

Region of the Americas [AMR]



WHO Region of the Americas [AMR]

As of fiscal year 2014, there are four bilateral influenza cooperative agreements in the WHO Region of the Americas. These agreements with ministries of health (MOH) or institutions designated by the MOHs work with the Pan American Health Organization (PAHO)/the World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC) to build capacity to routinely identify and respond to seasonal and novel influenza strains across the Americas.

Direct country support through non-research cooperative agreements is established in the following four countries:

- Brazil
- Mexico
- Paraguay
- Peru

In addition, CDC supports PAHO through a cooperative agreement. CDC also supports activities at the Center for Central America and Panama's (CDC-CAP), Global Disease Detection (GDD) site in Guatemala. These activities support programs in eight Central American/Caribbean countries: Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, and the Dominican Republic.

The core activities of the bilateral agreements and technical assistance are:

- To build sustainable national capacity to identify and respond to seasonal influenza, pandemic influenza and other emerging diseases in accordance with the International Health Regulations 2005 (IHR).
- To make routine contributions of surveillance and virology data to WHO's Global Influenza Surveillance and Response System (GISRS).
- To increase the geographic reach of WHO GISRS.
- To provide earlier access to critical virus isolates from humans and birds for WHO GISRS.
- To increase the numbers of shipments and influenza isolates provided by local influenza laboratories for analysis by WHO Collaborating Centers (CC).
- To develop sustainable epidemiologic and virologic surveillance systems for severe influenza in order to gain an understanding of the disease and economic burden caused by influenza and other respiratory viruses.
- To develop and sustain interagency national preparedness plans.
- To develop and train local rapid response and containment teams.
- To sustain and leverage quality sentinel surveillance and study cohorts to explore the potential cost-effectiveness of expanding vaccination and incorporating new delivery mechanisms, formulations, and novel influenza vaccines in the PAHO Region.

In addition to our bilateral work, we also partner with the U.S. Naval Medical Research Unit No. 6 (NAMRU-6) in Lima, Peru to jointly support South American countries that are starting influenza surveillance.

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Pan American Health Organization [PAHO]



HIGHLIGHTS

- Launched SARInet (<http://www.sarinet.org/>), the regional influenza network, in May 2014.
- Conducted the second annual SARInet Meeting in April 2015.
- Established regional estimates of influenza disease burden, in depth analyses of seasonality, and improved data sharing and dissemination through SARInet collaborations.
- Conducted SARInet technical webinars and disseminated quarterly newsletters.
- Continued to implement the PAHO SARI Surveillance Protocol in more than 90 hospitals in 20 countries.
- Developed an information system, PAHOFlu that generates automated outputs of case-based, integrated laboratory and epidemiologic data. Two Member States are using PAHOFlu and several others are using their own systems.
- Conducted site visits to improve surveillance capacity in Colombia and Nicaragua. Future visits are planned for Chile, Costa Rica, Ecuador, Honduras, Paraguay, and Suriname.
- Provided technical assistance on strengthening laboratory diagnostic capacity in Colombia, Ecuador, and Nicaragua.
- Purchased laboratory equipment, reagents and supplies for many countries in the region.



U.S. CDC DIRECT SUPPORT

The current five-year cooperative agreement, Surveillance and Response to Seasonal and Pandemic Influenza by Regional Offices of the World Health Organization (WHO), began in September 2011 and is now in its fourth year. The Pan American Health Organization (PAHO) is the WHO Regional Office for the Americas and is located in Washington, DC, USA. The Office serves 35 Member States, four Associate Members, and three Participating States.

In 2014–2015, technical cooperation activities centered on influenza and pandemic influenza preparedness through strengthening three pillars; epidemiology, laboratory, and analyses to estimate influenza disease burden.

In 2015–2016, PAHO will focus on supporting epidemiologic and laboratory capacity in the countries and developing influenza burden of disease estimates. Technical cooperation in strengthening epidemiologic capacity will include training in severe acute respiratory infections (SARI) surveillance and developing data-sharing bridges.

Laboratory activities will include support for immunofluorescence and real-time RT-PCR, including the detection of other respiratory viruses and building the laboratory networks, including the National Influenza Center (NIC) network and participation in WHO External Quality Assessment Project (EQAP) and CDC proficiency panel.

SURVEILLANCE

During the 2009 influenza pandemic, surveillance for severe respiratory disease became increasingly important. This was because cases in a hospital setting are easier to capture, are smaller in number than the milder ambulatory cases, and during a pandemic, information about severe cases is of paramount importance for making decisions about response. SARI_{net}, a network of PAHO/AMR Member States that conduct SARI surveillance, was created in 2014. Since then, countries in the Americas have been eager to improve their SARI surveillance, and today 15 (43%) countries in PAHO are reporting data through WHO's Fluid platform.

SURVEILLANCE ACTIVITIES

- Shared weekly epidemiologic and laboratory data through SARI_{net} (20 countries).

- Conducted an updated training course on event surveillance for unusual respiratory illness and developed surveillance guidance for influenza-like illness (ILI).
- Trained more than 20 healthcare workers (HCW) in Colombia and Nicaragua, with plans to train HCWs in Costa Rica, Honduras, Paraguay and Suriname.
- Published an analysis of influenza-associated mortality in the region in a peer-reviewed journal.

LABORATORY

Considering the challenges faced during the pandemic, technical cooperation was directed to increase the capacity in the laboratory to process specimens for real-time RT-PCR, through the purchase of automated extractors and vacuum extractors. PAHO has continued to support the strengthening of laboratory capacity for the diagnosis of influenza and other respiratory viruses, including through the limited decentralization of real-time RT-PCR for influenza, through refresher courses for real-time RT-PCR and immunofluorescence, and through participation in WHO's EQAP. Through these activities, PAHO continued to strengthen the regional laboratory network, which now consists of 27 NICs in Latin America and the Caribbean.

LABORATORY ACTIVITIES

- Worked with regional laboratories to strengthen the diagnostic capabilities for influenza and other respiratory viruses, through the provision of supplies, equipment purchases, and training.
- Submitted over 700 samples from Latin America and the Caribbean to the WHO CC in Atlanta for characterization.
- Participated in the 2014 WHO EQAP (32 NICs and laboratories from the Region).
- Shared virologic data for influenza and other respiratory viruses with PAHO (20 countries).
- Conducted laboratory evaluations using the CDC/APHL laboratory tool.

PREPAREDNESS

During the response to the Ebola virus disease (EVD) outbreak in West Africa, PAHO activated the emergency operation center (EOC) in Washington D.C. to coordinate preparedness activities in the region and provide support in the deployment of rapid response teams (RRT) to West Africa. The EOC serves

as the point of contact for communication between technical areas and MOHs. PAHO continues to support all countries in creating situation rooms and EOCs to centralize data and coordinate preparedness activities. In the context of the EVD response, PAHO had the opportunity to evaluate preparedness for the spread of Emerging Infectious Diseases (EIDs) and the status of Member States' core capacities under the International Health Regulations (IHR).

PREPAREDNESS ACTIVITIES

- Visited 25 countries for EVD preparedness assessments (November 2014 to January 2015). Country missions helped to detect gaps and provided an opportunity to prioritize essential public health functions.
- Enhanced a regional stockpile of personal protective equipment (PPE) for potential use in emergencies in the region at the PAHO warehouse in Panama.

TRAINING

- Conducted national, sub regional, and regional trainings on risk communication, clinical management and laboratory biosafety in the context of the EVD preparedness activities.

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BRAZIL



The Brazil Ministry of Health Influenza Surveillance Team (Fabiano Marques; Francisco Junior; Sabrina Mendes; Walquiria Almeida; Swamy Palmeira; Daiana Silva; and Juliana Leite).

OVERVIEW

Since 2011, the Ministry of Health (MoH) has been developing activities to strengthen influenza surveillance in order to understand the epidemiology of circulating viruses. Brazil, a large country with different climatic regions, experiences variation in influenza seasonality and outbreaks both temporally and geographically. In each of the 27 states of the Brazilian Federation there is an epidemiological team and a Central Laboratory from the State Secretariat of Health. The national influenza surveillance network has 146 Sentinel Units for influenza-like illness (ILI) surveillance, and 132 Intensive Care Units for severe acute respiratory infection (SARI). The number of sentinel units varies by state. Data collected are included in national databases: Sivep-Gripe for ILI and SINAN for sentinel surveillance and SARI surveillance. The laboratories process the clinical material and test for respiratory viruses by immunofluorescence (IFAT) assays using a commercial kit (RSV, adenoviruses, parainfluenza virus 1-3, influenza A and B viruses). Central laboratories in 16 states also perform influenza virus detection by real-time RT-PCR using CDC primers and probes. The results are added to databases and analyzed by the state epidemiological teams and the MoH.

HIGHLIGHTS

- Published the treatment protocol for suspected cases of influenza.
- Conducted an annual influenza vaccination campaign and included new priority groups for influenza vaccination.
- Conducted an influenza vaccine effectiveness study in Brazil.
- Conducted online courses for clinical treatment and surveillance of influenza.

SURVEILLANCE

Influenza surveillance in Brazil consists of both sentinel surveillance for ILI and SARI in intensive care unit inpatients and universal surveillance for SARI.

Sentinel surveillance is based on a network of health units distributed in all geographic regions of the country and the principal objective is to identify the circulating respiratory viruses in order to provide data to support the seasonal influenza vaccine composition recommendations. In addition, the surveillance system allows tracking of health system needs due to these respiratory viruses.

Currently the country has 76 municipalities with sentinel sites for influenza (ILI and SARI), and 278 SARI sites. The universal SARI surveillance monitors the hospitalizations and deaths due to influenza and helps with understanding the epidemiology of influenza in the country and guides decision-making in the Ministry of Health and the States and Municipal Health Secretariats. Data are collected through standardized forms and entered in the electronic health surveillance systems: Sivep-Gripe and SINAN Influenza Web for timely analysis.

SURVEILLANCE ACTIVITIES

- Conducted a workshop to update the treatment protocol for suspected cases of influenza.
- Developed surveillance guidelines and contingency plans for influenza.
- Conducted regional meetings and supervisory visits.
- Provides weekly technical reports.

LABORATORY

The network of the National Influenza Center (NIC) laboratories in Brazil, has three central laboratories: Evandro Chagas Institute (IEC) in Belém/Pará State; Adolfo Lutz Institute (IAL), in Sao Paulo and the Oswaldo Cruz Foundation (FIOCRUZ), in Rio de Janeiro which is also a National Reference laboratory for the MoH. In addition the NICs have 27 laboratories, in federal units and each NIC directs a number of laboratories for monitoring and supervision. The samples (nasopharyngeal aspirates or combined swabs) are collected at sentinel units and hospitals and a nationally standardized form is used to assess clinical and epidemiological information.

Data are included in National Databases—Sivep-Gripe and SINAN for sentinel surveillance and universal surveillance, respectively. The laboratories process the clinical material and test for respiratory viruses in IFAT assays using commercial kits. Central Laboratories in 16 states also perform influenza detection by real Time RT-PCR using CDC primers and probes.

LABORATORY ACTIVITIES

- Tested 36,134 samples in 2013 and 18,488 in 2014 in the SARI universal surveillance system.
- Conducted a training course on Influenza Virus Phylogenetic Studies.
- Conducted training for the analysis of antiviral resistance testing (FIOCRUZ).
- Tested 16,856 samples in 2013 and 20,638 in 2014, in the sentinel surveillance system.
- Expanded and modernized laboratories and enhanced capacity.

PREPAREDNESS

The MOH of Brazil has a Contingency Plan for Influenza which was developed after the 2009 influenza pandemic. The plan is updated as needed and WHO information on the circulation of animal influenza around the world is included. All recommendations of the plan follow the guidelines of the U.S. CDC and WHO. Currently this plan is being updated and will be available on Brazil's website.

PREPAREDNESS ACTIVITIES

- Conducted training for leaders of Federal Units of Brazil on the Contingency Plan Matrix.
- Conducted regional training seminars for the development of the Influenza Contingency Plan and plans for other diseases.
- Conducted meetings with the Ministry of Agriculture for discussion and actions regarding avian influenza.
- Developed an inter-ministerial technical group for pandemic preparedness planning.
- Worked with the Ministry of Agriculture to develop a plan to monitor influenza viruses in migratory birds.

TRAINING

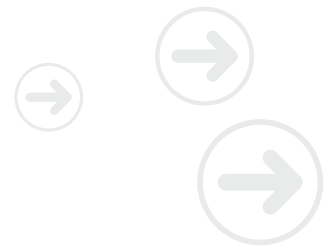
- Conducted training for ILI and SARI (ICU) sentinel surveillance and universal surveillance for SARI.
- Conducted trainings and a meeting on the burden of disease for influenza.
- Training for Contingency Plan Development for Influenza.
- Conducted training for Sivep-Gripe and SINAN web sites.
- Conducted training on influenza data analysis.

INFLUENZA VACCINE ACTIVITIES

In Brazil between 1999 and 2010, vaccination with seasonal influenza was available only for the elderly and some high risk groups. The evaluation of coverage was available only for the elderly group. The evaluation of coverage highlights that in 1999 the vaccination only included those 65 years of age and older.

In the elderly, over the period from 1999 to 2014, the vaccination coverage was high, between 64.78% (2000) to 87.9% (2013). The number of doses administered rose from 7.5 million (1999) to 18 million doses (2014) because of the growth of the elderly population.

Beginning in 2011, influenza vaccine coverage expanded to new groups with a significant increase in the amount of administered doses. In 2013, more than 35 million doses of seasonal influenza have been administered to the eligible groups. As with the vaccination of the elderly, vaccination coverage in these eligible groups remained above the set target



of 80% coverage, except for pregnant women and indigenous peoples where coverage remains less than optimal.

RESEARCH

In partnership with the Brazilian Ministry of Health and state health departments, CDC provides technical assistance to generate data for the design of influenza prevention and control strategies in the country. Ongoing projects evaluate the impact of influenza vaccination, burden of influenza disease, pandemic preparedness, and influenza vaccine effectiveness.

Primary activities include:

- Assessing the impact of seasonal influenza vaccination among persons 60 years and older on rates of influenza-associated mortality and hospitalization from 1994 to 2009, in São Paulo State, Brazil.
- Documenting the reemergence of influenza A (H1N1pdm09) virus in 2013, São Paulo, Brazil.

Additionally, Brazil is part of a multi-country evaluation of seasonal influenza vaccine effectiveness among high risk groups targeted for vaccination, a PAHO-sponsored initiative through REVELAC-i (Network for Evaluation of Influenza Vaccine Effectiveness).

CENTRAL AMERICA & PANAMA (CDC-CAP)



Guatemala MOH and COMISCA epidemiologists evaluate influenza surveillance performance in the San Juan de Dios Hospital in Guatemala City, 2014.

OVERVIEW

Influenza program activities of the U.S. Centers for Disease Control and Prevention's (CDC) Regional Office for Central America provide support to eight countries: Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama and the Dominican Republic. The focus is to strengthen capacity to respond to pandemic influenza and to prevent and control seasonal influenza. This includes improving influenza surveillance and laboratory capabilities, promoting the development of local pandemic plans, supporting targeted research projects, and building the evidence base for decisions on influenza vaccine program expansion.

SURVEILLANCE

Based on results of an exhaustive evaluation of influenza sentinel surveillance, some countries in the region have been updating their national guidelines to implement the new influenza surveillance standards developed by the World Health Organization (WHO). The main strategy to optimize the surveillance system is focused first on reducing the number of sentinel sites. This reduction in sites will focus resources, allowing for increasing the number and percentage of respiratory samples from severe acute respiratory infection (SARI) cases, and decreasing bias.

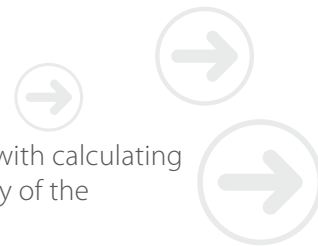
HIGHLIGHTS

- Strengthened surveillance for influenza and other respiratory viruses, laboratory capabilities, and pandemic influenza preparedness in Central American countries.
- Improved the abilities of the MOH surveillance laboratories to identify and characterize circulating influenza viruses and other respiratory viruses.
- Conducted an inventory of core capabilities to respond to an influenza pandemic in all eight Central American countries.
- Achieved significant changes to influenza vaccine policy in countries that receive technical support from CDC.

Surveillance activities will be further strengthened by continuous training, updating standardized procedures, and implementing an essential indicators-based monitoring plan. All activities are being coordinated with PAHO and Ministries of Health.

SURVEILLANCE ACTIVITIES

- Conducted standardized evaluations of influenza surveillance systems in each country by the Council of Ministers of Health of Central America (COMISCA) and PAHO experts.
- Developed a tool to assist the Ministry of Health (MOH) in right-sizing influenza surveillance systems.
- Provided technical assistance to local experts and epidemiologists in order to update national guidelines for influenza surveillance according to new WHO influenza surveillance standards.
- Revised and updated standardized operating procedures (SOP) for surveillance in some countries.
- Provided support for the national dissemination of updated guidelines in Honduras by assisting with preparation of content and printing posters.



LABORATORY

Public health institutions in Central America have continued to improve laboratory-based surveillance for respiratory viruses. These gains have involved establishing numerous laboratories and sentinel sites to process clinical specimens. Currently, there are six National Influenza Centers (NIC), two National Influenza Reference Laboratories and sixteen decentralized influenza laboratories in the region. These efforts have resulted in expanded diagnostic capabilities and improved data quality.

These laboratories now process approximately 20,000 respiratory samples per year. Personnel at the NICs have also updated algorithms, standard operating procedures and biosafety guidelines. Some countries in the region have developed or updated laboratory contingency plans. The support provided by CDC's Central America Regional Office (CDC-CAR) has improved the abilities of the MOH surveillance laboratories to identify and characterize the viruses that cause influenza and other acute respiratory infections. Seven laboratories are registered with CDC's Influenza Reagent Resource (IRR) and receive reagents and control materials for molecular methods and also cell lines.

LABORATORY ACTIVITIES

- Provided assistance to laboratories in the region to switch from serology-based surveillance to molecular methods.
- Conducted standardized evaluations of influenza laboratory capabilities in each country by TEPHINET and PAHO experts with the CDC/APHL review tool.
- Provided technical assistance to the NIC and decentralized influenza laboratories to update algorithms, SOPs, biosafety guidelines, and contingency plans.
- Strengthened electronic laboratory information systems.
- Participated in WHO's External Quality Assessment Project (EQAP)—six NICs and two National Influenza Reference Laboratories.
- Processed approximately 20,000 respiratory samples yearly (all influenza laboratories combined).

- Assisted the Honduras NIC with calculating the sensitivity and specificity of the immunofluorescence assay.
- Participated in ongoing discussions on the possibility of creating a regional reference laboratory and establishing an external quality control program on the immunofluorescence assay in the region.
- Provided technical assistance to improve quality of cell culture, influenza virus isolation, and selection of isolates and specimens.

PREPAREDNESS

All countries in the Central American region already have received recommendations to strengthen their Pandemic Influenza Preparedness (PIP) plans based on the results from a core capacity assessment for influenza pandemic preparedness and response conducted in 2014. These recommendations have been useful to help the countries prioritize their activities and identify the necessary resources for implementation.

Additionally, COMISCA has developed an informatics platform that will provide updated information to the rapid response teams to better contain infectious diseases of pandemic potential. This tool will allow a more efficient use of training resources and available time of the trainees. Several activities have been coordinated with PAHO to help update the national pandemic preparedness plans in the region.

PREPAREDNESS ACTIVITIES

- Conducted the core capabilities inventory to respond to influenza pandemic in all eight Central American countries.
- Provided support for the development of an electronic platform to provide updated information to the rapid response teams to better contain infectious diseases of pandemic potential.

TRAINING

- Conducted a regional training workshop to address new WHO influenza surveillance standards and unusual respiratory events surveillance system.
- Conducted several hands-on trainings at the NICs and decentralized laboratories.



The Gorgas Memorial Institute and CDC Influenza Division started the INFLUMI project in Panama and El Salvador in 2014. The INFLUMI's team in El Salvador and CDC-CAR Influenza Program key officers are shown, 2015.

INFLUENZA VACCINE ACTIVITIES

CDC-CAR Influenza Program has been supporting influenza vaccination research and decision-making in order to optimize influenza prevention in the Central American region and Dominican Republic. In 2013, we collaborated with PAHO to update the description of influenza seasonality in CAR and create a network for influenza vaccine evaluations in Latin America and the Caribbean called REVELAC-i for its acronym in Spanish (Red para la Evaluación de Vacunas En Latino América y el Caribe–influenza).

Additionally, studies were conducted on influenza disease burden and the economic burden of influenza. The Influenza Program assisted Honduras and Costa Rica with a change in the timing and/or formulation of influenza vaccines used. We have been supporting countries' efforts to use findings to inform Central American immunization programs and the Strategic Advisory Group of Experts about the potential value of vaccinating pregnant women and young children aged >6 months.

RESEARCH

Influenza Division works closely with GDD and other CDC programs in Guatemala; Universidad del Valle; The Gorgas Institute; COMISCA; PAHO; and Ministries of Health in Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, and Colombia to explore the timing of influenza in the American tropics, optimal times to vaccinate, the influenza-associated disease and economic burden, the effectiveness of influenza vaccination programs, and illnesses averted through vaccination, especially among SAGE target groups.

Ongoing research activities include studies to explore the following:

- Associations between seasonal influenza and meteorological parameters in Costa Rica, Honduras and Nicaragua.
- Prevalence of influenza A virus in swine and duck populations in rural backyards within tropical wetlands in Guatemala, 2013.
- Demographics and clinical characteristics of influenza A(H1N1)pdm09 virus-associated deaths in Central America and Dominican Republic 2009–2010.
- Influenza illness among case-patients hospitalized for suspected dengue, El Salvador, 2012.
- Incidence of influenza-associated severe acute respiratory infection among pregnant women in El Salvador.
- Medical and economic burden of influenza-like illnesses and influenza-associated medically-attended illness.
- Burden of influenza and influenza-associated pneumonia in the first year of life in a prospective cohort in Managua, Nicaragua.
- Influenza-associated hospitalizations and deaths in Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.
- Direct and indirect costs associated with laboratory-confirmed hospitalized influenza illness in Honduras, Panama, and Guatemala.
- Impact of maternal acute respiratory infection and laboratory-confirmed influenza illness on neonates.
- Pilot to evaluate the feasibility of measuring seasonal influenza vaccine effectiveness using surveillance platforms in Central America, 2012.
- Public health policies and practices of the use of influenza vaccine, oseltamivir and palivizumab in Costa Rica, El Salvador, Guatemala and Panama.
- Knowledge, attitudes and practices for influenza vaccination in Costa Rica, El Salvador, Honduras and Panama.

MEXICO



InDRE's Virology Department where influenza diagnostics occur.

OVERVIEW

The Mexican National Laboratory Network consists of the Institute for Epidemiologic Diagnosis and Reference “Manuel Martínez Baéz” (InDRE) that coordinates training, quality control and reporting for 31 state laboratories. The cooperative agreement has assisted Mexico’s Secretariat of Health (SOH) by increasing influenza laboratory capacity in Mexican states and improving diagnostic protocols. This grant helped Mexico to maintain seasonal influenza surveillance and develop response actions in the event of an influenza pandemic.

SURVEILLANCE

Mexico’s National Epidemic Surveillance System (SiNaVE) detects when influenza virus activity starts and when the season can be considered as active. In México, epidemic surveillance and laboratory-based surveillance are the two pillars of influenza surveillance used to detect virus activity and new influenza virus strains.

In 2014, the Influenza Epidemiological Surveillance Manual was updated and published. This manual describes the characteristics, activities and

HIGHLIGHTS

- Inaugurated the new campus of the Directorate General of Epidemiology including the new facilities of the National Influenza Center.
- Updated and published the Influenza Epidemiological Surveillance Manual.
- Collaborated with Mexico, USA and Canada (all involved in the North American Plan for Animal and Pandemic Influenza [NAPAPI]), to revise the 2014–2015 Work Plan.

responsibilities of the Influenza Sentinel Sites (USMI). A new case definition has also been introduced for “death due to influenza”, defined as a positive laboratory result for an influenza virus and a death certificate where the basic cause of death is specified as influenza. This definition has been implemented as a new variable on the platform of Epidemiological Surveillance System of Influenza (SISVEFLU).

SURVEILLANCE ACTIVITIES

- Posted epidemiological surveillance information to the website <http://www.epidemiologia.salud.gob.mx/informes/2015/influenza/influenza-semanas.html>.
- Developed a weekly newsletter that is distributed to the national epidemiological network and shared with partners.
- Updated and published the Influenza Epidemiological Surveillance Manual in which the characteristics of USMI and its activities and responsibilities are described.

LABORATORY

As part of the Directorate General of Epidemiology (DGE), the diagnostic capacities and capabilities of the National Influenza Center (NIC) in México, increased as a result of the first cooperative agreement. The same increases occurred in all laboratories of the national public health laboratory network.

With the resources of the recent agreement, DGE was able to recruit more staff. In April 2014, the President of Mexico, Enrique Peña Nieto, inaugurated the new Directorate General of Epidemiology Campus; including the new facilities of the NIC and InDRE.

LABORATORY ACTIVITIES

2013

- Collected, registered, and tested 18,118 samples from patients with severe acute respiratory infection (SARI); 2,001 (11.0%) were positive for an influenza virus.

2014

- Collected, registered, and tested 19,294 samples from patients with SARI; 4,861 (25.2%) were positive for an influenza virus.

PREPAREDNESS

Through a series of meetings with representatives of the three countries (Mexico, USA and Canada) involved in the North American Plan for Animal and Pandemic Influenza (NAPAPI), the Work Plan for 2014–2015 has been revised. Among the activities to be undertaken are maintaining communication through the National Focal Points of the three countries (Mexico, USA and Canada) and updating emergency protocols in case of an influenza epidemic for immediate response.

Potential areas of collaboration are being considered in case of an emergency event. The activities also include investigating outbreaks, sharing laboratory samples and medical countermeasures, and sharing information in a trilateral way. In May 2014, Mexico made the official transfer of the NAPAPI Secretariat to the Assistant Secretary for Preparedness and Response (ASPR) to the Department of Health and Human Services of the United States.

PREPAREDNESS ACTIVITIES

- Continued exchange of information and maintained communication regarding possible pandemic influenza emergencies between NAPAPI country members.
- Upgraded NAPAPI Board Members.

TRAINING

- Conducted a simulation exercise between NAPAPI member countries on pandemic preparedness in order to assess coordination and response.



A site visit outside of Mexico City with the Epidemiology Team.

PARAGUAY



Agueda Cabello, Director of SVS, Cynthia Vasconez, of the NIC (Laboratorio Central de Salud Publica—LCSP), Duc Vugia, Sara Mirza and Marta von Horoch at the Direccion General Vigilancia de la Salud (DGVS) offices.

OVERVIEW

Since August 2009, CDC has provided funds to the Paraguay General Directorate of Health Surveillance through a cooperative agreement to help the Paraguay Ministry of Health (MOH) strengthen influenza surveillance. In 2013, Paraguay entered into a sustainability cooperative agreement having completed the capacity building phase of the first cooperative agreement.

The country has strong sentinel surveillance for severe acute respiratory infections (SARI) and data reporting has been regular and maintained throughout the year. Current data are comparable with data from the region and are regularly incorporated and disseminated through a national epidemiological bulletin and the weekly PAHO influenza report. The country also is member of the network of the vaccine effectiveness study of Latin America and the regional SARI surveillance network.

SURVEILLANCE

In response to lessons learned during the 2009 influenza pandemic, a sentinel surveillance system for SARI was created. It is a hospital-based, systematic surveillance that covers all ages, and is supported by the cooperative agreement with CDC; the focus is on building capacity. There are ten hospitals that perform SARI surveillance and five sites that monitor for influenza-like illness (ILI). The country now has data on circulating respiratory viruses from patients of all age groups, and follow-up procedures are in place to monitor risk factor and severity of the disease.

HIGHLIGHTS

- Developed a sustainability plan for SARI and ILI national surveillance.
- Established ten SARI sentinel hospitals and five ILI sentinel sites that complete our early warning system.
- Implemented epidemiological units in every regional hospital.
- Analyzed 2,993 respiratory samples by RT-PCR assay and 2,715 by immunofluorescence (IFI) assay.

SURVEILLANCE ACTIVITIES

- Developed weekly summaries and weekly reports on SARI and ILI cases.
- Established better interaction between epidemiology and laboratory teams at the national level.
- Improved the computer system and integrated laboratory data.
- Conducted an evaluation of the surveillance system in April 2014.

LABORATORY

The National Influenza Center (NIC) capacity was strengthened in response to year round demand for testing, and this was supported in large part by the cooperative agreement. The implementation of RT-PCR as an exclusive assay performed in the reference laboratory was the next step for the detection of all respiratory viruses under surveillance.

The diagnostic capacity to perform the immunofluorescence (IFI) assay in local laboratories at the sentinel sites and the ability to send samples for RT-PCR to the national reference laboratory was increased. Now one of the sentinel sites is considering introduction of RT-PCR in their local laboratory. Surveillance of other respiratory viruses that may cause SARI (e.g., rhinoviruses, human metapneumovirus) is also needed to better understand the epidemiology and etiology of SARI, and it is important to incorporate techniques to detect these additional viruses. During 2014, some information about metapneumovirus was collected.

LABORATORY ACTIVITIES

- Completed a self-evaluation of the NIC and two sentinel laboratories in collaboration with CDC.
- Participated in CDC's Influenza Molecular Diagnostic Performance Evaluation Panel.
- Submitted 20 influenza virus isolates to CDC for further characterization.
- Implemented RSV and adenovirus detection by real-time RT-PCR in all samples negative for an influenza virus.
- Conducted training on the use of gauge CO2 for the incubator cell cultures.
- Conducted molecular diagnosis of other respiratory viruses such as bocavirus, coronaviruses, rhinoviruses, and enteroviruses.

PREPAREDNESS

CDC support helped evaluate the ability of the surveillance system and these results were used to update the national pandemic preparedness and response plan. The cooperative agreement strengthened surveillance capabilities, and the country continued the work by committing its own budget, increasing support of the NIC, and incorporating human resources at both the national level and the sentinel sites. It has also expanded and improved the infrastructure of the buildings and equipment. Human resources dedicated to surveillance both centrally and locally have been trained.

PREPAREDNESS ACTIVITIES

- Conducted a desktop simulation exercise with stakeholders to review procedures set forth in the plan for a particular scenario.
- Determined corrective measures based on the outcome of the simulation exercise to adapt evidence-based findings from the 2009 influenza pandemic into the plan.
- Included a protocol for detection of unusual SARI events in the plan with actions to be taken by the rapid response teams.

TRAINING

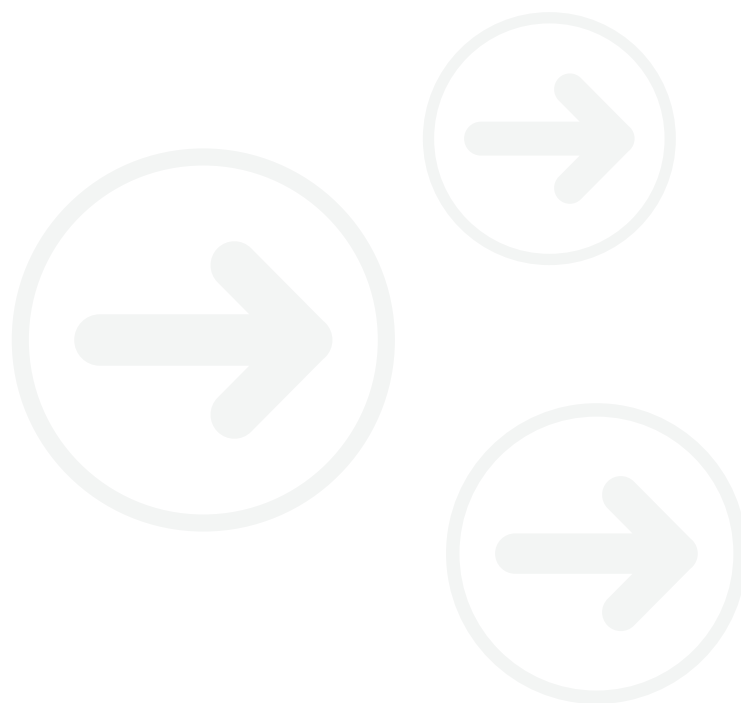
PAHO and CDC continued to provide training to ensure proper functioning of the sentinel surveillance system, high quality of surveillance data, prompt data analysis, and integration of information between the epidemiology and laboratory teams.

- Conducted training on surveillance procedures in hospitals at sentinel sites.
- Conducted in-service training at two sentinel sites on the SARI and ILI surveillance protocol.
- Conducted training for virologists on influenza virus isolation and identification.
- Conducted training on infection control at all national hospitals emphasizing the proper use of personal protective equipment.
- Conducted computer training at two sentinel sites.

INFLUENZA VACCINE ACTIVITIES

The country introduced influenza vaccine in 2006, targeted to populations at higher risk of severe illness or death. In this context, it is time to assess the impact and effectiveness of the vaccine.

To achieve this the country joined the Network of evaluating the effectiveness of the vaccine in Latin America and the Caribbean (REVELAC-i) and provided surveillance data.



PERU



OVERVIEW

Peru began to develop preparedness and response plans against avian influenza in 2005. The Ministry of Health initiated advocacy to increase the awareness of health and non-health authorities, and to encourage working together to prepare to face a potential influenza pandemic threat. This work was the first line of response against the 2009 influenza pandemic. In 2010, Peru's Ministry of Health and the Directorate General of Epidemiology entered into an agreement to strengthen surveillance and detection for avian and human influenza in the country. Peru's influenza surveillance system uses sentinel sites to identify influenza-like illness (ILI) and severe acute respiratory infection (SARI) case patients throughout the country. Laboratory testing for influenza viruses takes place in the 15 regional laboratories, as well as the National Influenza Center (NIC) located in the National Institute of Health (INS) in Lima.

SURVEILLANCE

Peru has 21 surveillance sites that perform ILI and SARI surveillance throughout the country. Since 2006, the MoH sub-committee for influenza surveillance has collaborated with the Virology Department of the U.S. Naval Medical Research Unit No. 6 (NAMRU-6) based in Peru.

SURVEILLANCE ACTIVITIES

- Updated the guidelines for investigation and control of outbreaks of influenza and SARI.
- Developed a 'professional supervision' tool to support surveillance sites.
- Conducted a PAHO review of the Expanded Program for Immunization that also included a review of surveillance for influenza.
- Conducted meetings to analyze the surveillance system and identify methods for improvement.

LABORATORY

Peru has a National Influenza Center, located in the laboratories of the National Health Institute in Lima that has for many years achieved 100% agreement in quality control testing, and routinely provides data to networks of the Pan American Health Organization

HIGHLIGHTS

- Continued epidemiological surveillance of influenza and produced analysis and reports on influenza activity in the country.
- Strengthened epidemiological surveillance (notification and immediate investigation of probable and confirmed cases) of influenza A (H1N1)pdm09 virus, including cases of ILI, SARI and SARI deaths.
- Used virological data and knowledge from the surveillance system to help guide vaccination policies.

(e.g. SARInet and REVELAC-i). The laboratory also sends strains to the World Health Organization Collaborating Centre to inform decisions on the formulation of the influenza vaccine. The country has 15 regional laboratories all of which receive respiratory samples from influenza sentinel sites. Samples at the regional sites are tested using immunofluorescent assays (IFA), and those that are positive are then sent to the country's NIC for testing by RT-PCR. Testing at the NIC is done the same day samples are received and results are generally returned within 72 hours. The influenza positive samples are cultured in MDCK cells. Positive isolates are shared with CDC at least three times per year.

LABORATORY ACTIVITIES

- Learned that influenza A (H1N1)pmd09 virus is circulating in different parts of the country; however, the type of influenza virus that presents most frequently is influenza B.

PREPAREDNESS

In 2014, Peru revised their National Plan of Preparedness and Response to a potential pandemic of influenza and other emerging respiratory viruses.

INFLUENZA VACCINE ACTIVITIES

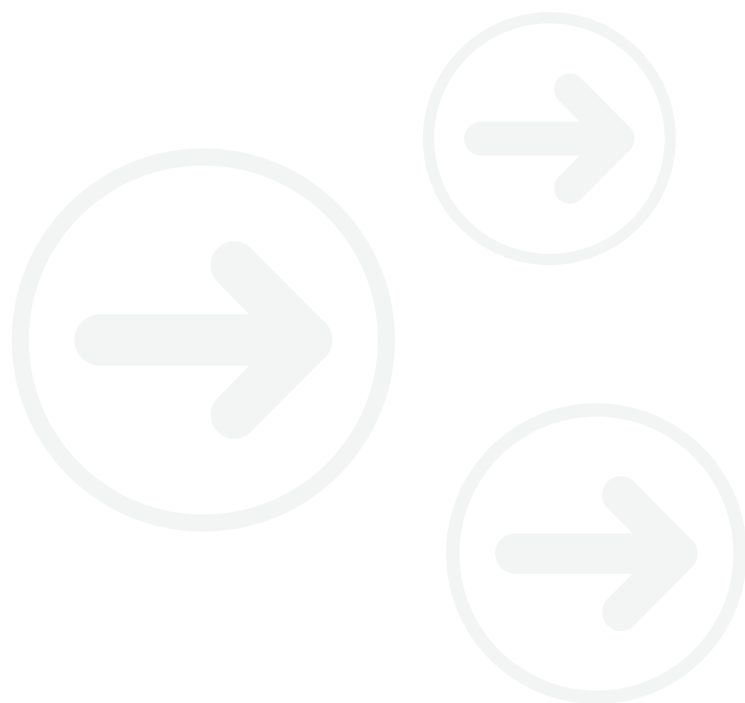
In 2014, Peru distributed vaccines against influenza in all departments. As of April 2014, there was only 6.5% coverage in children under one year and 8.12% in persons over 65 years.

RESEARCH

The Influenza Division has partnered with the Ministry of Health, PAHO, and NAMRU-6 to explore the timing of influenza in different macro-regions of Peru, the optimal time of influenza vaccination, the disease and economic burden associated with disease, and the vaccine effectiveness among potential target groups.

Research activities include:

- Describing the timing of influenza epidemics and optimal time to vaccinate using seven years of National Influenza Centre and WHO Collaborating Centre data.
- Estimating the incidence and burden of influenza in four ecologically distinct regions in Peru through a household-based community cohort study.
- Estimating the economic burden of influenza in Peru, 2009–2010.
- Exploring vaccine effectiveness of the trivalent inactivated influenza vaccine among health care workers in Lima, Peru.





Research Activities

ARGENTINA

During the past 5 years, CDC's Influenza Division has worked closely with the Ministry of Health, academic partners, and the Pan American Health Organization to explore the disease and economic burden of influenza illness as well as the effectiveness of influenza vaccination among children and older adults.

This latter effort is anticipated to help Argentina assess how many illnesses and the costs that could be averted through its vaccination program.

Research activities include:

- A study to quantify the incidence of viral respiratory infections among outpatient and hospitalized children aged ≤ 5 years and its associated cost in Buenos Aires, Argentina
- A cohort study to quantify rates of laboratory-confirmed influenza among pregnant women.
- A study to describe the timing of respiratory virus epidemics in subregions of Argentina during 30 years.
- Participation in a program evaluation to estimate the influenza vaccine effectiveness among young children and older adults during 2012–2015 through the PAHO led REVELAC-I network.

AMERICAS

CDC's Influenza Division and PAHO are collaborating to strengthen surveillance systems in the region and leverage the data generated from these activities to answer questions of public health importance.

Activities have focused on estimating the burden and cost of medically-attended influenza disease, estimating influenza vaccine effectiveness, and determining the seasonality of influenza circulation to optimize vaccine timing. Ongoing research findings include:

- Influenza peak-activity in the American tropics as reported to SARINet (www.sarinet.org/) appears to occur during May through September, and countries in this region should consider timing influenza vaccine accordingly.

- Efforts to estimate the burden of influenza-associated hospitalizations throughout the region are ongoing.
- Most (88%) countries in the Americas have seasonal influenza vaccination policies.
- On average, annually, ~85,000 people appear to die from influenza in the Americas.
- Regional efforts are ongoing to estimate influenza-associated mortality among pregnant women, a priority group recommended to receive influenza vaccine by WHO.
- Preliminary results suggest that the 2013 trivalent influenza vaccine-effectiveness to prevent hospitalization in nine Latin American countries was 49% (95% confidence interval: 32–61%) in children less than 5 years of age and 48% (95% confidence interval: 33–59%) in adults 60 years and older.

ECUADOR

CDC is working through SARINet, the Pan American Health Organization regional surveillance network, to help the National Influenza Centre explore the timing of influenza epidemics in different provinces within Ecuador. In addition, CDC is exploring a collaboration between the National Influenza Centre, the Universidad Catolica, and the University of Liverpool to estimate the influenza burden of acute respiratory illness among very young children in Ecuador.

The Ministry of Health in Ecuador may also participate in the Pan American Health Organization led REVELAC-i network to estimate influenza vaccine effectiveness among SAGE target groups.

Research activities include:

- An analysis to determine the timing of historical influenza seasons in different provinces within Ecuador and the optimal time for influenza vaccination.
- A cohort study to quantify rates of laboratory-confirmed influenza acute respiratory illness among very young children in the highlands of Ecuador.

NICARAGUA

CDC's Influenza Division is collaborating with the Ministry of Health, PAHO, and the University of Michigan to explore the timing of influenza season in Nicaragua, verify the optimal timing of influenza vaccination, and quantify the burden of influenza illness among SAGE target groups. CDC is also partnering with the Ministry of Health, PAHO and the Partnership for Influenza Vaccine Introduction to explore vaccine effectiveness and the value of maternal immunization to prevent illness among pregnant women and their infants. Research activities include:

- Describing the timing of influenza epidemics and optimal time to vaccinate using seven years of National Influenza Centre and WHO Collaborating Centre data.
- Quantifying the burden of influenza and influenza-associated pneumonia in the first year of life in a prospective cohort study in Managua, Nicaragua.
- Estimating influenza-associated hospitalizations and deaths in Central America (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua) among various key age groups.
- Estimating, through REVELAC-i, the efficacy of inactivated influenza vaccine to prevent influenza among children and older adults in the region.
- Assessing the effect of seasonal vaccination in pregnant women on birth outcomes.





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