INSTITUT PASTEUR de Dakar

Bridging R&D, Manufacturing and Clinical Research
Institut Pasteur de Dakar Ecosystem

Presented by Dr Inès VIGAN-WOMAS

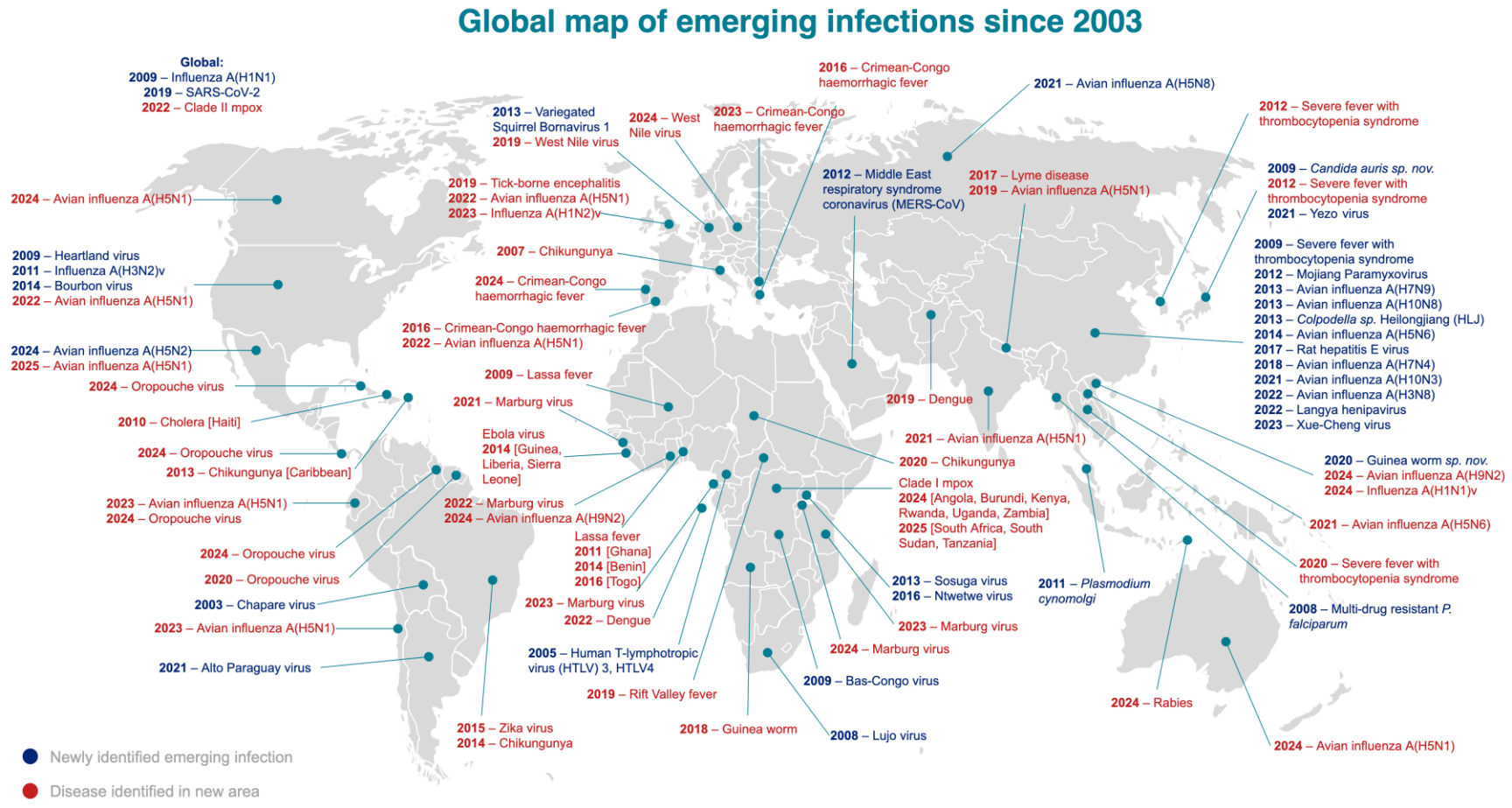
Malaria Symposium 2026
Paris – June 4, 2026

INSTITUT PASTEUR de Dakar

Today's focus

- Global Health challenge
- IPD, A Centenary of Innovation
- R&D&I Ecosystem
- Vx & Dx Manufacturing Strategy
- Snapshot of current malaria research Vx & Dx programs

The Challenge of emerging and re-emerging infectious diseases



https://www.gov.uk/government/publications/emerging-infections-characteristics-epidemiology-and-global-distribution/emerging-infections-how-and-why-they-arise

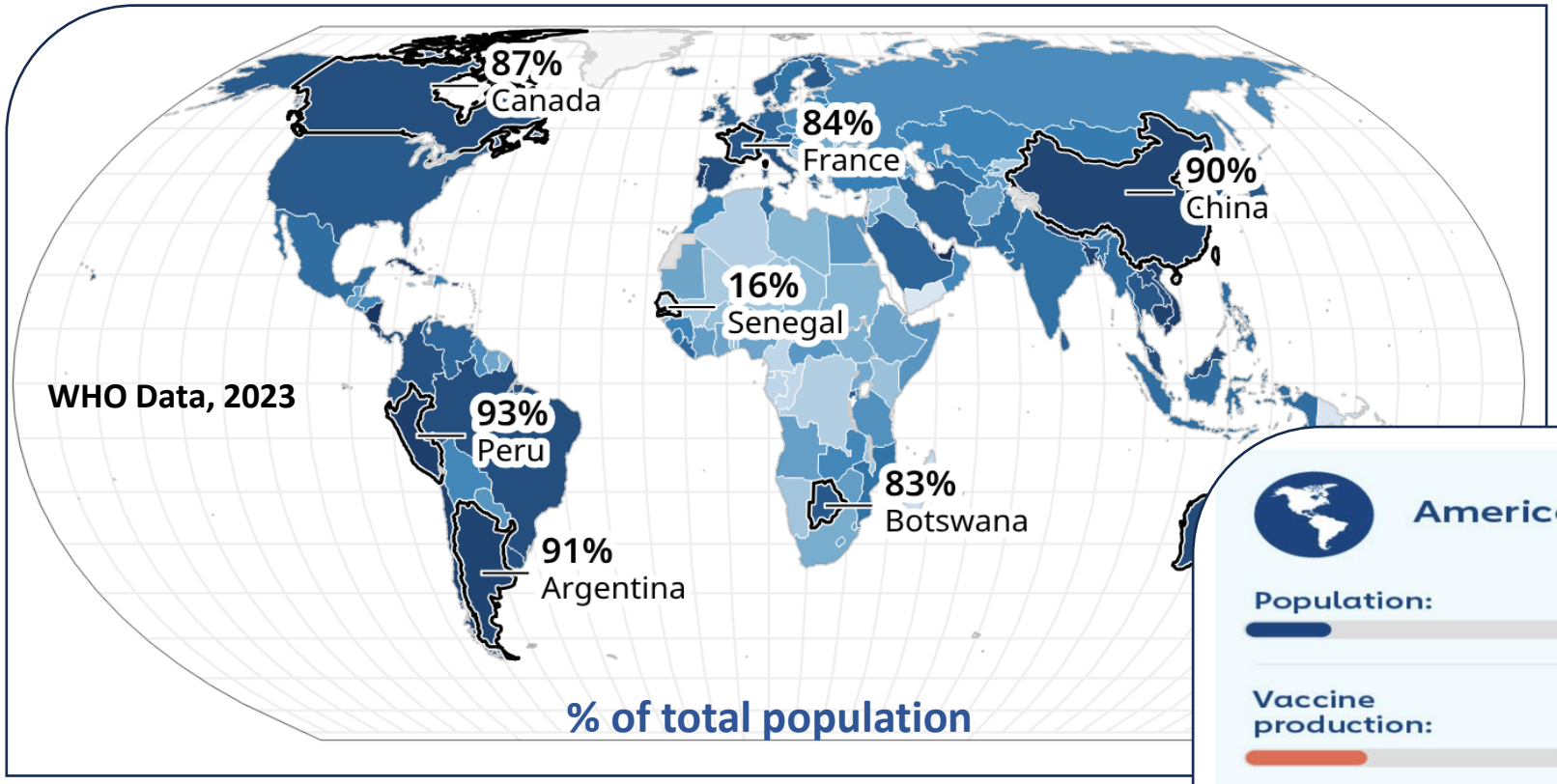
2023- 2025: Disease identified in new areas

- ✓ **Marburg** (Equatorial Guinea, Tanzania, Rwanda)
- ✓ **West Niles** (Poland)
- ✓ **Oropouche** (Panama, Guyana, Ecuador, Cuba)
- ✓ **Mpox – Clade I** (Zambie, Uganda, Senegal, Rwanda, Madagascar, …..)
- ✓ **Crimean-Congo** Haemorragic Fever (Portugal, Senegal)
- ✓ **Avian influenza A** (H9N2 (Vietnam, Ghana, Mexico,

2026

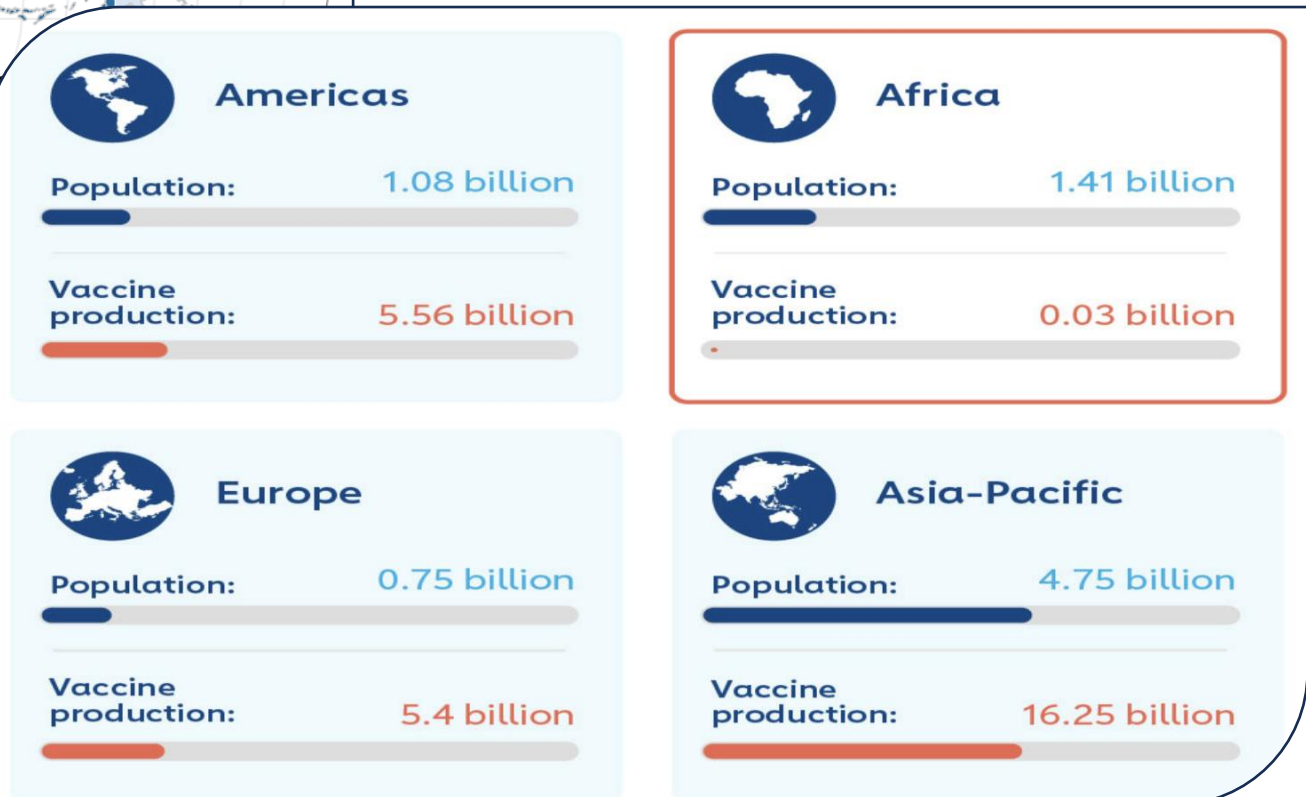
- ✓ **Hantavirus**
- ✓ **Ebola Bundibugyo, RDC**

Africa ➔ Limited vaccine manufacturing capacity

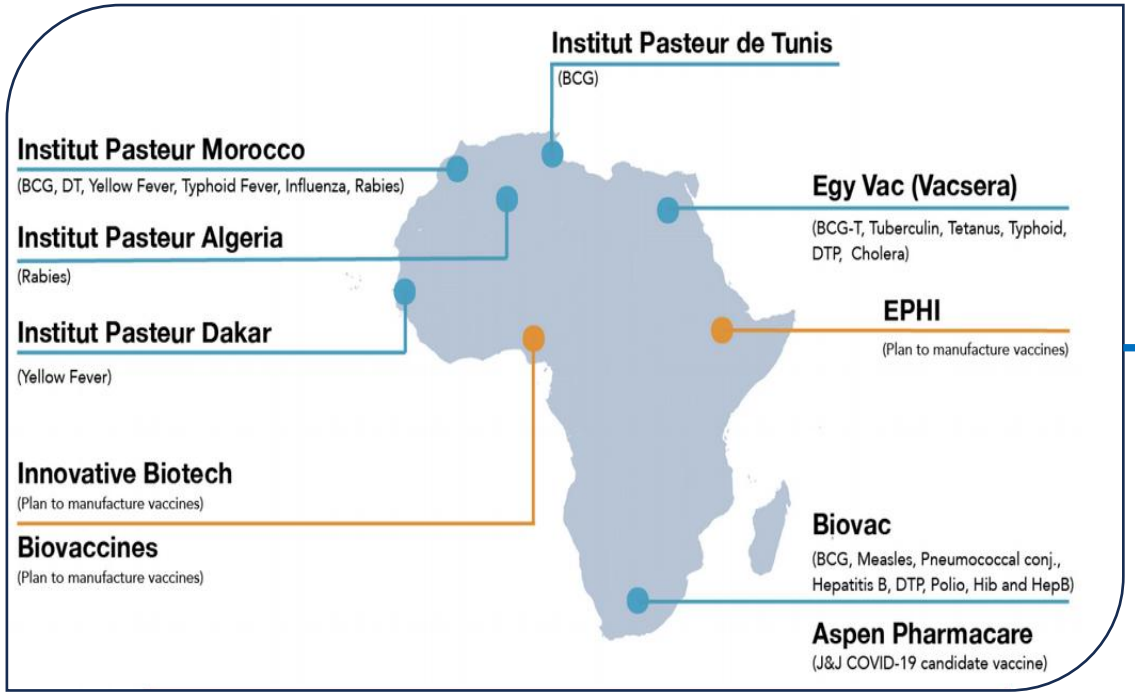


COVID-19 Vaccine Coverage Map

Vaccine production capacity
Africa, < 1%



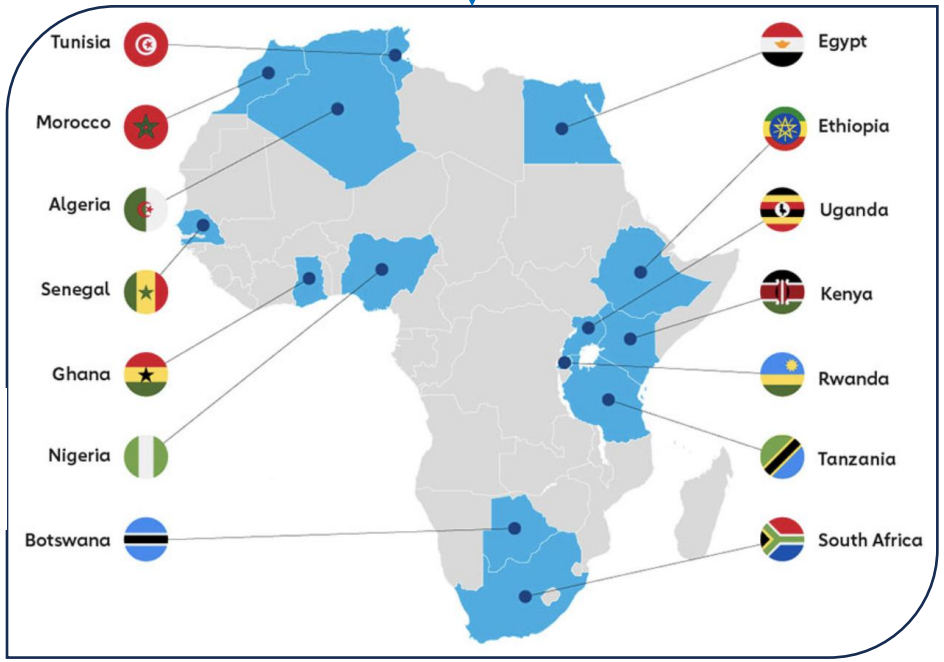
Africa ➔ Limited vaccine manufacturing capacity



10 Vaccine manufacturers in 2021

1. **Build on existing capacity**
2. **Expand vaccine production ➔ 1% to 60% in 2040**

30 manufacturing projects across 14 countries



World Health Organization

Gavi The Vaccine Alliance

AFRICA CDC
Centres for Disease Control and Prevention
Safeguarding Africa's Health

VISION & MISSION

INSTITUT PASTEUR de Dakar

Vision

Save and protect lives

Mission

Accelerate equitable, sustainable, and affordable access to healthcare in Senegal, Africa, and around the world

Values

Creativity | Excellence | Ethic | Collective Intelligence | Equity | Inclusion

A Century of Innovation

IPD is hosted one of the four **WHO prequalified manufacturers** to supply **Yellow Fever vaccines** to UN Agencies.

1924

First microbiology lab in Africa — St-Louis, Senegal — 1896

IPD is created — Lab set up in Dakar — 1924

Yellow fever virus — Discovery — 1927

Yellow fever vaccine — Manufacturing — 1937

WHO pre-qualification — Allocation to the YF vaccine — 1966

Foundation IPD — Senegalese, non-for-profit — 2009

Galien Prize Awarded — Diatropix local manufacturing

MADIBA — Construction of vaccinopole in Diamniadio starts

Approval of Saytu Rapid Test — first locally manufactured Dx — 2021

Genomic Algebra — Discovery and Patent — 2022

Construction of CARE starts — Educate – Innovate - Transform

Biobank creation

Launch of MADIBA Workforce Initiative — 2023

Vaccine bioprocessing lab — Biologicals and RNA manufacturing — 2024

DIATROPIX

VaxSen

100 ans

Secretary WA RCCN — Regional training Hub — 2025

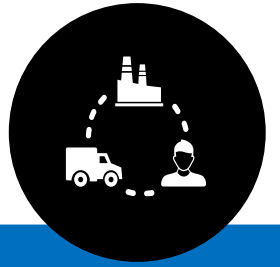
MADIBA

2026

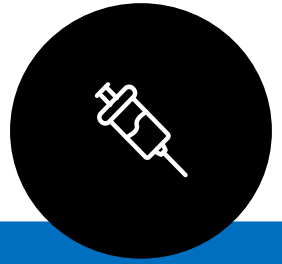
IPD's Strategic Pillars

Biomedical research & Innovation

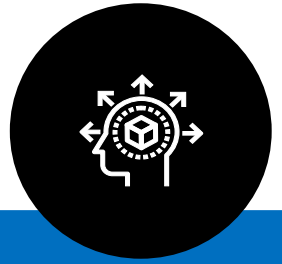
Public health, epidemiological surveillance & Epidemic response



Healthcare solutions & Specialized laboratory services



Vaccine & Diagnostic production



Education, Training & Talent development

Flagship programs at IPD

MADIBA

Manufacturing In Africa for Disease Immunization and Building Autonomy

DIATROPIX

Promoting access to diagnostics

Manufacturing Rapid Diagnostic Tests for Neglected Epidemics and Outbreaks

DAVAX

Dakar Vaccine Accelerator

PROTECTING THE NEXT BILLION

Dakar Clinical Biomanufacturing Facility for RNA, subunit, and live attenuated vaccines

CARE

EDUCATE, INNOVATE, TRANSFORM

Centre for Africa's Resilience to Epidemics

INSTITUT PASTEUR de Dakar

Regional Training Hub in Biomanufacturing

Secretariat WA-RCCN

Biosafety and Biosecurity Training Centre of Excellence

AfricaCDC

Centres for Disease Control and Prevention

SEDAR

Enabling Life Science partnerships and Joint ventures for Pharma companies entering African market

VaxSen

Early Detection for rapid response

Paired sample collection and biobanking
Serial sampling from acute to convalescent phases

Swab
Blood
Stools
Urine

Serum, Plasma
PBMC
Blood pellets

Epidemiological & clinical studies

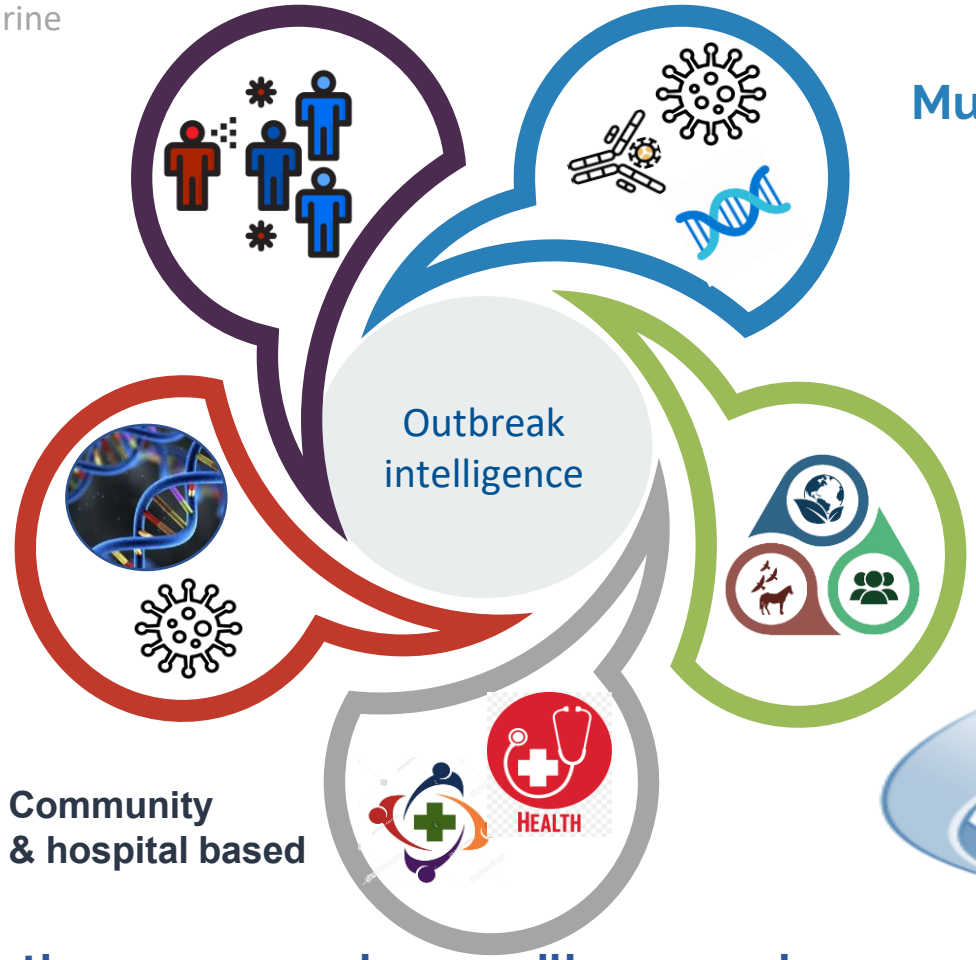
Hospitalized, clinical and sentinel surveillance, populational and longitudinal cohorts, vaccinated cohorts, outbreaks

Pathogen diagnostic & sequencing

Laboratory diagnostic: national & regional RC, WHO-RL, (molecular, serology, functional assays)
Decentralized diagnostic: POCs, mobile Labs, field stations, genomic hub

Surveillance System

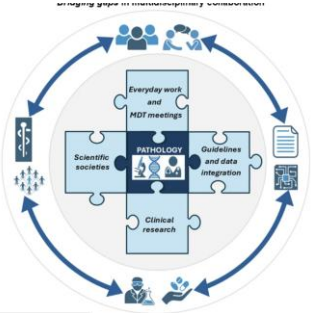
Sentinel sites
Integrated pathogen surveillance
One-Health observatoire
Field Investigations
ALERT



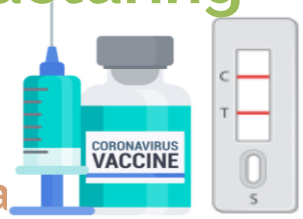
Community & hospital based

Mutidisciplinary studies (R&D&I)

Virology
Entomology
Immunology & Malaria
Microbiology
Epidemiology
Clinical research
Social science



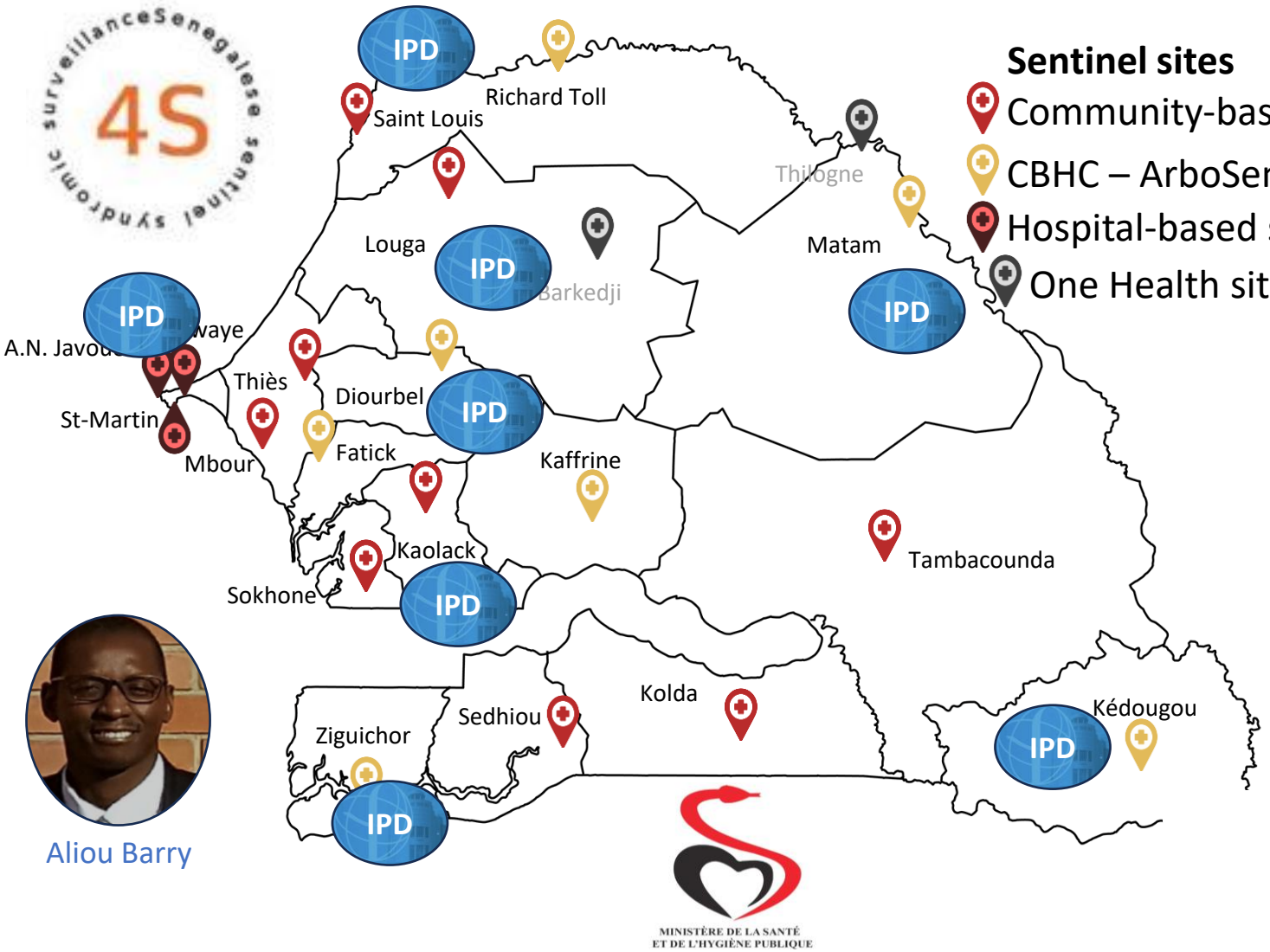
Vx & Dx Manufacturing



Accelerate the connection of local pathogen genomic surveillance and research data for Vx a

Early Detection for rapid response
Syndromic Sentinel Surveillance System (4S Network)

IPD Research Dept & Public Health Dept.



Sentinel sites

- Community-based (CBHC) sites
- CBHC – ArboSen+
- Hospital-based sites
- One Health sites

45 sentinel sites (all the 14 regions)

Aliou Barry

Outbreaks detected just after 4S system implementation

- ✓ **Sangalkam (Dakar)**: Dengue outbreak (September - November 2024)
- ✓ **Gossas:** Dengue outbreak (Sept - December 2024), RVF (August 2024)
- ✓ **Koungheul:** Dengue outbreak (October - November 2024)
- ✓ **Goudomp:** West Nile (December 2024)
- ✓ **Saint-Louis:** RVF (September 2025)

Early Detection for rapid response
Expansion of 4S Network in West Africa

Abdourahmane Sow

10 countries / 30 sentinel sites

2023 ➔ Gambia, Mauritania & Cabo Verde
2024 ➔ Mali, Niger, Guinea, Togo and Guinea Bissau
2025 ➔ Sierra Leone & Benin

Aliou Barry

Boubacar Diallo

Pathogens detection after 4S system implementation

- ✓ **Gambia:** 1st detection of Chikungunya outbreak in the history in September 2023; 1st detection of Dengue outbreak in the history in October 2024; 04 Yellow Fever cases detected between October and December 2024
- ✓ **Cabo Verde:** Detection of the major Dengue outbreak in November 2023
- ✓ **Guinea Conakry:** Detection of 1st Dengue Outbreak in the history 10 days after setting up syndromic sentinel surveillance
- ✓ **Niger:** Detection of 08 Dengue cases in 2024
- ✓ **Mali:** Detection of 61 Dengue cases in 2024
- ✓ **Togo**: Detection of 04 Dengue cases
- ✓ **Benin:** Detection of 34 Dengue cases
- ✓ **Mauritania:** Detection of 11 Dengue and 01 CCHF cases reported in 2024
- ✓ **Sierra Leone:** Detection of 1st Dengue autochthonous case in Freetown in July 2025;
- ✓ **Guinea Bissau:** 1st detection of Dengue outbreak in the history in October 2025

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IPD R&D&I Ecosystem

7 Reference Centers/Laboratories

6 R&D & Vaccine development Department

IPD Dept.

- Epidemiology & Data Sciences
- Virology (ISO 9001)
- Microbiology
- Immunophysiopathology and Infectious Diseases (ISO 9001)
- Medical Zoology
- Vaccine Research Center (VRC)

Biomedical Research and Innovation

EXPERTISE

COVID-19
Malaria
Dengue
Crimean Congo
Rift Valley Fever
Chikungunya
AMR
Ebola & HFV
Vector-borne diseases
Disease X

Genomic
Immunology
Data sciences
Public health
Clinical research

IPD Ref Centers

- Arboviruses and viral haemorrhagic fevers (WHO CC)
- Yellow fever (Regional RC)
- Influenza, COVID-19 and other respiratory viruses (WHO RC)
- Poliomyelitis (WHO RC), Enteroviruses, and environmental surveillance
- Rabies and viral encephalitis (National RC)
- Measles and Rubella (WHO RL)
- Antimicrobial Resistance AMR (FAO RL)
- CEPI Reference Lab (IPD-RL)

SARS-CoV-2
Lassa
Rift RVFV

R&D&I

Research and Development

Getting ahead of disease with cutting-edge scientific research and innovation

ISO 9001 CERTIFIED

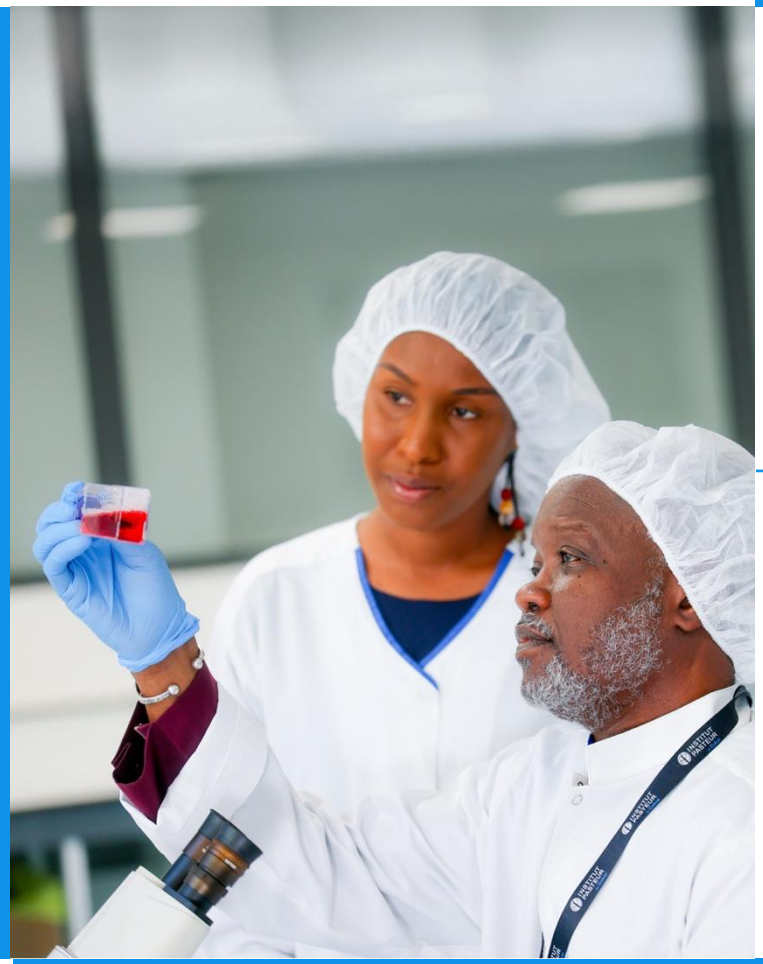
ISO 20387 Compliant Biobanking

Biobanking

By combining the scientific expertise with cutting-edge technology, we are working to discover and develop new vaccines and biomedical innovations that will transform people's lives. It is work we've been at the forefront of, in Africa, for over a century, with research departments focusing **on virology, immunology, medical zoology, microbiology, epidemiology and data sciences**

Genomic / sequencing platform

BSL3 Laboratory



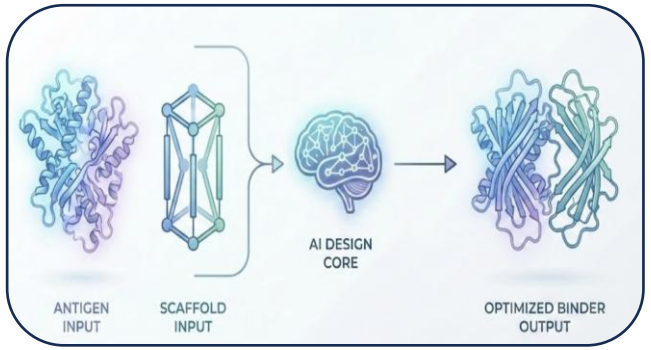
109 scientific articles

published in peer-reviewed journals since 2024. Our goal is to boost research productivity up to 150 publications per year in the next 10 years

Outbreak responses

Molecular suite cases

Vaccine Research Center (VRC)
Enhancing speed and adaptability



AI-Driven Antigen Design

Computational design tools (CVD) integrated with real-time surveillance data for faster candidate selection.

Cell-based Ag/Ab

mRNA Design Capability

Expanding VRC's toolkit to support rapid vaccine design for emerging pathogens.

Marie Angélique Sène

Minibinder platform enables simultaneous development. **Rift Valley Fever** is the lead proof-of-concept.

- Measles & Rubella
- Lassa
- Marburg
- Rift Valley Fever
- Chikungunya

DIATROPIX
Promoting access to diagnostics

Vaccine + Diagnostic Co-Design

VRC is integrating next-generation tools to accelerate development of priority vaccines in epidemic settings ➔ **Applied to priority vaccines and epidemic response use cases**.

Vaccine Manufacturing

Diversified high-volume production of essential and outbreak vaccines

MADIBA

Catalysed by the COVID-19 pandemic, which shone a light on the vulnerability of Africa's ability to access vaccines, we built a new manufacturing facility to radically expand our industrial capacity. Our goal is to increase capacity 40-fold from approximately 5 million vaccine doses produced per annum to 150-200 million doses. Long-term, our ambition is for routine production capacity of 300 million annual doses, with the potential to reach up to 1 billion during a pandemic. We are also working to expand our

Vaccine portfolio to cover Measles-Rubella, Rotavirus, outbreak vaccines such as Lassa, Rift Valley Fever, next generation Polio vaccines, and develop a cell-culture Yellow Fever candidate.

CEPI partnership ➔ transfer the leading Lassa Fever vaccine for production in Senegal.

WHO Prequalified

We are Africa's only vaccine WHO prequalified manufacturing facility and one of four prequalified suppliers of Yellow Fever vaccine globally

$300 Million Secured

We have secured $300 million to date in vaccine manufacturing and state of the art technologies

1 Billion Doses

Our new manufacturing facilities will have capacity for routine production of 300 million vaccine annual doses, with the potential to reach up to 1 billion doses during a pandemic.

Diagnostic Manufacturing
Industrial scale for self-sufficiency

Cheikh Tidiane Diagne

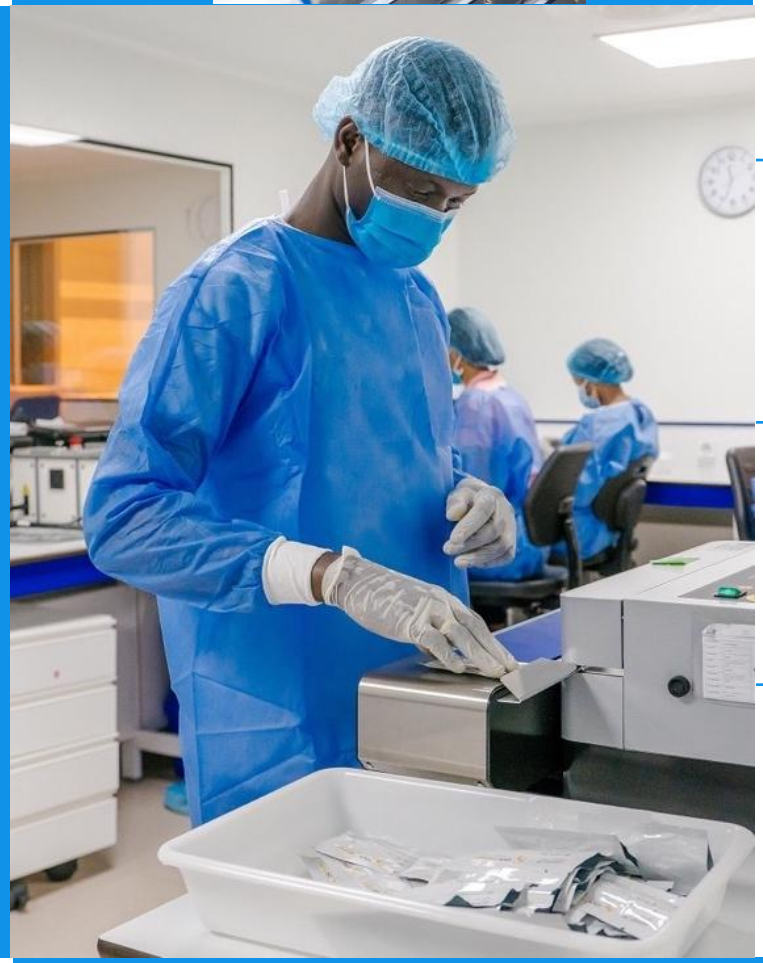
DIATROPIX
Promoting access to diagnostics

Produce affordable diagnostics for neglected epidemics, reducing Africa's severe dependence on imported medical supplies.

RDT Portfolio : Measles, HIV, Yellow Fever and COVID-19, with other infectious disease and neglected tropical disease rapid tests in pipeline, including Meningitis, Ebola, Dengue, Rubella, Onchocerciasis and Sickle Cell Disease.

In addition, we are establishing a clinical biomanufacturing facility to produce **small-scale materials for use in our clinical trials**.

SEDAR



75 million tests
We have built the capacity to produce 75 million rapid diagnostic tests per year for epidemics and outbreaks

$15 million invested
in diagnostic development and manufacturing capabilities. This includes opening a state-of-the-art manufacturing site for rapid diagnostic tests in 2024

100 personnel
Scaling up to 100 personnel in our expanded production facility in Mbao, for diagnostic production

2 million COVID-19 tests
We made 2 million rapid tests during the COVID-19 pandemic, with products were distributed in 14 African countries

First measles rapid test
Carrying out diagnostic accuracy and implementation studies for the world's first Measles Rapid Diagnostic Test in Senegal, Zambia, Ethiopia and Canada

2 manufacturing sites: IPD campus & Mbao

World's first measles rapid test: Enabling faster outbreak detection for more targeted vaccination interventions

World Health Organization

Public Health Agency of Canada

Agence de la santé publique du Canada

92% sensitivity

98% specificity

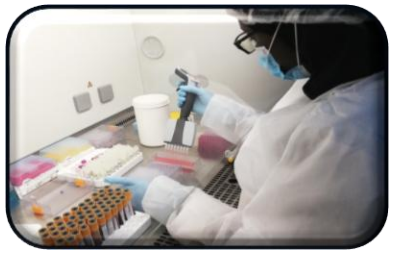
GMRLN RECOMMENDED
VERIFIED DIAGNOSTIC TEST

DIATROPIX
Promoting access to diagnostics

Clinical Research Unit

CEPI

IPD Clinical Research Unit | Clinical Trial Pipeline



Portable ultrasound

Probiotics in pregnancy, Ph III

Measles RDT

ChAdOx1 RVF, Ph I/II

MV-CHIK, Ph I/III

ACT-CHIK

MR, Ph I/II

Meningitis RDT

Marburg Ph I/II

Laura Merson

Billo Tall

2025 2026 2027 2028 2029 2030

Preparing IPD clinical trials capacity...

to deliver clinical trials on IPD products

Referecne Laboratory

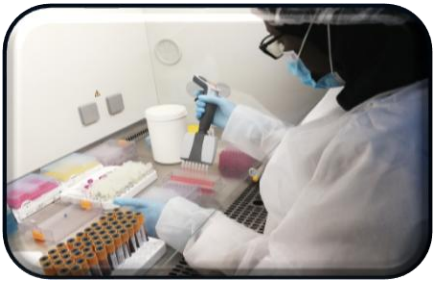
CEPI

IPD Reference Laboratory for Vaccine & MCM Evaluation

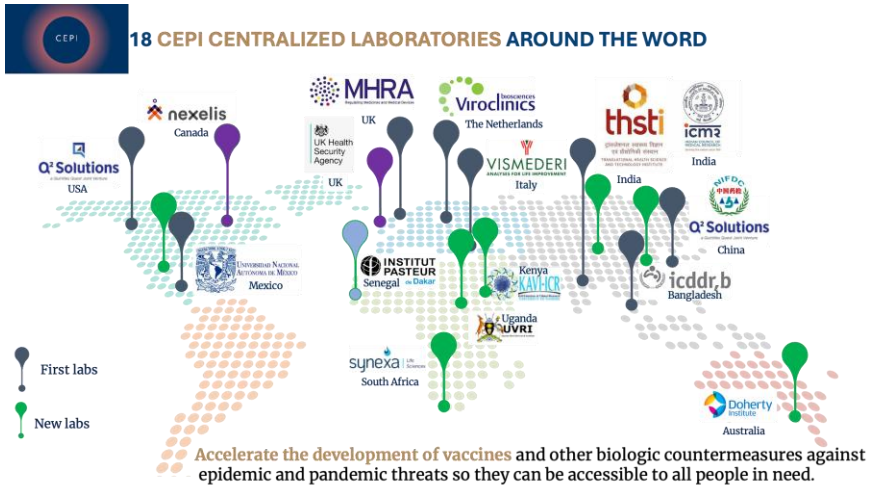
PvSeroRDT RDT

ChAdOx1 RVF, Ph I/II

MV-CHIK, Ph I/III



INSTITUT PASTEUR de Dakar | LINGUÈRE Life Sciences



- **Vaccine immunogenicity**
- Standardization of immunological assays (ELISA, MBA, ELISPOT, PRNT)
- Test samples from pre-clinical to Phase III clinical studies
- Facilitate rapid evaluation, approval, and dissemination of the most effective vaccine candidates
- Support vaccine developers in the pathway towards licensure
- Increase the chances of finding a successful vaccine
- Better define disease correlates of protection

Inès Vigan-Womas

Henriette Ndione

2025 2026 2027 2028 2029 2030

Preparing IPD clinical trials capacity...

to deliver clinical trials on IPD products

Vaccine Research Center

Bridging Surveillance, Research, Manufacturing & Clinical research

Prevent, Detect, Respond, Control, Predict

Pathogen Surveillance & Discovery

Research & Innovation

Identify targets

VRC Process Dev

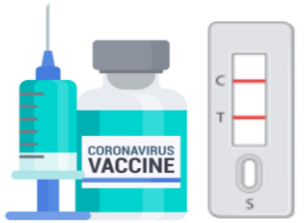
Translate discovery into robust vaccine production processes

Manufacturing

Scale manufacturing for clinical supply

MADIBA

DIATROPIX
Promoting access to diagnostics



Clinical & Deployment

Ensure readiness for trials and rollout

INSTITUT PASTEUR de Dakar | LINGUÈRE Life Sciences

Focused on enabling priority vaccine programs, IPD ensures that vaccine candidates can be manufactured and deployed, reducing risk and accelerating timelines to clinical and industrial readiness.

CARE
EDUCATE, INNOVATE, TRANSFORM

Training and Capacity building

Regional Training Hub in Biomanufacturing

IPD's ACHIEVEMENTS

89

Years of Yellow Fever vaccine production

12

Reference Laboratory for WHO, FAO, Africa CDC, ECOWAS & CEPI

+45

Sites of the Sentinel Syndromic Surveillance Network in Senegal

+10

Countries equipped with Sentinel 4S sites in West Africa

+40

African Countries supported in Epidemic Outbreaks

+100

Strategic Partners

INSTITUT PASTEUR de Dakar

Malaria Vx & Dx Research Programs

Malaria Genetics & Vaccines Team Approach

Genetic and genomic approaches to inform malaria vaccinology: lessons from deeply rooted partnerships

Amy Kristine Bei
Associate Professor (Yale)
Research Group Leader

Laty Gaye Thiam
(Research Associate ARISE/AREF Fellow)
Group Co-Leader

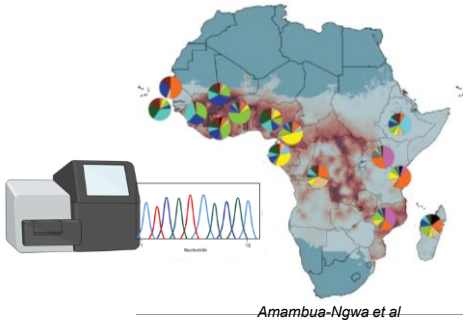
Mariama Nicole Pouye
(PostDoc – GHES)

Aboubacar Ba
(PhD, 3Y)

Mame Diarra Bousso Ba (PhD, 1Y)

Marietou Ndiaye
(MS-2)

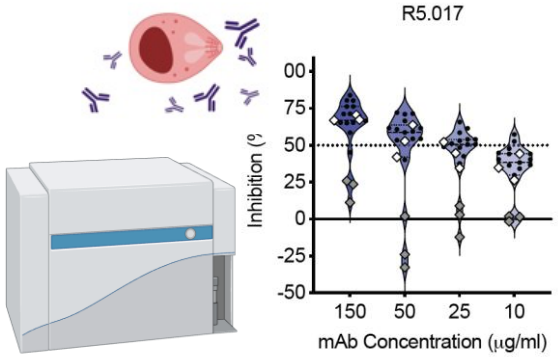
The Challenge



Vaccine Efficacy & Genetic Diversity

How can we achieve a highly effective next-generation malaria vaccine?

The Approach



Genomic Surveillance & Phenotyping: GIA

Investigating the activity of vaccinee antibodies against diverse parasite isolates

The Field

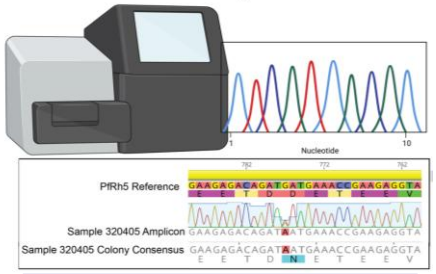
Lessons from Kedougou

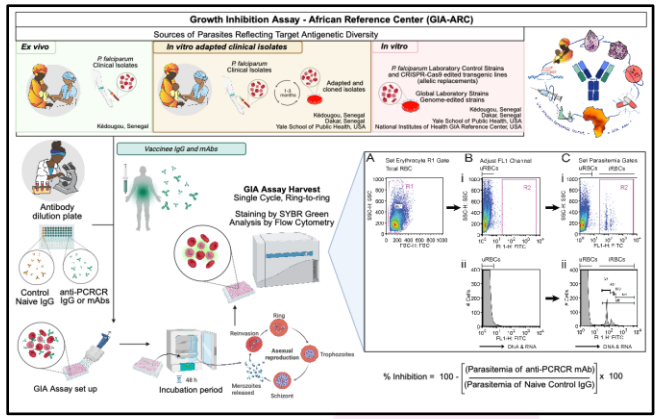
Adapting and Innovating to do great science where disease burden is greatest

Moving evaluation of genetic diversity to the forefront of vaccine discovery

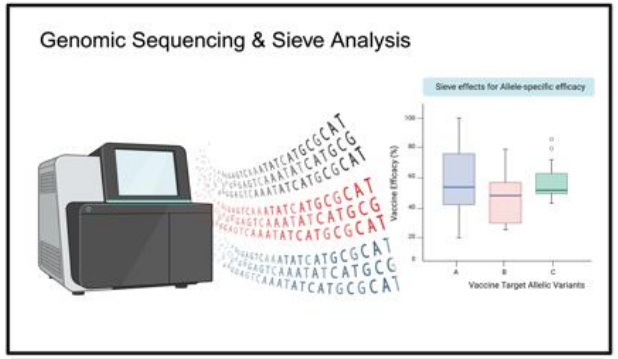
Genomics & Structure Guided Vaccine Design

Next Generation Sequencing: SNP discovery





Phase 1: Ex vivo GIA Assays



Phase 2b Trials
Genomics & Modeling
Sieve Analysis

- PfRH5 identified and Characterised
- PfRH5 shown to bind erythrocytes
- Basigin-receptor identified
- PfRipr identified as interacting partner

- Anti-PfRH5 antibody shown to block erythrocyte invasion
- Crystal structure of PfRH5 elucidated

- Animal studies
- Pre-clinical trials
- Human mAbs shown to have neutralizing activity against PfRH5

- Controlled human malaria infection (CHMI)
- PfPCRCR complex elucidated

- Antigen/ AS01(B) shown to elicit higher specific cTfh cell response

- Vaccine optimization and improvement

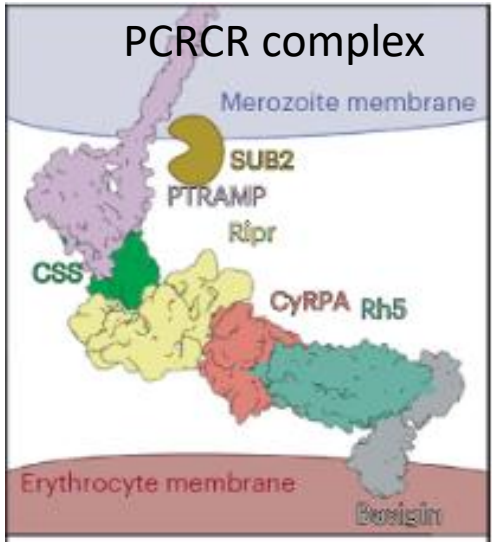
- Phase 1a/b clinical trials

- Phase 2a/b clinical trials

Phase III trials?

2008 - 2011 | 2012 - 2014 | 2015 - 2019 | 2020 - 2022 | 2023 - 2024 | Beyond 2025?

PfRH5 | PfRH5_FL | RH5.1/AS01$_B$ | RH5.1/Matrix-M | RH5.2VLP/Matrix-M



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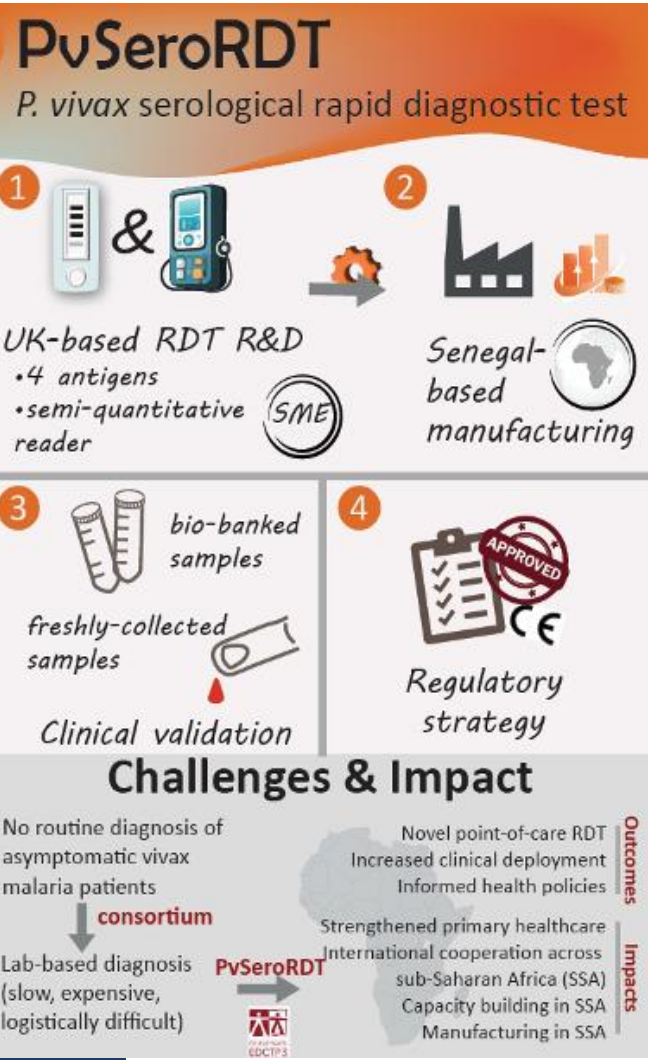
Plasmodium vivax RDT

A Point-Of-Care Serological Rapid Diagnostic Test to detect *Plasmodium vivax* Hypnozoite Infection (PvSeroRDT)



Inès & Makhtar
INSTITUT PASTEUR de Dakar

Cheikh Tidiane
DIATROPIX
MOLOGIC
FORESIGHT DIAGNOSTICS

Michael White
INSTITUT PASTEUR

INSTITUT PASTEUR de Madagascar

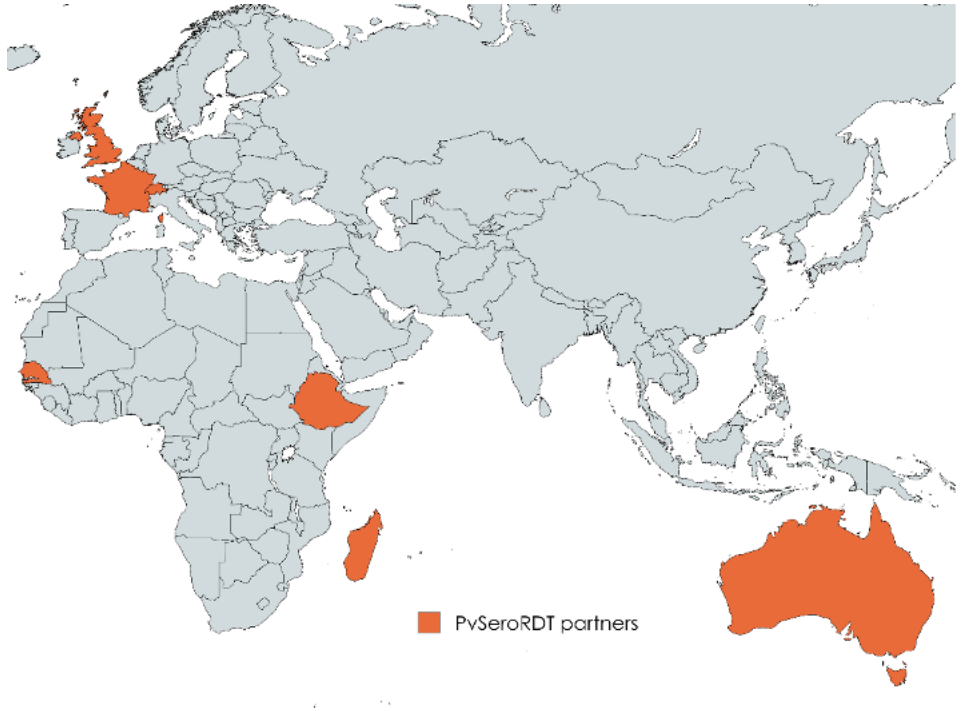
Ahri
Ethiopie

Ivo Mueller
Walter+Eliza Hall Institute of Medical Research
DISCOVERIES FOR HUMANITY

FIND
Diagnosis for all

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

EDCTP



Malaria and Neglected Tropical Diseases Team

INSTITUT PASTEUR de Dakar

THANK YOU

From seed funding to sustainable partnerships

ONE IPD


VACCINOPOLE
DE DIAMNIADIO
BIONEAR
MADIBA
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CARE
CARE

Thank you

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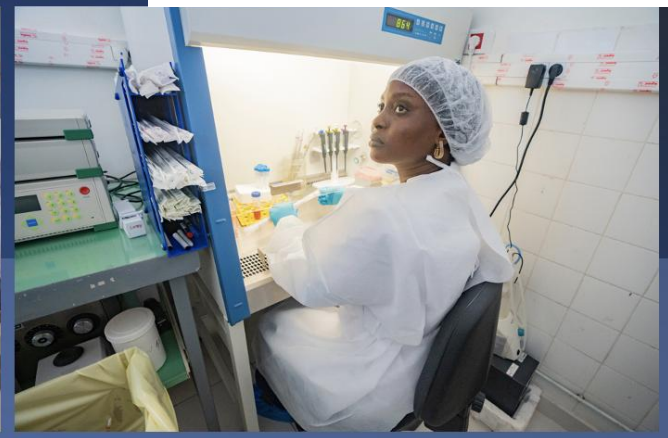
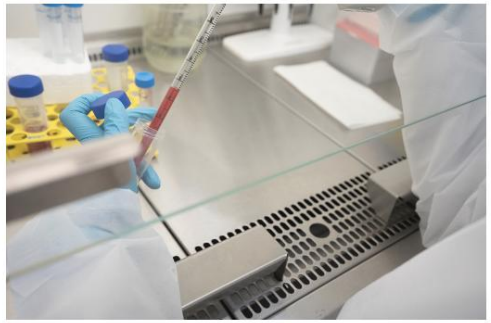


THANK YOU !

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