The importance of a surveillance and alert network

- **Essential role of the global outbreak alert and response network (or GOARN), WHO:**
  - Assist countries in their efforts to fight against diseases, by providing an appropriate technical support to populations in a timely manner
  - Investigate and characterize sanitary events and analyze the risks of a rapidly-emerging threat
  - Support the national authorities’ efforts to prepare for sanitary crises
  - Contribute to the lasting confinement of epidemic threats
Reporting systems and early warning, essential keys to provide an effective response

- **Existence of reporting systems: example of ProMed (Program for Monitoring Emerging Diseases), an Internet-based reporting system dedicated to rapid global dissemination of information on outbreaks.**

- **Fundamental role of an early warning of outbreaks of emerging and re-emerging diseases: enables authorities to take public health precautions in a timely manner.**

- **Importance of sentinels: national reference laboratories, hospitals, physicians, etc → early detection is a key element to control epidemics.**

Promed Mail report by disease, 1994-2006 category

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian influenza</td>
<td>1727</td>
</tr>
<tr>
<td>Foot and Mouth disease</td>
<td>913</td>
</tr>
<tr>
<td>Dengue</td>
<td>891</td>
</tr>
<tr>
<td>West Nile Virus</td>
<td>891</td>
</tr>
<tr>
<td>Cholera</td>
<td>785</td>
</tr>
<tr>
<td>Anthrax</td>
<td>777</td>
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<tr>
<td>Bovine spongiform encephalopathy</td>
<td>745</td>
</tr>
<tr>
<td>Rabies</td>
<td>741</td>
</tr>
<tr>
<td>Unknow Illness</td>
<td>660</td>
</tr>
<tr>
<td>Ebola</td>
<td>484</td>
</tr>
</tbody>
</table>
33 institutes Pasteur gather about 9 500 people in 26 countries, over 5 continents

- in agreement with the local health authorities
- within the international network, the institutes share their knowledge, their research programs and keep control of the development of infectious diseases
- A major partner for international institutions, Fundations, Governments and industrials
Institut Pasteur International Network:

A global Network with 32 Institutes / 25 countries / 5 continents

In countries with high incidence and endemic infectious diseases
The Institut Pasteur in Guinea


Novembre 2014 : Un laboratoire à Macenta.


Novembre 2015 : Signature du protocole d’accord du futur Institut Pasteur de Guinée.
Solid foundation in the field • Established relationships with local governments • Recognized partner for outbreak response
International Institut Pasteur Network, a land opportunity...

- Unique and leadership position in various areas

2. RIIP Scientific Advisory Board June 5th, 2014
YF labs
Regional reference

WHO surveillance labs network
7000 suspected cases/ year
Acute jaundice &Fever
from 20 countries

1% Yellow fever and 99% unknown etiologies

Case study in Senegal
Plasmodium falciparum
Borrelia Crocidurae
Hepatitis A, B, C, D, E, G
Salmonella enterica, Typhimurium
New Virus
New emerging and re-emerging pathogens

- Rift Valley fever virus
  - Mauritania in 2012
  - Senegal in 2013

- Dengue virus in 2013
  - Dengue 1 in Angola and Cape verde
  - Dengue 2 in Ethiopia
  - Dengue 3 in Burkina Faso

- Hepatitis E virus in Senegal in 2014

- Zika Fever in French Polynesia
  and Brazil, Caraibean area

- Ebola virus in Guinea

- Yellow fever
The Institut Pasteur International network mobilized against ZIKA
## International partnerships

### ASIA
- China CHINESE ACADEMY OF SCIENCES
- Japan RIKEN, IMSUT Institute of Medical Science, University of Tokyo, NIID National Institute of Infectious Diseases, JICA-JST
- Corea, ASIP

### USA
- DHHS/ASPR Dep. of Health and Social Services
- NIH National Institutes for Health
- CDC American Center for Disease Control
- USAID US Agency for International Development
- GEIS Global Emerging Infectious System
- PEPFAR President's Emergency Plan for AIDS Relief

### CENTRAL AND SOUTH AMERICA
- Mexico, CONACYT Mexican National Council for Science and Technology
- Peru, Ministry of HEALTH OF PERU
- Colombia, in process
- Argentina, in process

### EUROPA
- WHO (Switzerland)
- WELLCOME TRUST (UK)
Pasteur International Network Association becomes an NGO in official relations with WHO

During its 138th session on January 30, 2016, the Executive Board of WHO admitted the Pasteur International Network Association as an institution "in official relations with WHO".

The Association gathers all the 33 institutes of the Network.

It is a great step for the recognition of the Association and the Institut Pasteur International Network as an important non-state actor in favour of global public health.

This status will allow the Association, representing the Pasteur Network to:

- participate (without right of vote) to WHO’s meetings and especially to the General Assembly
- submit a memorandum to the WHO Director-General.
Karma Project: K-13 Artemisinin Resistance Multicentre rapid Assessment

Malaria control & elimination

Emergence of artemisinin resistant parasites in South east Asia and spread to Africa

Leadership in the discovery of a genetic marker of *P. falciparum* resistance to artemisinin (K13) (Arey et al, Nature 2014)

Support of WHO for playing a key role in using this marker for a global tracking and monitoring of artemisinin-resistance

RIIP/IP have a privileged position for deciphering the molecular and immunological mechanisms underlying the emergence of artemisinin resistant parasites.
Karma Project: K-13 Artemisinin Resistance Multicentre rapid Assessment

Up-to-date situation (February 2014)

37 institutions have declared to be part in the KARMA project (including 11 IPIN), covering 35 countries:

- 22 in Africa
- 8 in Asia
- 2 in Oceania
- 3 in South America
- (+ French and UK National Reference Center for imported malaria cases)

A total of 20,329 samples are available (17,062 after 2012)
KARMA: K13 Artemisinin Resistance Multicenter Rapid Assessment

- **Asia:** high prevalence of Artemisinin resistance mutants (36.5% of the parasites with K13 non-synonymous mutation) and distinct dominant originating from multiple independent events (Cambodia-Vietnam-Lao PDR and Thailand-Myanmar-China)
- **Africa:** Africa is free of Artemisinin resistance-associated Asian alleles
A Worldwide Map of *Plasmodium falciparum* K13-Propeller Polymorphisms

The Institut Pasteur is moving to establish a global framework for reproducible research with unified bio-banking, data storage, management and analysis. Resources will be connected and shared through the IP cloud for data analysis.
A coordinated network of resource hubs covering all continents and providing biobanking, data generation (sequencing, spectrometry, cytometry, etc.), data storage and high performance computing resources for the Global Health Genomics Center.