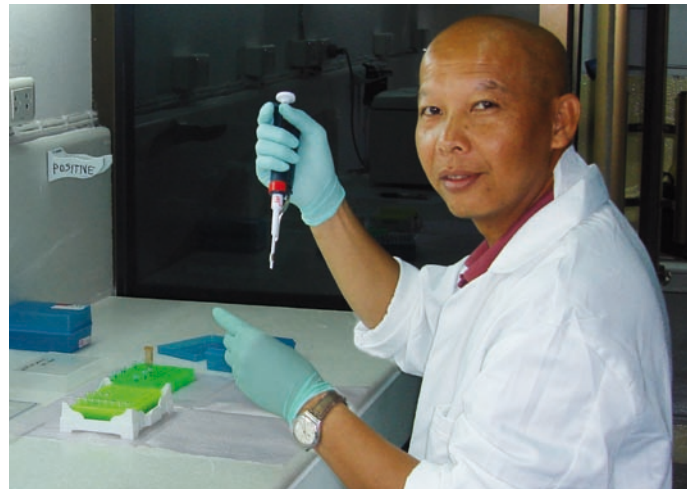


Program

# The French Development Agency (AFD) and the Institut Pasteur & SISEA Surveillance and Investigation of Epidemic Situations in South-East Asia



*"Knowledge belongs  
to all mankind"*  
Louis Pasteur



# Reinforcing the network of reference laboratories



## > Technical support

SISEA has upgraded regional laboratories, thereby strengthening their role as regional and national reference centers for viral and bacterial diagnostics of encephalitis and respiratory tract infections.

- **In Cambodia:** setting up of a high security laboratory (level P3)
- **In Laos:** providing equipment and personnel to the National Center for Laboratory and Epidemiology (NCLE)
- **In Vietnam:** deployment of last generation material and equipment for viral detection
- **In China:** development of viral tests appropriate for the regional environment

SISEA has also improved research in the four partner countries through

- standardizing molecular biology techniques
- developing laboratory quality assurance and quality control
- implementing safe procedures for transportation of infectious material

## > Transfer of knowledge

The project has been associated with a major effort to train staff both in central and peripheral laboratories at field sites

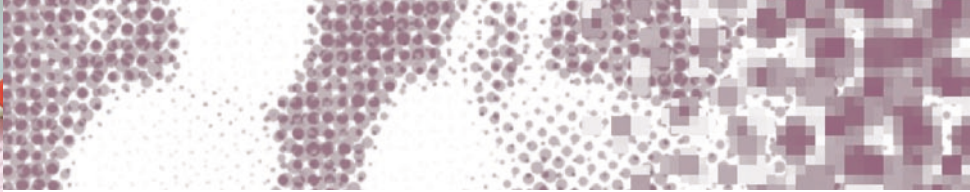
- Training of virologists in molecular biology techniques
- Specific training for technicians to use the equipment available
- Regional training of epidemiologists
- Awareness on safe handling and transportation of human specimens

These actions have been carried out locally in the provinces with emphasis on interactions among health-care workers at field sites and reference hospitals. Technicians in diagnostic laboratories have also benefited from tailored training, and virologists and bacteriologists involved in the project have been able to network regionally and hence share their expertise. Collaboration with the Regional Emerging Disease Intervention (REDI) center in Singapore has given the training an even larger regional dimension, beyond the countries targeted by SISEA.

### Partnership with the NCLE

Since the establishment of the SISEA project, AFD has provided constant aid to the National Center for Laboratory and Epidemiology (NCLE) in Laos. Two technical assistants from Institut Pasteur have worked on-site, training virologists, bacteriologists, and epidemiologists in the most modern laboratory techniques, which are now available locally thanks to the SISEA project.





## SISEA, monitoring and investigation of respiratory illnesses

### Predominance of rhinovirus

In South-East Asia, over 40% of cases of acute respiratory syndrome are due to rhinovirus. More precise typing of the different rhinoviruses and analysis of their pathogenicity through epidemiological studies will enable better prevention of severe forms.

### Melioidosis in Cambodia

In 2008, bacteriologists at Institut Pasteur in Cambodia discovered that 10% of serious bacterial respiratory tract infections were due to *Burkholderia pseudomallei*, the infectious agent responsible for melioidosis. This discovery has resulted in changes to the therapeutic protocols in the country and has improved patient prognosis.

### Responsiveness of the SISEA network

Soon after the start of the 2009 influenza pandemic, the new test developed by Institut Pasteur to detect the emerging H1N1v virus has been made available and is now routinely used in diagnostic tests by SISEA partners.

Respiratory illnesses remain one of the most serious diseases throughout the world. The recently detected and potentially epidemic viruses — SARS, H5N1, and H1N1v — are good examples.

For this reason, since the start of the SISEA project, virologists have worked to establish standardized tests for the 17 most widespread respiratory viruses in South-East Asia:

- six sub-types of influenza A and B (H1, H2, H3, H5, H7 and H9)
- respiratory syncytial virus (RSV)
- rhinovirus
- echovirus
- parainfluenza virus
- metapneumovirus
- adenovirus
- bocavirus
- enterovirus
- coronavirus

By the end of 2009, data had been collected from over 6000 patients suffering from acute respiratory syndrome. Through standardized tests, the viral origin of the pathology was identified in over half of these patients. Detailed analyses allow to evaluate circulating viruses, their pathogenicity, their regional impact on public health and monitor seasonal variations.



# SISEA, monitoring and investigation of encephalitis

The problem of the potential emergence of encephalitis of unknown origin has been addressed since the start of the SISEA project in 2006.

A panel of virologists, clinicians and regional experts has met regularly to work on two complementary areas:

## - the development of diagnostic tests specific to viruses present in the region:

- Japanese encephalitis virus
- flavivirus
- enterovirus, in particular EV71 strain
- alphavirus
- herpes
- rubella
- mumps
- adenovirus

## - formation of a network of sentinel hospitals and health centers for disease surveillance and targeted research in response to identified cases.

A strong drive towards regional collaborations has led to draft common diagnostic algorithms that have been adopted by SISEA partners.. The work on encephalitis has also strengthened contacts between virologists supported by the SISEA project and their colleagues working in the World Health Organization (WHO), Greater Mekong Subregion Regional Communicable Diseases Control Project (GMS-CDC), the Wellcome Trust, regional academic institutions and within the Pasteur Network. Epidemiological and viral data available at the end of 2009 for almost 300 patients has confirmed the prevalence of enterovirus and Japanese encephalitis virus.



**Cases of Japanese encephalitis** were detected in the Ben Tre region in Vietnam through the use of a rapid ELISA test. This has enabled virologists from the Pasteur Institute of Ho Chi Minh City to warn the health authorities of a possible outbreak. Besides raising awareness of clinicians to the disease, this group of identified cases has also proved useful for entomological investigations (analysis of mosquitoes, the main vector of the virus). Vaccination campaigns have been started to prevent the disease caused by this virus.

**Devising a specific test in Shanghai** Institut Pasteur in Shanghai is working on improving specific tests for Japanese encephalitis which can be used with both cerebrospinal fluid and blood samples.





## A network involved in surveillance and warning



**Since the beginning of the SISEA project**, reference laboratories have been requested to investigate suspected cases of H5N1 infection. The Institut Pasteur in Cambodia has taken a leading role in several such investigations and, more recently, the NCLE in Laos has been involved in the follow-up of cases reported in 2008.

Partners of the SISEA project have developed links with local health authorities, and consequently, are actively contributing to epidemiological surveillance in their country. Thanks to this in 2008, bacteriologists at the Institut Pasteur -Cambodia identified cases of melioidosis, which were previously misdiagnosed and, as a result, poorly managed. Faced with the emergence of the H1N1v virus in 2009, all partners involved in the SISEA project were requested by local health authorities to participate in monitoring the infection in the general population.. Also in 2009, in Vietnam, virologists from the National Institute of Hygiene and Epidemiology (NIHE) in Hanoi, identified the emergence of respiratory infections associated with the coronavirus, NL63. Furthermore, Institut Pasteur in Shanghai is working on the characterization of the pathogenic potential of different types of rhinovirus to improve detection of the emergence of the most dangerous strains.



**The application of quality control procedures to research and diagnostic tests is essential for data validation and the long term impact of the SISEA project.** Implemented in collaboration with Institut Pasteur in Paris, quality-control protocols have been enforced together with a campaign promoting awareness of biosecurity, with special attention to transportation and handling of samples with highly pathogenic potential.

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Over the past decade, new viruses with the potential to cause worldwide epidemics (pandemics) were identified in South-East Asia: SARS and H5N1. To improve detection of new pathogens that can easily spread from one country to another, effective surveillance and warning systems are required to enable local hospitals to transmit in timely fashion information to central health authorities. It is also essential that the standards of diagnostic laboratories in the field are constantly improved with the most sensitive techniques so that reliable information can be quickly provided without having to transfer pathogenic strains to centers with better facilities. Recognizing the importance of this situation, AFD and Institut Pasteur have joined forces in 2006 to set up an ambitious 5-year project with a budget of 5.9 million euros.



## > 4 countries, 3 aims

The SISEA project involves four countries in South-East-Asia: China (Institut Pasteur in Shanghai), Vietnam (NIHE in Hanoi, Pasteur Institute in Nha Trang, Pasteur Institute in Ho Cho Minh City), Cambodia (Institut Pasteur-Cambodia), and Laos (NCLE).

There are three main aims: improving the reference function of the network, intensifying surveillance and warning systems, and strengthening the networks involved in the response to epidemics.

**News from the SISEA project and publications are regularly updated and available on the SISEA project website**

<http://www.pasteur-international.org>

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