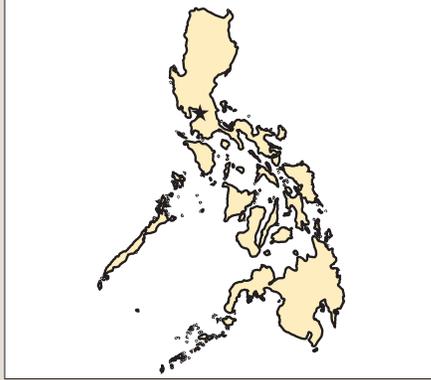


The Philippines



- **Capital:** Manila
- **Area:** 300,000 sq km
- **Population:** 103,775,002 (July 2012 est.)
- **Age Structure:** 0-14 years: 34.6% (male 17,999,279/female 17,285,040); 15-64 years: 61.1% (male 31,103,967/female 31,097,203); 65 years and over: 4.3% (male 1,876,805/female 2,471,644) (2011 est.)
- **Life Expectancy at Birth:** Total population: 71.94 years; male: 68.99 years; female: 75.03 years (2012 est.)
- **Infant Mortality Rate:** Total: 18.75 deaths/1,000 live births; male: 21.21 deaths/1,000 live births; female: 16.18 deaths/1,000 live births (2012 est.)
- **Literacy Rate:** Total population: 92.6%; male: 92.5%; female: 92.7% (2000 census)
- **GDP:** \$389.8 billion (2011 est.)
- **GDP per Capita:** \$4,100 (2011 est.)

Highlights

- Two-hundred and nine samples were tested to detect the H274Y mutation in the neuraminidase (NA) gene which is associated with oseltamivir resistance; results indicated that oseltamivir-sensitive viruses are still predominant in the Philippines. Nevertheless, two influenza A and two influenza B viruses, were found to have reduced NA inhibitor sensitivity.
- The Research Institute for Tropical Medicine (RITM) which is the Philippines National Influenza Center (NIC), correctly identified all 10 samples in the U.S. Centers for Disease Control and Prevention's (CDC) pilot, performance evaluation panel, to identify influenza using molecular diagnostic methods.
- Virological information is now integrated into the influenza-like illness (ILI) case report form of the Philippines' Integrated Disease Surveillance and Response.
- The NIC contributed to the manuscript titled, "Epidemiological and virological characteristics of influenza in the Western Pacific Region of the World Health Organization, 2006–2010," which was initiated by the WHO Western Pacific Regional Office (WPRO).

U.S. CDC Direct Country Support

The first five-year, CDC capacity-building cooperative agreement (CoAg) with the Philippines' RITM and Department of Health, titled, *Development of an Influenza Surveillance Network*, started in 2005. That CoAg enabled the establishment of an influenza surveillance network with 44 sentinel sites, both health centers and outpatient departments in tertiary level hospitals, distributed across 12 of the 17 regions in the country. The CoAg also supported the development of severe acute respiratory infection (SARI) surveillance in 16 health centers and seven hospitals in an urban setting, to establish the burden of disease associated with

influenza. The CoAg enabled the establishment of the Philippines' NIC and substantial capacity-building among staff in the virology department and the molecular biology laboratory of the RITM. The same agreement also allowed for the development and implementation of an upgraded data management system to ensure the accurate recording and reporting of surveillance information.

In 2009, CDC and RITM entered into a second, five-year sustainability cooperative agreement titled, *Developing a Sustainable Influenza Surveillance Network and Response to Avian and Pandemic Influenza*. This second grant is to ensure the sustainability of the RITM as an NIC and to plan for the continued existence of the surveillance network.

Surveillance

The CDC cooperative agreement supported an increase in sentinel sites from four to 44. Prospective ILI surveillance is conducted by trained nurses in 44 sentinel sites in order to establish seasonal influenza patterns. Each site is visited weekly to obtain epidemiological information and clinical specimens for virus culture and/or PCR. Virus culture is performed on all specimens collected through the national surveillance network. SARI surveillance has taken place in 16 health centers and six hospitals for establishing influenza burden of disease. Specimens collected from the influenza burden of disease sites are tested by real-time RT-PCR, while 25% undergo virus isolation.

Surveillance information is generated by trained nurses from each of the 44 ILI sites and used by the Regional Epidemiology Surveillance Units (RESU); the NIC provides weekly surveillance information for the whole country to the National Epidemiology Center (NEC) and WHO's FluNet.

The quality and efficiency of sentinel site performance is verified through regular monitoring visits and through a set of process and outcome indicators.

Surveillance Activities

- One hundred percent of specimens were received at the NIC in good condition, e.g. without frozen packs, spillage or desecration.
- One hundred percent of ILI cases sampled for testing had complete clinical and epidemiological information.
- One hundred percent of SARI cases sampled for testing had complete clinical and epidemiological information.
- A total of 14,805 ILI cases were reported through all sentinel sites; specimens were collected from 39.9% of these cases. The virus isolation positivity rate was 16.7% while influenza virus isolation positivity rate was 8.2%.
- A total of 22,847 health center consultations were recorded in the influenza burden of disease sites; 15.4% were for ILI. Specimens were collected from 42.5% of these ILI cases; the PCR virus detection rate was 13.5% while the influenza virus detection rate was 11.7%.
- A total of 32,185 hospital admissions were reported in the six surveillance hospitals, where 11.2% were SARI admissions. Specimens were collected from 25.3% of the SARI enrolled patients. Viruses were detected in 9.3% of these specimens while influenza viruses were found in 5.2% of the specimens tested.



Influenza surveillance nurse collecting nasopharyngeal swab from a pediatric ILI case in one of the 44 sentinel sites in the country.

- The local virologist, epidemiologist and biostatistician are required to visit and monitor regional sites.

Laboratory

The RITM performs a full array of culture-based and PCR-based testing producing high quality results to support surveillance activities for influenza and other respiratory viruses. Virus culture and indirect fluorescent antibody (IFA) testing are routinely performed to isolate and identify influenza A, B, human parainfluenza viruses (HPIV-1, HPIV-2 and HPIV-3), adenovirus, respiratory syncytial virus (RSV), and herpes simplex virus (HSV). Hemagglutination and hemagglutination inhibition tests are performed to characterize influenza viruses. Both real-time and conventional PCR assays are performed to identify and subtype influenza viruses. RITM is developing influenza PCR testing capacity in regional laboratories through training and monitoring to further assist in regional influenza surveillance and surge capacity. RITM has a system in place that supports the timely reporting of influenza surveillance data electronically, by fax, and/or by mail.

The NIC continued to send unsubtypable isolates and representative isolates, for quality assurance, to the WHO CC in Melbourne. In 2011, 141 isolates were shipped. The NIC continues to participate in the WHO External Quality Assessment Project (EQAP) and has consistently attained 100% in these proficiency panels.

Laboratory Activities

- In 2011, 690 specimens were positive for influenza based on virus isolation, of which 32.8% were positive for pandemic A (H1N1). A total of 1,368 specimens were tested using PCR; 164 were positive for influenza of which 62.2% were positive for pandemic A (H1N1).
- In collaboration with Tohoku University, studies were conducted on 209 samples from selected geographic regions of the country to investigate oseltamivir resistance to the 2009 H1N1 pandemic strain. RT-PCR and sequencing was used to detect the H274Y mutation in the NA gene associated with oseltamivir resistance. All 209 samples tested did not harbor the mutation, indicating that oseltamivir-sensitive isolates still predominate in the Philippines.
- ILI seasonal influenza surveillance yielded two influenza A and two influenza B samples which were found to have reduced NA inhibitor sensitivity.
- The NIC scored 100% in CDC's pilot performance evaluation panel, identify influenza using molecular diagnostic methods.
- Virological information is now integrated into the ILI case report form of the Philippines' Integrated Disease Surveillance and Response.
- The NIC developed a new software and barcode system for the routine receipt, processing and reporting of influenza specimens and their test results.

Preparedness

The 2009 H1N1 influenza pandemic tested the efficiency and functionality of the NIC procedures. This resulted in the development of a barcode system for influenza specimen receipt, processing and reporting of results. In addition, training of NIC second-line staff and staff from subnational laboratories was conducted as part of surge capacity planning and response. RITM, which is also the referral hospital for emerging and re-emerging infections, has reviewed and refined the clinical management guidelines for influenza based on the 2009 H1N1 pandemic experience.

CDC support has assisted in the continuous development of the Philippines' national preparedness plan. To coordinate influenza preparedness activities, the Philippines' Department of Health has four major committees including: a planning committee, an operations committee, a logistics committee and a finance committee. Each committee works on developing guidelines and making recommendations concerning

influenza such as quarantine and isolation at points of entry, containment, mitigation, vaccine purchases and guidelines for prioritization and rapid response teams (which are currently being reviewed and may be revised in the coming year).

Preparedness Activities

- The NIC has trained second line staff to perform molecular diagnostics.
- The NIC has provided proficiency training in molecular diagnostic tests to staff from subnational laboratories as part of surge capacity planning.
- The RITM has refined the clinical management guidelines for influenza.
- The RITM has reviewed, refined and disseminated infection control procedures in hospitals.

Training

- Panel one proficiency testing for RITM second line staff was conducted in November–December 2010.
- Panels three and four of proficiency testing was conducted for the subnational laboratory staff. In both tests, staff from three of the five laboratories obtained 100%.
- Three NIC staff participated in the “Scientific Writing Workshop on Influenza Surveillance” in Seoul, South Korea and two others participated in a similar training in Tohoku University, Japan.
- Refresher training for surveillance staff was conducted in August 31–September 2, 2010.

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