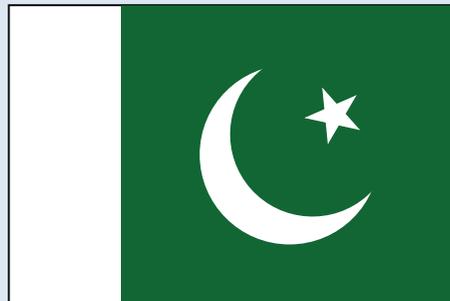


Pakistan



- **Capital:** Islamabad
- **Area:** 796,095 sq km
- **Population:** 190,291,129 (July 2012 est.)2011 est.)
- **Age Structure:** 0-14 years: 35.4% (male 34,093,853/female 32,278,462); 15-64 years: 60.4% (male 58,401,016/female 54,671,873); 65 years and over: 4.2% (male 3,739,647/female 4,157,870) (2011 est.)
- **Life Expectancy at Birth:** Total population: 66.35 years; male: 64.52 years; female: 68.28 years (2012 est.)
- **Infant Mortality Rate:** Total: 61.27 deaths/1,000 live births; male: 64.51 deaths/1,000 live births; female: 57.88 deaths/1,000 live births (2012 est.)
- **Literacy Rate:** Total population: 49.9%; male: 63%; female: 36% (2005 est.)
- **GDP:** \$488 billion (2011 est.)
- **GDP per Capita:** \$2,800 (2011 est.)

Highlights

- The Sindh sentinel laboratory at Civil Hospital in Karachi started processing seasonal and pandemic samples in October 2010.
- Rapid response team (RRT) trainings were held in Gilgit Baltistan, Punjab, Sindh and KPK provinces. Public health professionals were trained on how to respond to suspected outbreaks including, how to investigate suspected cases, use of personal protective equipment (PPE) and infection control measures.
- Two officers from Pakistan's National Institute of Health (NIH) participated in a comprehensive training workshop on avian influenza in April 2011 in China.
- A scientific poster on the 2009 H1N1 pandemic work in Pakistan was presented at the Keystone Symposia held in May 2011 in Hong Kong.

U.S. CDC Direct Country Support

The U.S. Centers for Disease Control and Prevention (CDC) and Pakistan entered the first year of a five-year cooperative agreement in FY 2011, titled *Developing Sustainable Influenza Surveillance Networks and Response to Avian and Pandemic Influenza*. This cooperative agreement has supported the development of state-of-the-art laboratories in designated sentinel sites across Pakistan for rapid confirmation of human and novel influenza cases. CDC also supports activities aimed at pandemic influenza preparedness through improved national influenza surveillance as well as the development of a national vaccine policy. Significant progress has been made in light of continuing social and political challenges. Five sentinel sites are located in outpatient departments of major tertiary care hospitals in four provinces and the federal capital, Islamabad.

These sentinel sites were selected on the basis of geographic representation, high population density, and patient turnover rates.

Pakistan's five sentinel sites are operational after biosafety enhancements, installation of laboratory equipment, and basic training of physicians in the collection of epidemiological data and specimens from influenza-like illness (ILI) and severe acute respiratory infections (SARI) cases. Relevant standard operating procedures (SOP) and protocols for laboratory techniques have been developed per CDC protocols.

Surveillance

Prior to the 2011 cooperative agreement, no sentinel site, laboratory-based surveillance system existed in Pakistan. At present, five sentinel sites are reporting ILI and SARI cases through active and passive case-finding to Pakistan's NIH. Standard case definitions, together with SOPs for sampling, storage, and specimen transportation have been developed and implemented in the surveillance system and are being periodically reviewed based on the emerging situation. Epidemiologic surveillance data gathered through this system is being submitted online to the World Health Organization's (WHO) FluNet and that process is being strengthened. Seasonal influenza vaccine has been procured and administered to personnel engaged in influenza surveillance. Viral transport medium (VTM) is dispatched to provincial health departments and high-risk districts on a regular basis, and rapid response teams have been trained and activated for timely response to outbreaks. Sentinel site and rapid response trainings were conducted in Hayatabad Medical Complex (HMC) and in the newly evaluated sentinel site in Gilgit-Baltistan province.

Surveillance Activities

- Laboratory-based surveillance for ILI and SARI cases has been activated at five sentinel sites through both active and passive case-finding.
- Epidemiological data on ILI and SARI cases is being submitted online to WHO's FluNet.
- ILI and SARI reporting forms have been reviewed and updated.
- Monitoring and evaluation of sentinel sites began through onsite visits, and gaps in both laboratory and surveillance activities have been identified and addressed.
- Two CDC staff visited Pakistan in March 2011 to observe ongoing surveillance activities and made recommendations for improvements.

Laboratory

The first CDC cooperative agreement with Pakistan (2004–2009) supported the establishment of five key laboratories for influenza surveillance. This laboratory network consists of the central laboratory at Pakistan's NIH, which is engaged in virus isolation and the molecular diagnosis of influenza viruses, and sentinel influenza laboratories in each of the four provincial capitals. The Sindh sentinel laboratory at Civil Hospital in Karachi started processing samples in 2010, while the three remaining sentinel laboratories routinely process specimens and send aliquots to NIH for confirmation and virus culture. Under Pakistan's current cooperative agreement with CDC, three additional influenza laboratories are planned for construction in Multan (Punjab), Gilgit (Baltistan) and AJK provinces. A preliminary evaluation of the designated sentinel laboratory at Gilgit was completed in 2010.

Laboratory Activities

- From Pakistan's five sentinel surveillance sites, 1,086 specimens were processed and reported.
- Logistic and technical support was provided to sentinel influenza laboratories.
- Seasonal and pandemic virological data has been regularly shared with the Global Influenza Surveillance and Response System (GISRS) using WHO's FluNet.

- Epidemiological data submission was initiated on FluID.
- A manual for influenza diagnostic protocols, to be distributed to various laboratories, is under development.

Preparedness

Pakistan's national preparedness plan for prevention and control of avian and pandemic influenza, established at the NIH, was developed by the multi-sectoral National Expert Committee in 2005. Based on this document, Pakistan's MOH implemented the *National Programme for Prevention and Control of Avian and Pandemic Influenza* in 2006. Some of the program's major components include emergency response, clinical health services, antiviral medicines, vaccine deployment, containment and quarantine, and public health communication. Influenza surveillance has been strengthened through the cohesive efforts of the MOH and the NIH laboratory-based project.

Training

Physicians, public health professionals and laboratory personnel throughout Pakistan have received training:

- Seven influenza surveillance trainings were conducted for 93 sentinel site physicians.
- Rapid response training was conducted and attended by 26 persons in Gilgit province, an area considered at high-risk for influenza transmission.
- Twenty laboratory staff members at sentinel sites received refresher PCR training.

Contacts

Birjees Mazher Kazi, MBBS, DCP, MPhil
Executive Director
National Institute of Health
Islamabad, Pakistan
Email: bmkazi@gmail.com

Syed Sohail Zahoor Zaidi, MPhil
Head of Virology
Public Health Laboratories Division
National Institute of Health
Islamabad, Pakistan
Email: zaidis@pak.emro.who.int;
sohailz@live.com



A visit to the Lok Virsa National Institute of Folk and Traditional Heritage in Islamabad after completing a review of Pakistan's influenza surveillance systems in March 2011. From left to right: Charlene Sanders (Senior Program Manager, CDC), Nazish Badar (Microbiologist, Pakistan NIH), Uzma Bashir (Senior Virologist, Pakistan NIH), Fatimah Dawood (Medical Epidemiologist, CDC), Nadia Nisar (Statistician, Pakistan NIH), Rashid Mehmood (Senior Epidemiologist, Pakistan NIH).