"PROJECT KWAME – KNOWLEDGE & WORKFORCE FOR AFRICA MANUFACTURING FOR EQUITY

In response to the pressing need for vaccine sovereignty, substantial investments are being channeled into local and continental initiatives, with a specific emphasis on nurturing a skilled workforce, particularly within the youth demographic. The ambitious goal of MADIBA to boost vaccine production capacity to 300 million doses annually by 2025 mandates the recruitment of 200 full-time equivalents (FTEs). At a continental level, the aspiration is to meet 60% of vaccine demand by 2040, necessitating an additional 14,000 FTEs.

In February 2023, IPD launched Project KWAME to align with local and continental aspirations for vaccine production. Adopting a comprehensive approach, the project's activities revolve around three key objectives.





Objective 1: Operationalizing MADIBA by recruiting and training 200 FTEs.

In 2023, the focus was on strategic hiring efforts for MADIBA, with plans to bring on board 200 individuals, with a significant emphasis on youth representation (85%) and gender diversity (40% women). The year saw a concerted effort to recruit a managerial team to lead the way for subsequent hiring phases at MADIBA. To accelerate the recruitment process, a job dating event was organized in November, attracting local and international/diaspora talent, resulting in access to 3,500 potential candidates. As a direct outcome, 11 new hires were onboarded, and an additional 70 positions are in the pipeline for 2024, currently under screening with ongoing interviews.

Furthermore, 2023 marked the finalization of internal gap analysis and the activation of strategic partnerships, including IVI, to roll out a comprehensive training plan starting in 2024. These initiatives reflect the commitment to building a diverse and skilled workforce to meet the ambitious production targets set for MADIBA.

Objective 2: Establishing a regional training hub to annually train and place 300 to 800 individuals.

KWAME was initiated with a workshop that brought together 35 strategic partners in Senegal, co-hosted by IPD, Africa CDC, and the SAMRC. Notable attendees included the Mastercard Foundation, the IVI, CEPI, GIZ, BMGF, KEMRI, and WHO. The workshop aimed to assess and co-create a roadmap for talent development, resulting in key outcomes such as mapping the continental-level offerings, identifying crucial stakeholders to engage, and agreeing on cultivating a supportive ecosystem for talent development.

In November 2023, the group reconvened at the annual CPHIA in Zambia to showcase progress and officially introduce the PAVM competency frameworks for vaccine manufacturing and research and development. Through strategic partnerships with stakeholders like Africa CDC acting as the Regional Capability Capacity Centre for West Africa, IVI for sharing best practices, knowledge transfer, and engaging with NIBRT through their Global partnership program, IPD is on track to establish itself as a reputable regional training center. In 2023, 131 IPD staff received training on various biomanufacturing topics, with 26% of them being women.

Furthermore, an advisory committee chaired by Mr. Prashant Yadav from the INSEAD Group, and comprised of experts in the global biomanufacturing and training domains, was established to provide strategic direction and oversight.

Objective 3: Engaging 300 young adolescents each year, with a focus on attracting women into the field.

In 2023, IPD launched the High School Roadshow to foster the growth of the future biomanufacturing workforce in Senegal and Africa. The initiative kicked off with the celebration of Science Day 2023, involving 100 freshmen and junior year students in high school who were pursuing a science track, with 83% of them being women. The roadshow encompassed visits to 6 public high schools and 3 private high schools to inspire and engage the next generation in the field of biomanufacturing.

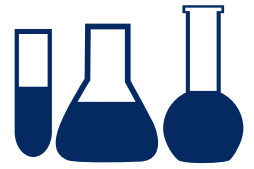
In addition to this, IPD is also engaging different external partners such as Batonga, Force, and Lasec Education to expand its reach.



 **INSTITUT
PASTEUR**
de Dakar

IPD Strategic Pillars:

Healthcare Solutions and Specialised Laboratories



BIOMEDICAL LABORATORY

The Biomedical Laboratory had a busy and productive year in 2023, marked by various significant developments and accomplishments.



Expansion and Renovation:

To address the increasing demand for services, the laboratory underwent an expansion on the 1st floor in December 2023. This extension allowed for an increased capacity to see more patients, ultimately improving the efficiency and effectiveness of medical services provided. Furthermore, the laboratory invested in renovating the Spermiologie department and upgrading its facilities. These enhancements not only improved the quality of care but also reflected the laboratory's commitment to continuous improvement.

New Partnerships and Collaborations:

In 2023, the laboratory signed new partnerships and collaborations with organizations such as WATER AID West Africa, SEN'EAU, SENELEC, and GECAMINES Granulats. These partnerships expanded the reach of the laboratory's services to multiple sites in Dakar and the surrounding regions, further enhancing its impact on public health.

Home Sample Collection Program:

The laboratory introduced a home sample collection program with around 100 monthly visits to enhance medical service accessibility. A customer survey in the same year reported a notable 91.5% satisfaction rate, underscoring the laboratory's dedication to meeting patient needs through services like appointment scheduling and sample collection.

ISO 15189 V 2022 Standard Implementation:

In line with international standards, the laboratory successfully implemented the requirements of the new ISO 15189 V 2022 standard in 2023. Through comprehensive training and transition plans, the laboratory ensured compliance with the latest quality management practices, demonstrating its dedication to excellence in medical services. Additionally, the laboratory underwent several audits and evaluations throughout the year to maintain and improve quality standards.

Overall, the Biomedical Laboratory made significant progress in 2023, expanding its capabilities, enhancing partnerships, improving patient access, and maintaining high standards of quality and customer satisfaction. The dedication and efforts of the laboratory staff have undoubtedly contributed to the positive impact of the laboratory on public health and wellness in the region.



MEDICAL CENTER

The Medical Center encompasses three primary units dedicated to providing essential health services: the OHS, the Anti-rabies Treatment Center, and the International Vaccination Center.

Occupational Health Service

The OHS plays a crucial role in safeguarding and promoting the health, safety, and well-being of IPD's employees and their families. In 2023, the OHS conducted 791 consultations, providing comprehensive care and support to both staff and their families.

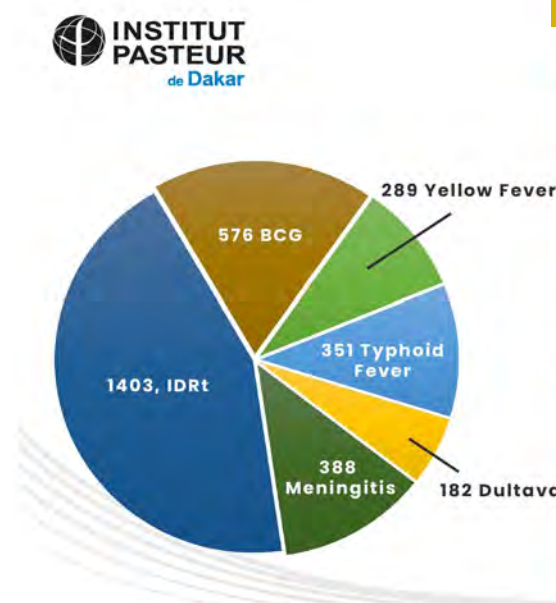
Anti-rabies Treatment Center

At the Anti-rabies Treatment Center, individuals seeking rabies vaccination for preventive or curative purposes receive appropriate care. Depending on the case, local treatments may be administered, or referrals may be prescribed. In 2023, the center attended to a total of 1,003 patients for anti-rabies consultations, including 776 post-exposure consultations and 227 pre-exposure consultations.

International Vaccination Center

Every individual presenting at the International Vaccination Center undergoes a pre-vaccination consultation, a routine procedure conducted before administering any vaccines. This consultation is designed to identify any contraindications to vaccination while also serving to educate and raise awareness about the significance of vaccination in preventing specific diseases. The Medical Center also provides comprehensive care for post-vaccination side effects, including consultations, assessments, and treatment, while ensuring that adverse events are reported to the MSAS.

In 2023, the following statistics were documented:



289 Clients For Yellow Fever

351 Clients For Typhoid Fever

182 Clients For Dultavax

388 Clients For Meningitis

1,403 Clients For Tuberculin Skin Test (IDRT)

576 Clients For BCG

Overall, the Medical Center demonstrated a strong commitment to public health through its comprehensive services and preventive care initiatives in 2023. The dedication and efforts of the staff across all units have significantly contributed to the well-being of the community and the advancement of public health in the region.

FOOD SAFETY AND ENVIRONMENTAL HYGIENE LABORATORY



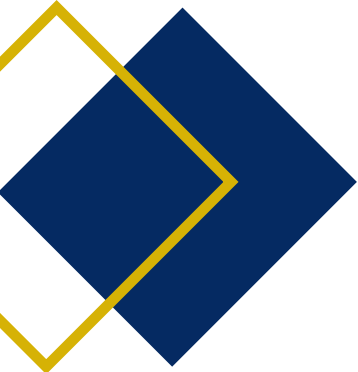
The LSAHE is a specialized facility dedicated to ensuring the safety of food products. Comprising two laboratories equipped to conduct comprehensive analyses, LSAHE identifies biological and chemical hazards often implicated in food safety issues. It stands out as one of the most proficient laboratories, accredited by SOAC for 20 parameters (water and food) and internationally recognized for its technical proficiency in conducting these analyses.

The laboratory assists a diverse range of clients, including hotels, restaurants, government agencies, and professionals in the agri-food, agricultural, and mining sectors. It plays a critical role in verifying the compliance of products on the market with relevant health regulations and in preventing health problems associated with the consumption of unsuitable food items.

LSAHE's crucial role in protecting public health is underscored by its microbiological analyses of water, food, and the environment. These analyses are essential for detecting pathogens that pose significant risks. The consumption of contaminated foods, carrying bacteria, viruses, parasites, or harmful chemicals, can result in over 200 acute or chronic illnesses, potentially leading to severe cases with permanent disability or fatal outcomes. Notably, diarrheal diseases rank fifth among the leading causes of death in low-income countries, highlighting the critical importance of the laboratory's work in preventing such health crises.

In 2023, the LSAHE achieved noteworthy milestones, including the successful transfer of accreditation from the French accreditation body, Cofrac, to the sub-regional organization, SOAC. Additionally, the laboratory conducted thorough analyses of 9,000 samples covering 35,000 parameters and provided guidance to a significant number of Master's and undergraduate students.

Overall, the LSAHE's dedication to ensuring food safety and environmental hygiene has significantly contributed to public health in the region. The laboratory's achievements in 2023 reflect its commitment to maintaining high standards of safety and quality, protecting consumers, and educating future professionals in the field.



Support Functions

HUMAN CAPITAL MANAGEMENT

The Human Capital Department embarked on a transformative journey in 2023, marked by significant developments and strategic initiatives aimed at enhancing our workforce and aligning with our organizational goals. Following the internal diagnostic conducted by an international consultancy, several key projects were launched to reform our human resources management into a comprehensive Human Capital Management system.

Restructuring the Organization:

The first major initiative focused on restructuring our overall organization to better align with our strategic objectives. This restructuring included revising organizational charts, updating job descriptions, and implementing new service notes and nominations to streamline operations and enhance efficiency.

Addressing Staffing Shortages:

To resolve staffing deficits, we undertook substantial recruitment efforts, resulting in the addition of 114 new hires. This recruitment wave, combined with low turnover rates, contributed to a decrease in the average age of employees from 41 to 39 years and a reduction in average tenure from 8 to 6 years, reflecting a younger, dynamic workforce.

Reforming Compensation Management:

A comprehensive overhaul of our remuneration system was implemented to ensure competitive and fair compensation practices. This included launching a generalized salary revaluation and introducing new benefits, such as improved health insurance coverage through a partnership with OLEA.



Developing a Human Resource Information System (HRIS):

To improve HR processes, a new HRIS was developed and deployed, enhancing our capabilities in managing employee data, payroll, and performance. This digital transformation has significantly improved our operational efficiency and data accuracy.

Launching the Mobility Policy:

A new mobility policy was introduced to support employee transportation needs. This policy includes the provision of buses and a car plan, enhancing accessibility and convenience for our staff.

Reforming the Establishment Agreement:

The establishment agreement was reformed to reflect the updated policies and practices, ensuring compliance with legal and regulatory standards while fostering a positive work environment.

Fostering Social Engagement:

Efforts to animate the social life of the institute included team-building activities, "Café RH" sessions, and conferences. These initiatives have been instrumental in creating a cohesive and motivated workforce.

Throughout 2023, the Human Capital Department has demonstrated a strong commitment to building a high-quality workforce capable of driving the IPD towards achieving its mission. The dedication and efforts of our team have significantly contributed to the positive impact on our organizational performance and public health outcomes in the region.

DIGITAL TRANSFORMATION

The digital transformation department has been marked by significant achievements in 2023, underscoring our commitment to enhancing operational efficiency and meeting the evolving demands of the healthcare landscape. Through strategic initiatives, we have successfully defined and addressed our digitalization needs, optimizing our processes and capabilities to align with our mission and strategic goals.

Key System Implementations:

In our pursuit of digital innovation, we implemented several critical systems to streamline our operations:

- **Enterprise Resource Planning (ERP):** This comprehensive system now covers Finance, Accounting, Human Resources, Sales, Invoicing, Supply Chain, Maintenance Management, and Vaccine and Diagnostic Production.
- **Electronic Quality Management System (eQMS):** The adoption of eQMS has significantly streamlined our document management processes.
- **Biobank Solution:** This implementation has enhanced the efficiency of our sample management.

- **HPC Infrastructure:** The establishment of HPC infrastructure has bolstered our computational capacity for genomic calculations, empowering our researchers with state-of-the-art tools to drive groundbreaking discoveries.

Engagement and Process Optimization:

Our digital transformation efforts have been characterized by extensive engagement and collaboration. Over 150 people were mobilized, and 76 workshops were conducted to model over 80 processes. These initiatives have been crucial in refining our workflows and ensuring that our digital tools meet the specific needs of our operations.

Enhanced Computational Resources:

We have deployed high-caliber computational resources, including 320 CPUs, 1024 GB of RAM, and 400 TB of storage. These resources provide our researchers with the computational power necessary to make impactful scientific breakthroughs.

Future Focus and Continued Advancements:

Looking ahead, our focus remains on advancing our digital capabilities through the continued deployment of ERP, eQMS, Biobank, Customer Relationship Management (CRM) systems, and ElabJournal for digitizing researchers' laboratory notebooks. Our commitment to digital surveillance is exemplified by the digitization of the 4S sentinel surveillance system and the Walip initiative, aimed at centralizing information reporting from laboratories to key stakeholders.

Collaborative Partnerships:

Our partnerships with industry leaders such as ATOS, BearingPoint, Safir, Efor-CVO, eNNOV, and ModulBio underscore our collaborative approach to driving digital transformation in healthcare. These collaborations have been instrumental in providing the expertise and technology needed to support our digital journey.

In conclusion, 2023 has been a transformative year for digital innovation at IPD. Our strategic initiatives and partnerships have not only enhanced our operational efficiency but also empowered our researchers with cutting-edge tools and resources to advance public health outcomes. We remain committed to leveraging digital technologies to drive excellence in healthcare and scientific research.



SUPPLY CHAIN

The Supply Chain department, established in May 2023, has prioritized operational excellence by continuously optimizing procurement processes. Navigating the complexities of global supply chains, the department faces challenges such as prolonged lead times due to the geographical distance between our delivery sites in Senegal and suppliers primarily based in Europe, Asia, and the USA. These challenges have necessitated a strategic overhaul to address inefficiencies, bottlenecks, and potential risks in our supply chain.

Our dedicated Supply Chain team has implemented several measures to enhance procurement efficiency and streamline operations. Key actions undertaken since the department's inception include:

Diagnostic Assessment: A comprehensive diagnostic of the supply chain system was conducted to identify areas for improvement.

Ishikawa Diagram Implementation: The procurement process was optimized using an Ishikawa diagram (PHEB Tool) to streamline order management flow.

Consultations and Tenders: Multiple consultations and calls for tenders were executed across various projects.

Strengthened Validation Processes: Validation processes were bolstered through a predefined checklist involving key stakeholders.

Demand Consolidation: Demand expressions were unified through a centralized Supply Chain address, enhancing internal customer support.

Task Force Recruitment: A Task Force team was recruited for expedited order processing and backlog resolution.

Outsourced Local Transit Operations: Local transit operations were outsourced to two service providers.

Procurement Steering Committees: Weekly Procurement Steering Committees were established to reinforce governance oversight.

Enhanced Purchasing Agreements: Negotiated rates with strategic suppliers were leveraged to enhance purchasing agreements.

Stock Management Assessment: A stock management assessment was conducted to optimize inventory handling.

The team has diligently cultivated strategic partnerships with key suppliers, emphasizing the importance of building enduring trust relationships and enhancing contract management practices. This collaborative approach encourages joint solution development to address specific needs, demonstrating flexibility to accommodate internal requirements and navigate supplier constraints.

These collective efforts have resulted in significant cost savings exceeding 2 billion CFA francs through optimized procurement processes and cost-efficient purchasing strategies. Looking ahead, the team will focus on further refining operational processes to enhance visibility, bolster control, and optimize procurement and inventory management practices. Additionally, efforts will intensify in analyzing and optimizing supplier performance for sustained efficiency and value creation.

OPERATIONAL RESOURCES

The Operational Resources department ensures efficiency by managing the QHSE Service, the Metrology Service, and the SMTI. In 2023, key targets were achieved, reflecting IPD's dedication to compliance, high-quality processes, and a safe working environment for all employees and stakeholders. The organization's commitment to safety in biohazard handling and its leadership in promoting best practices in biosafety and biosecurity across West Africa were demonstrated once again.

Quality, Hygiene, Safety, and Environment Service

The QHSE Service coordinates the overall Quality Management System and manages risk prevention with the Hygiene Safety Committee, promoting biosecurity and biosafety for laboratory and service activities. In 2023, key achievements included:

Accreditations: Achieving accreditation for the LBM laboratories according to ISO 15189, LSAHE according to ISO 17025, and transferring accreditation files from COFRAC to SOAC. Additionally, the Virology Pole services obtained ISO 9001 certification from AFNOR, and DIATROPIX received ISO 13486 certification from BSI. The WHO Prequalification of the Yellow Fever Vaccine Unit was also attained.



Quality Enhancements: Activities to enhance quality included document management, conducting internal audits, holding management reviews, and addressing interdepartmental non-conformities.

Risk Prevention: Significant efforts in risk prevention involved comprehensive risk assessments and prevention plans across IPD sites in Dakar and regional locations. Key initiatives included developing the POI, first aid and fire risk training, and conducting emergency evacuation drills. **Biohazard Management:** The IPD was appointed as the Regional Center of Excellence for Biosafety & Biosecurity by the Africa CDC. Initiatives included providing specialized training for new staff on biosafety and the safe transport of biological samples, contributing to regional workshops, and overseeing certification exams by the IFBA.

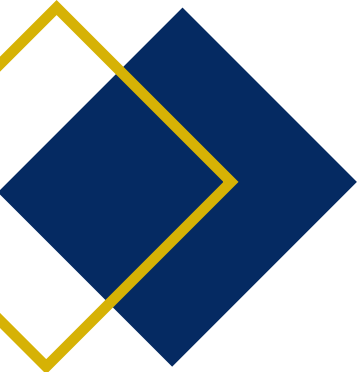
Metrology Service

In 2023, the Metrology Service aligned its quality management system with regulations, passed the initial audit for ISO 17025 accreditation by SOAC, and supported laboratories and services during external audits. The service oversaw over 1052 operations (verifications/calibrations) across relevant laboratories and services. World Metrology Day was celebrated with an awareness campaign involving all staff members.

Technical Maintenance and Infrastructure Service

The SMTI has been pivotal in renovating and transforming IPD's sites and activities. In 2023, SMTI was involved in 455 interventions and more than 22 construction projects, including the CARE and AVBL facilities on the historic campus and the biomedical laboratory in Touba. These services ensured the maintenance and compliance of equipment and facilities, contributing significantly to IPD's internal and external transformation.





Focus on Partnerships

STRONGER TOGETHER: THE POWER OF PARTNERSHIPS IN ADVANCING IPD'S MISSION

Partnerships play a pivotal role in advancing IPD's mission. The support, dedication, and contributions of partner organizations are essential to our success. In 2023, IPD forged new partnerships with various organizations to enhance its capacity in research, vaccine production, and public health initiatives.

IPD's New Partnerships in 2023>

NON-PROFIT PUBLIC HEALTH ORGANISATIONS AND ALLIANCES:

Coalition for Epidemic Preparedness Innovations

IPD and CEPI signed a 10-year partnering agreement to develop and produce outbreak vaccines. This collaboration aims to expand IPD's capacity to produce routine immunization vaccines and rapidly supply vaccines to Global South countries during disease outbreaks. This partnership will enhance manufacturing resilience and accelerate access to life-saving vaccines during future outbreaks and pandemics.



The International Vaccine Institute

IVI and IPD are working together to establish IPD's Regional Center of Training Excellence. This initiative focuses on training individuals in vaccine research and biomanufacturing, fostering a sustainable ecosystem for vaccine production in Senegal and Africa. The collaboration aims to accelerate vaccine development and ensure equitable access to essential health technologies across the continent.



**International
Vaccine
Institute**

Global Health Innovative Technology Fund

This partnership aims to advance research and development for new diagnostics and vaccines in low- and middle-income countries (LMICs). By combining GHIT Fund's expertise in medical innovation with IPD's capabilities in biomedical research, the collaboration seeks to enhance the development of solutions to combat infectious diseases and improve access to essential health technologies in LMICs.



Global Health Innovative Technology Fund

FOUNDATIONS AND CORPORATE PHILANTHROPY

The Mastercard Foundation

In partnership with IPD, the Mastercard Foundation is working to establish new vaccine manufacturing capabilities and develop a skilled workforce in Africa. This collaboration focuses on equipping young Africans, with an emphasis on gender equality, with specialized skills in vaccine research, production, and distribution. The goal is to enhance African vaccine manufacturing autonomy and foster economic growth and job creation across the continent.



Susan Thompson Buffett Foundation

In 2023, IPD embarked on a new collaboration with the Susan Thompson Buffett Foundation, marking the beginning of a significant partnership. Through the foundation's grant, IPD initiated various crucial initiatives aimed at advancing women's health, including a comprehensive investigation into HPV and Cervical Cancer in Senegal. Additionally, the partnership focuses on exploring the local production of essential reproductive health tools, empowering women in the field of science, and bolstering a women-led community health program in Senegal. The foundation's grant also provides institutional support to aid IPD in its ongoing transformation efforts. We are hopeful that this partnership will lay the foundation for a successful and enduring collaboration, yielding positive impacts for women's health and community well-being.



The Bill and Melinda Gates Foundation

o mRNA technology:

Announced at the Grand Challenges annual meeting in Dakar, co-hosted by Bill Gates and President Macky Sall, the Gates Foundation launched new investments to advance mRNA research and vaccine manufacturing in Africa. IPD was selected to establish a new mRNA laboratory in Senegal with a \$5 million grant. The initiative aims to lower vaccine costs and improve access to mRNA technology in low-income settings. Rift Valley Fever mRNA vaccine will be the first project, with discussions underway for a second vaccine candidate.



o Integrated surveillance:

The Gates Foundation initiated a \$2 million grant to support the integration of IPD's surveillance activities. This includes expanding sentinel surveillance sites across Senegal and initiating new sites in neighboring countries. The grant will also pilot new surveillance activities, such as environmental sensors and digitally-enabled rapid diagnostic tests, enhancing outbreak response and routine data analysis.

o **MR vaccine:**

IPD is developing the first MR (measles and rubella) vaccine for production in Africa, supported by a grant from the Gates Foundation. The project involves deploying innovative production processes to accelerate manufacturing and ensure affordable access to vaccines. Following clinical trials, production will be transferred to the MADIBA facility, a regional hub with the capacity to produce 300 million doses annually.

o **Yellow Fever vaccine manufacturing:**

In 2023, the Gates Foundation continued to support IPD's yellow fever vaccine manufacturing facility, ensuring it meets WHO prequalification standards. This support is crucial for IPD's legacy vaccine and the transfer of technology for other live attenuated vaccines.

ACADEMIA

Université Rose Dieng France (former Campus Franco Sénégalais)

This partnership aims to develop a skilled workforce for the vaccine industry in Senegal and Africa. Through short-term professional programs and foundational degrees tailored to industry needs, IPD leverages its vaccine production expertise while the university designs and implements specialized training programs.

These partnerships are instrumental in advancing IPD's mission and enhancing its impact on global health. By collaborating with diverse organizations, IPD continues to drive progress in vaccine research, production, and public health, ultimately contributing to a healthier and more resilient world.



OUR PARTNERS





Governance

The governance of IPD is structured through a comprehensive board system that includes government appointees, IPD staff, representatives from Institut Pasteur Paris, and independent scientific experts. This robust framework is further strengthened by the Scientific Advisory Board, which provides critical scientific oversight and strategic direction. The governance structure is also complemented by a dedicated leadership team, specialized advisors, and an Advisory Board for the newly established IPD Vaccine Center. Collectively, these boards bring a wealth of diverse expertise to support and enhance the institution's operations.

The IPD governance board meets at least twice a year to oversee the institution's strategic direction and ensure alignment with its mission and goals. The Scientific Advisory Board, which convenes annually, provides additional scientific guidance and recommendations. In 2023, the Advisory Board for the IPD Vaccine Center was formed and held its inaugural meeting in October. Moving forward, this board will convene at least once a year to guide the vaccine center's initiatives and ensure its alignment with global health priorities.

IPD GOVERNANCE BOARD IN 2023

M. François	Romaneix	Board member
M. Bassirou	Sarr	Board member
Pr. Fernando	Arenzana Seisdedos	Board member
M. Philippe	Lalliot	Board member
Dr Mame Thierno	SY	Chairperson
M. Andrew	Asamoah	Board member
Dr Mawlouth	Diallo	Board member
Dr Babacar	Diouf	Board member
Ms. Khardiata	Ndiaye	Board member
Dr Elhadji Mamadou	Ndiaye	Board member

IPD SCIENTIFIC ADVISORY GROUP IN 2023

Pr. Peter Piot	London School of Hygiene and Tropical Medicine, UK
Dr Marie-Paule Kieny	Medicines Patent Pool Switzerland (former WHO)
Pr. Christophe Peyrefitte	Institut Pasteur de Guyane
Dr. Rebecca F. Grais	Pasteur Network, Paris
Pr. Momar Ndao	McGill University, Canada
Pr. Cheikh Saad Bouh Boye	University Cheikh Anta Diop, Senegal
Pr. Gary Kobinger	University Laval, Canada
Pr. Jorge Kalil	Harvard Medical School, USA
Ms. Khardiata	Ndiaye
Dr Elhadji Mamadou	Ndiaye

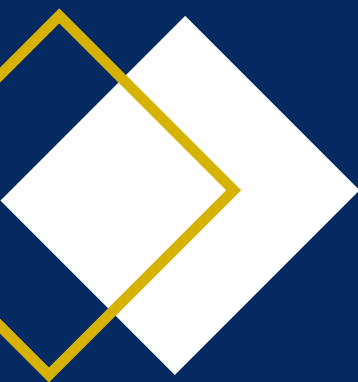
IPD LEADERSHIP TEAM IN 2023

Dr Amadou Sall	Chief Executive Officer
Ms. Rama Ka Ndoye	Chief Financial Officer
M. Brandon Brega	Chief Operating Officer – Biomanufacturing
M. Abdoulaye Fall	Director of Human Capital
Dr Xavier Berthet	Scientific Director
Dr Ibrahima Dia	Scientific Careers
Dr Abdourahmane Sow	Director of Public Health
Ms. Karine Belondrade	Director of Partnerships
Ms. Barbara Ngouyombo	Associate Director of Partnerships – Program KWAME
M. Alain Samne / Ms. Khady Kebe	Director of Supply Chain
M. Moussa Traore	Director of Digital Transformation and Information Technology

IPD LEADERSHIP TEAM IN 2023

M. Babacar Gning	Director of Operational Resources
M. Mohamed Penda NDIAYE	Director of Delivery Unit
M. Lamine Sene	Vaccine Biomanufacturing Site Director for Diamniadio
Dr Joe Fitchett	Senior adviser for biotechnology
Dr Ousmane Faye	Senior adviser for public health and outbreaks
M. Khalidou Bokoum	Internal Control Manager





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