

# Cambodia



**Capital:** Phnom Penh  
**Infant Mortality Rate:** 52.7/1,000 live births  
**Population:** 15,205,539 (July 2013 est.)



## Overview

CDC has provided support to Cambodia to build human capacity and infrastructure for influenza surveillance, response, laboratory diagnosis, and pandemic preparedness. CDC's support has resulted in the establishment of a molecular laboratory at Cambodia's National Institute of Public Health Laboratory (NIPHL) capable of detecting influenza viruses, seasonal and avian, and other respiratory viruses. Influenza-like illness (ILI) surveillance, which began in 2006, is currently being monitored via six sentinel sites in six provinces. Additionally, all ILI samples are now tested at the National Institute of Public Health Laboratory. The laboratory is an active contributor to the WHO Global Influenza Surveillance and Response System (GISRS) and has diagnosed H5N1 in humans through this new system.

## Highlights

- Received Year 2 and Year 3 awards under the current cooperative agreement as well as H7N9 supplemental funding to combat the spread of H7 in China.
- Completed structural enhancements for biosafety level (BSL) 2/2+ and cell culture rooms at NIPHL.
- Detected H5N1 infections for the first time since inception in both the influenza-like illness (ILI) and severe acute respiratory illness (SARI) surveillance systems in 2006 and 2009, respectively.
- Achieved perfect scores on Panels 11 and 12 of WHO's External Quality Assessment Project (EQAP) for the Detection of Influenza Virus Type A by PCR.
- Completed a CDC administered surveillance review in May 2012.

## Surveillance

Since 2006, ILI surveillance in Cambodia has been supported by either or both of U.S. CDC's MOH and WHO cooperative agreements. ILI surveillance expanded to 13 sites in 2010 for improved geographical representation. Since January 2013, the number of sites has been reduced to six to increase surveillance efficiency and quality at a sustainable cost. Weekly upper respiratory samples of ILI patients have been tested for influenza viruses at IPC and NIPHL.

In 2009, under the first five-year U.S. CDC-MOH cooperative agreement, severe acute respiratory infection (SARI) surveillance was established at four referral hospitals in Phnom Penh, Kandal province, and Siem Reap province. Patients admitted for SARI are tested for influenza viruses and other respiratory viruses, bacterial pathogens and acid fast bacilli at NIPHL.

U.S. CDC-WHO cooperative agreement has also supported operational improvements of Cambodia's national communicable disease surveillance (CamEWAR) and event-based surveillance systems.

## Surveillance Activities

- Maintained production of monthly MOH Respiratory Disease and Influenza Bulletin, which includes ILI, SARI and CamEWAR data.
- Shared SARI microbiologic isolate and antibiotic-resistance data with the Working Group on Community-Acquired Lung Bacteria and Antibiotics in Cambodia (CALIBAN).

## Laboratory

Funding from the CDC-MOH cooperative agreement, together with close technical support and monitoring by the CDC Influenza Program in Cambodia and guidance from laboratory staff at the CDC Influenza Division, has resulted in significant strengthening of public health laboratory capacity at NIPHL. The molecular laboratory can perform real-time RT PCR for seasonal, avian (H5N1), and pandemic (nH1N1) viruses, in addition to conventional PCR for other respiratory viruses. Furthermore, NIPHL has added EV71 and H7N9 testing to its real-time RT PCR platform in 2012 and 2013, respectively.

In addition, funding from the CDC-WPRO cooperative agreement has supported testing for influenza at IPC and NIPHL. To further expand laboratory capacity at NIPHL, BSL2, BSL2+, and cell culture rooms have been added to allow for isolation and antigenic characterization of influenza viruses. Structural enhancements of these rooms were completed in October 2012, with equipment procurement, staff training, and laboratory operationalization scheduled for FY 2014.

### Laboratory Activities

- Tested over 1,000 ILI samples for influenza since October 2012, and detected H5N1 infection for the first time since ILI surveillance was initiated in 2006.
- Completed structural enhancements of BSL 2/2+ and cell culture rooms.
- Implemented testing for EV71 virus.
- Achieved perfect scores on Panels 11 and 12 of WHO's EQAP for the Detection of Influenza Virus Type A by PCR.
- Performed screening and confirmatory H5N1 testing of suspect human cases.
- Tested outbreak investigation samples from close contacts of all confirmed human H5N1 cases.
- Performed culture/antibiotic sensitivity and/or Acid Fast Bacilli detection on over 1,300 SARI surveillance samples.
- Submitted ILI and/or SARI samples to WHO Collaborating Centers in Melbourne and Atlanta (from IPC and NIPHL).
- Tested nearly 1,200 SARI surveillance samples for influenza; a subset of these samples, approximately one third of these samples were tested for other respiratory viruses (RSV, PIV, hMPV, adenovirus).

## Preparedness

Through the first five-year U.S. CDC-WPRO cooperative agreement, pandemic influenza preparedness and planning in Cambodia has been significantly advanced. Although activities in the current second five-year CDC-WPRO cooperative agreement do not include pandemic planning, multiple stakeholders involved with pandemic planning in-country have continued to build on efforts and outputs accomplished as a result of previous CDC cooperative agreement funding.

## Training

- Conducted ILI and SARI refresher training workshops for staff members from all surveillance sites.
- Conducted SARI surveillance supervisory/on-the-job training visits to each site.
- Conducted a CamEWAR surveillance review workshop.
- Conducted refresher training on H5N1 for village health volunteers affected by human cases in four provinces.
- Conducted a workshop on H7N9 and MERS-Coronavirus for staff from provincial health departments, hospitals, and agricultural departments.
- Conducted on-the-job training for microbiology staff, technical school students and provincial health department laboratory staff on basic bacterial isolation/identification/ antibiotic susceptibility testing and laboratory safety.
- Conducted a train-the-trainer workshop on infection prevention and control.
- Conducted IATA training for NIPHL and U.S. CDC Cambodia staff in Phnom Penh.
- Attended the Data Management and Epidemiological Analysis for Influenza Course for WHO, NIPH, and other MOH staff involved with influenza surveillance data.

## Publications

Chheng K, Carter MJ, Emary K, Chanpheaktra N, Moore CE, Stoesser N, Putchhat H, Sona S, Reaksmey S, Kitsutani P, Sar B, van Doorn HR, Uyen NH, Van Tan L, Paris D, Blacksell SD, Amornchai P, Wuthiekanun V, Parry CM, Day NP, Kumar V. A prospective study of the causes of febrile illness requiring hospitalization in children in Cambodia. *PLoS One*. 2013 Apr 9;8(4):e60634.

## Special Project

### *Tuberculosis Case Finding among Adults Hospitalized with Severe Acute Respiratory Illness (SARI) in Cambodia*

This project was jointly conducted by the CDC Division of Tuberculosis Elimination, the CDC Influenza Program in Cambodia, NIPH, the Cambodia National Tuberculosis Program (CENAT), and three SARI surveillance sites. The primary objective of this project was to determine the impact of SARI surveillance as a novel method of TB case finding. To achieve this, data from all SARI cases  $\geq 15$  years of age reported between December 2009 and April 2012 who were tested for acid fast bacilli (AFB) were analyzed. The project found high TB prevalence (12%) among SARI cases, demonstrating the potential role of SARI surveillance in enhancing TB case finding in Cambodia.