

# CERMES (Pasteur Institute of Niger)

The missions:

- a basic, applied and operational, in medical and health fields;
- Support for national institutions and services and possibly to any other state, for everything related to laboratory medicine and public health;
- The expertise of risks and evaluation of programs against endemic diseases;
- Training of health cadres, domestic or foreign.

The CERMES Branch is assured since March 2012 by Odile Ouwe Missi-OUKEM

## Research

1. **Biology** (Bacteriology- Virology) (UBIOL)
2. Medical **Entomology** (EMU)
3. **Parasitology** (UPARA)
4. **Epidemiology-Health-Environment-Climate** (EUSEC)

## Three main themes

- **Bacterial meningitis**
  1. Impact of **MenAfriVac vaccine**
  2. Asymptomatic Portage
  3. Negative CSF
  4. Mortality
  5. Aftermath
  6. Infections pneumococcal
- **Malaria**
  1. **Genetic diversity** of parasites and anophéliennes populations
  2. Efficiency based **combination Artémisineine**
  3. Impact of massive campaigns of **distribution of mosquito nets** (LLINs)
  4. Comparison of methods of distribution of LLINs
- **Relationships Health-Environment-Climate**
  1. **Analysis** of spatiotemporal meningitis
  2. Special features of urban malaria
  3. **Thresholds Alerts**
- **A New Theme Respiratory Infection Aigues IRAs (in development)**
- **Other issues of interest**
  1. Antimalarial **Resistance**
  2. **Resistance** to insecticides
  3. Antimicrobial **Resistance**

- **National Reference Laboratories (NRL)**
  1. Diagnosis and Surveillance of **Meningitis**
  2. Diagnosis and Surveillance of **Influenza**
  3. Diagnosis and Monitoring of **Cholera** and other Gastroenteritis
  4. Surveillance of **Antimalarial Drug Resistance**
  5. Coordination of the National Network of Laboratories
  
- **A strip production unit**
  - Production of strips for the **rapid diagnosis of meningitis A, C, W, Y**

## Meningitis

- Surveillance of meningitis in Niger
- Microbiological monitoring of meningitis
- Rapid diagnostic test

### Research activities

- **Cerebro-spinal Study of negative fluid samples**
  - Evaluate the diagnostic conduct face a suspected case of meningitis, performed in the medical courses and know the potential pathogens involved Atres than those detected by surveillance.
  
- **Studies sequelae after meningitis**
  - The main objective is to **estimate the incidence of bacterial meningitis sequelae in Niger** in the range of three to six months after the meningitis episode, and the relative risk compared to the general population.
  
- **Study and carry immunity (MenAfriCar)**
  - The objectives are:
    - The identification of **carriers of meningococcal meningitis** in countries of the meningitis belt Africa.
    - **Characterization of porting dynamic** among the holders of families and what will be the impact of vaccination with the new conjugate vaccine A.
    - The investigation of the **relationship between** the carriage of potentially pathogenic meningococci and Neisseria sponpathogenic **before and after vaccination** with the new conjugate vaccine A.
  
- This research project initiated by Brian Greenwood (**London School** of Hygiene & Tropical Medicine) and funded by the Wellcome Trust / B. Gates Foundation and associate on seven countries in the African meningitis belt: **Chad** , **Ethiopia, Gambia, Ghana, Mali, Nigeria and Niger** (with two associated countries: **Burkina Faso and Senegal**).

### International Collaborations

- National Centre of Reference and Neisseria Neisseria Unit, Institute Pasteur, **Paris**: Dr Muhamed Taha K
- Technical Platform PT5, Institute Pasteur, **Paris**: Dr Farida Nato
- Preventive Medicine Association, **Paris**: Dr. Judith Muller, Betty Lafourcade, Dr. Alfred Da Sylva

- **WHO** Collaboration Centre for meningococcal IMTSSA / Le Pharo, Marseille: Dr Pierre Nicolas
- Health Protection Agency (Manchester Medical Microbiology Partnership), **Manchester**, UK: Dr Ray Borrow
- Muraz Center, Bobo Dioulasso, **Burkina Faso**: Dr Yves Traore
- R. Piqué Hospital (**Bordeaux**): Dr. Jean-Louis Koeck
- National Reference Center pneumococci, European Georges Pompidou Hospital, **Paris**
- International Network of Pasteur Institutes (**Cameroon, Bangui, Dakar, Ivory Coast, Paris**)

**Malaria** Head of Parasitology Unit: Rabiou Labbo

## Research

- Participation in the management of malaria cases
  1. Establishment of **a monitoring network of P. falciparum resistance** to antimalarials.
  2. Equipment of a technical platform for **carrying out tests in vitro** and in addition molecular **in vivo tests**.
  3. **Training of health workers** in methods of laboratory diagnosis of malaria.
- Vector control and reduction of transmission.
  1. Intra Home residual **spraying** (IRS)
  2. Especially the **distribution of LLINs**.
    - Evaluation of **sensitivity of vectors to éendus insecticides** and used to impregnate the nets.
    - Evaluation of the **impact of PID campaigns on the transmission and Resistances**.
    - Measuring the impact of **universal coverage of LLINs in the transmission**, the parasite and species of anopheles, and finally the behavior of vectors
    - **Vector transmission** study in urban areas.

## International Collaborations

- Network of Pasteur Institutes (**Madagascar, Cambodia, Guyana**).
- Institute of Tropical Medicine of the Army Health Service (Marseille, **France**).
- Pasteur Institute (**Paris**).
- Massachusetts Institute of Technology (Boston, **USA**).

## The areas of expertise are:

- **Molecular epidemiology** of malaria.
- Ecology and dynamics of **vector populations**.
- **Environmental factors** related to the parasite portage.
- **Surveillance of resistance** of P. falciparum to antimalarial drugs and insecticide anopheles.
- Biological **diagnosis** of malaria microscopy, rapid tests and molecular tests.

- **Training** and receiving trainees.

## **Health / environment-climate** - Jean-Paul Moulia Pelat, MD, PhD, Epidemiologist, Head of Unit Epidemiology / Health-Environment-Climate

This link is quantified **measure of risk** corresponding to the probability that an individual suffers harm or harm to his health if exposed to danger especially of environmental origin. Advances in **statistics, epidemiology** now allow this quantification. **Relational database** management systems and geographic information systems (**GIS**) allow to optimally exploit **monitoring data in the study of the link between disease and the environment**.

- The seasonality of meningitis and malaria
  - In the Sahel, **seasonal variations in malaria** cases are strongly related to climate variations including rainfall.
  - **Outbreaks of meningococcal meningitis** are, too, because of the **marked seasonal role** of certain climatic factors (humidity, dust) and limited to certain areas.
- The themes include:
  - **GIS-monitoring**: health card and spatiotemporal distribution of meningitis
  - Study of the link **between disease and the environment**.
- The activities include:
  - develop the **tools and resources necessary for spatial and temporal analysis** of the transmission of malaria and meningitis
  - **collect environmental and climate information** at scales compatible with health data, in time and in space and establish collaborations with specialized agencies to identify and get the most relevant climatic and environmental parameters
  - measure the **risk posed by environmental factors** in the occurrence of a disease
  - **Develop training** in the field of environmental health.

### **Research**

- Digital support **national health map Niger**
- Spatiotemporal distribution of meningitis
  - Spatial and spatio-temporal clusters identified during the 2002 season - 2009 (N. meningitidis and S. pneumoniae)
- **Environmental health**: study of the relationship between **climatic factors / meningitis and malaria**

## **Public health**

**Flu: NRL for the monitoring and diagnosis of influenza** - Coordination: Jean-Paul MOULIA PELAT, PhD, Epidemiologist,  
Head of the Unit of Epidemiology / Health-Climate-Environment

- Influenza surveillance in Niger
- The main objectives are:
  - The description of **seasonal influenza** (A and B) in terms of seasonality (approach), its **geographic distribution** and **epidemiology**.
  - **Antigenic and genetic comparison of strains circulating in Africa** (dynamic genetic diversity of influenza viruses).
  - The measurement of **antiviral resistance** strains isolated
- International Collaborations
  - **WHO** Collaborating Centre for Reference and Research on influenza viruses and other respiratory viruses, Institute Pasteur, **Paris**.
  - **WHO** Influenza EQAP Working Team, **Hong Kong**

## Training

- activity with two main directions:
  - Laboratory Technician Refresher Course
  - Regional thematic scientific workshops
  - Mémoires Master, and ingénieriat of doctoral thesis
  - Stages And memories of the National School of Public Health and Institute of Public Health, Niamey
  - Stages Scholars (International Youth)
- During National Malaria
  - The National Malaria Course (NOC) is the result of collaboration between the Faculty of Health Sciences of the University Abu Moumouni (FSS / **UAM**), the National Program against Malaria (**NMCP**), the Hospital Niamey National (**HNN**) and the Center for Medical and Health Research (**CERMES**).
    - The goal: train scientists and stakeholders in the fight against malaria by using internet search engines under the supervision of a facilitator.