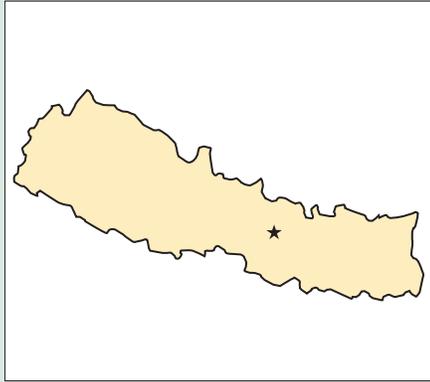


# Nepal



- **Capital:** Kathmandu
- **Area:** 147,181 sq km
- **Population:** 29,890,686 (July 2012 est.)
- **Age Structure:** 0-14 years: 34.6% (male 5,177,264/female 4,983,864); 15-64 years: 61.1% (male 8,607,338/female 9,344,537); 65 years and over: 4.4% (male 597,628/female 681,252) (2011 est.)
- **Life Expectancy at Birth:** Total population: 66.51 years; male: 65.26 years; female: 67.82 years (2012 est.)
- **Infant Mortality Rate:** Total: 43.13 deaths/1,000 live births; male: 43.15 deaths/1,000 live births; female: 43.1 deaths/1,000 live births (2012 est.)
- **Literacy Rate:** Total population: 48.6%; male: 62.7%; female: 34.9% (2001 census)
- **GDP:** \$37.74 billion (2011 est.)
- **GDP per Capita:** \$1,300 (2011 est.)

## Highlights

- Additional well qualified staff were hired and trained. The team now includes a virologist, a public health epidemiologist and an assistant to oversee consistent data and specimen collection at the sentinel site.
- Nepal's Patan Academy of Health Sciences (PAHS) has one year of reliable epidemiologic and virologic data for influenza-like illness (ILI) from Patan Hospital.
- Patan Hospital is transferring all written hospital charts into an electronic database with an identification number so it will be easy to analyze ILI and severe acute respiratory infections (SARI) data by age, gender and co-morbidities.

## U.S. CDC Direct Country Support

Nepal's Patan Academy of Health Sciences (PAHS), a public health science university at Patan Hospital, was awarded Nepal's first influenza cooperative agreement in September 2009. The project, *Influenza Pandemic Preparedness and Response Project (IPPRP)*, is in their second year of a four-year award.

PAHS's goals are to support Nepal's Ministry of Health and Population (MOHP) in the following activities: establishment of routine influenza virologic and epidemiologic surveillance in three sentinel hospitals, characterization of circulating influenza viruses, understanding the pattern of respiratory illness, and assistance with outbreak response and management. A network of partners consisting of the National Public Health Laboratory (NPHL) at the MOHP, Walter Reed Research Unit Nepal (WARUN) and PAHS work closely to achieve these goals. The U.S. Centers for Disease Control and Prevention (CDC) cooperative agreement has strengthened influenza surveillance and supported building epidemiologic and laboratory capacity in Nepal.

Nepal has experienced several outbreaks of avian influenza in poultry. Teams that include NPHL staff are part of the rapid response. No human avian influenza A (H5N1) cases have been detected to date.

## **Surveillance**

Currently, the network plans to have a total of 11 routine influenza surveillance sentinel sites. PAHS will oversee three ILI/SARI sites, WARUN oversees three ILI sites, and NPHL plans to oversee five ILI/SARI sites. All PAHS and NPHL sites will use the same reporting forms and standard operating procedures. Together the three agencies will cover key geographic areas around the country. The institutions share data, provide trainings together, and support each other through technical assistance and resources when needed.

### **Surveillance Activities**

- PAHS has collected and analyzed ILI epidemiologic data by age and gender from Patan Hospital since January 2010. Specimens have been collected from ILI cases since January 2011. SARI surveillance is expected to begin in early 2012. PAHS reports the total number of outpatients seen, the proportion of ILI by age and gender, and the number and percent of cases testing positive for influenza.
- The MOHP uploads ILI and SARI cases into the World Health Organization's (WHO) FluNet on a quarterly basis.
- PAHS staff with expertise in epidemiology and collecting, storing and sending specimens made technical assistance visits to the additional two influenza sentinel sites, B.P. Koirala Institute of Health Sciences in eastern Nepal and Nepalgunj Medical College in western Nepal. Epidemiological and virological surveillance began in these sites in early January 2012.
- A pilot sentinel site is being established in a public health community center in Bhimphe, Makwanpur district. ILI samples will be collected to determine prevalence of ILI in a local community where many families seek their non-urgent health care.
- Network partners have established two influenza seasons: July–September (monsoon) and January–March (cold weather).

## **Laboratory**

NPHL was designated a National Influenza Center (NIC) in 2010. A newly constructed Biosafety Level 2 (BSL-2) laboratory is fully functional. The NIC is now capable of conducting tissue culture, virus isolation and sequencing. PAHS is establishing a BSL-2 molecular laboratory with real-time RT-PCR and will test samples from their sentinel sites as well as provide backup support to the NIC when asked. Until the PAHS laboratory is functional, ILI and SARI specimens are tested at NPHL using real-time RT-PCR.

### **Laboratory Activities**

- PAHS hired a virologist who will oversee the molecular laboratory.
- PAHS staff trained sentinel site laboratory personnel and will continue to provide technical assistance on sample collection technique, specimen storage and shipping, and completing forms correctly.
- With reagents from CDC, the NIC is testing for influenza A (H1), influenza A (H3), influenza A (H5) and influenza B.
- The NIC has submitted 28 influenza viral isolates to the WHO Collaborating Center in Tokyo for advanced antigenic and genetic analysis. The results help form the basis for the WHO recommendations on the composition of influenza vaccine each year.
- A total of 311 samples were tested and 39% were positive for influenza. Of those that were positive, 98.33% were influenza A viruses and 1.67% were influenza B viruses.

## Preparedness

PAHS uses the recording forms, formats and requirements as per national protocols which are consistent with International Health Regulations 2005 (IHR). PAHS continues to work with the sentinel sites in East and West Nepal to build their preparedness capacity for future outbreaks and pandemics.

### Preparedness Activities

- Patan Hospital developed an emergency plan to be used in response to an outbreak, pandemic or disaster.
- With MOPH and other partners, PAHS developed mass media messages needed during an outbreak which will be broadcast when needed.
- Simulation exercises involving an outreach technical team occur twice a year in Patan Hospital.
- Each sentinel site (each is a tertiary hospital) has an isolation room that will be used during an outbreak or pandemic.
- A workshop is being planned for Ministry of Education, Nepal Police and journalists to discuss their roles during a serious outbreak or pandemic.



Entry to Nepal's Department of Health Services.

## Training

- The PAHS virologist received training on occupational health and biosafety from the U.S. Army Medical Component of the Armed Forces Research Institute of the Medical Sciences in Kathmandu.
- The medical and laboratory personnel at the network sentinel sites were given an orientation workshop that taught case definitions, case identification and laboratory sample collection.
- The IPPRP team held a five-day workshop that included reviewing progress to date and setting milestones for future.
- IPPRP staff visited sentinel sites to provide hands-on training and technical assistance.

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