Regional and country implementation
Laboratory & surveillance capacity building: regions and countries

Most PIP funds were invested in strengthening laboratory and surveillance systems, with implementation at global, regional and country level.

For regional and country level implementation, Regional Offices worked actively with all countries in their regions (Figure 9) to broaden engagement in and improve national pandemic influenza preparedness. In addition, priority countries were identified, and targeted by Regional Offices to strengthen L&S capacities according to the local needs and context of each country.

The following section provides an overview of major accomplishments across regions and in priority countries receiving PIP funds.

Figure 9: The six WHO regions
Across the African Region, countries prioritized and advanced epidemiological and virological surveillance capacities. These capacities are vital under the IHR (2005), as well as the Integrated Disease Surveillance and Response (IDSR), which is the regional framework for surveillance and response.

Several manuals, protocols and trainings were developed to guide countries to implement influenza surveillance. A Community-based Surveillance Training Manual was developed, and a Protocol for national influenza sentinel surveillance was updated and made available in three languages. A training programme that integrated this guidance was rolled-out to cover the three key elements of surveillance: epidemiology, virology, and data management. By the end of 2016, 12 countries had been trained. Together, these guidelines and training enabled countries to have a solid foundation for building robust and sustainable influenza surveillance.

The Regional Office also supported outbreak response capacities by developing the Protocol for the investigation of acute respiratory illness outbreaks of unknown etiology. This was used by the Central African Republic and Kenya during SARI events in 2016, and by Cameroon during an avian influenza A(H5N1) outbreak in the same year. PIP funds were also used to support emergency response to influenza outbreaks in Ghana, Senegal and Swaziland.
A number of laboratory capacities were supported to enable countries to advance laboratory-based influenza surveillance and GISRS participation. Continuity of surveillance was enhanced by the annual provision of essential consumables and laboratory reagents to all 11 PIP priority countries. As the availability of these products is highly limited in the region, a unified regional supply system enabled countries to regularly test and then share surveillance data through FluNet. Sustained testing has also helped to improve the quality of laboratory surveillance, as evidenced by the participation and good performance on EQAP of several countries in the region. Furthermore, the regional support facilitated countries to engage in GISRS, where six out of the 11 PIP priority countries shared viruses with WHO CCs in 2017 namely, Algeria, Cameroon, Ghana, Madagascar, the United Republic of Tanzania, and South Africa.

The systematic regional roll-out of surveillance, laboratory, and response support has helped countries to generate and share quality data. As a result, the regional Influenza Bulletin is published weekly and circulated to all country focal points, and supports situational awareness and risk assessment. Thanks to the enhanced capacities, better up-to-date information is available on influenza, which supports early notification of, and a quick response to, a virus with pandemic potential.

Progress in key capacities for PIP priority countries in the Region (2014–2017)

Performance against indicators for all 47 countries in the Region (2017)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory testing algorithm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance bulletins published</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional event-based surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluNet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional HAI coordination mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active ILI surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active PCR testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National RRTs trained yearly and ready for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SARI surveillance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of countries (N=11)

FluID 9% countries consistently shared epidemiological data through WHO FluID

FluNet 47% countries consistently shared influenza virological data through WHO FluNet

Virus sharing 43% countries routinely shared seasonal influenza viruses with GISRS
Coordination between animal and human health sectors operationalized

An outbreak of avian influenza A(H5N1) was detected in poultry in September 2016. A RRT was mobilized to control the outbreak in birds and to identify and prevent infection in humans. Coordination between the human health and animal health sectors was integral to the investigation. While the animal health authorities were controlling disease spread among poultry, the human health team visited affected farms to screen for people with influenza-like symptoms, to conduct serosurveillance, and to enhance awareness and disease prevention through risk communication. Ultimately, no human cases were identified during the outbreak. Since animal influenza viruses have pandemic potential, the capacity to respond to animal influenza outbreaks is critical for pandemic preparedness. Through the support of PIP, this capacity was exercised in Cameroon.

Cameroon

POPULATION: 23,344,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $250K
NATIONAL INFLUENZA CENTRE: YES

Influenza surveillance and capacities for monitoring influenza trends expanded

Using PIP funds, three sentinel surveillance sites for influenza were established, and training was provided to both laboratory and surveillance officers. Country-wide surveillance improved with the establishment of a sample transport system and the setup of a new internet network to facilitate information sharing.

Congo

POPULATION: 4,620,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $270K
NATIONAL INFLUENZA CENTRE: NO

Teams are now better equipped to collect specimens, analyze data, and provide feedback on influenza virus circulation through surveillance reports. With greater commitment to influenza surveillance, data are also being shared internationally through FluNet.
Data management streamlined disease surveillance

The national health information management system was modified to capture the epidemiological characteristics of acute respiratory disease cases. This has allowed influenza sentinel sites to report directly into the information system. This also enables the NIC to integrate the laboratory and epidemiological data from these cases to provide a more comprehensive picture of influenza and other respiratory disease activity in the country. A key benefit of this streamlined system is that the data can be accessed from any administrative level - district, regional or national - which increases the timeliness of data sharing and encourages broader use across the country.

Significant progress achieved in surveillance

Ghana utilized PIP funds to enhance the quality of the influenza surveillance system. The surveillance protocol was updated, messaging groups were established for rapid information sharing, and meetings were held across sectors to discuss surveillance findings including zoonotic influenza. Information is currently shared through the Ghana Weekly Epidemiological Report, which is a surveillance report on priority diseases that is publicly available. As a result of these investments, there was a five-fold increase in SARI and ILI samples sent from sentinel sites to the NIC from 2015 to 2017.

Outbreak response capacities in action

In 2017, a boarding school in southern Ghana discovered febrile illness among its students, and two deaths were reported within a week. A RRT was mobilized to conduct investigations. Specimens were rapidly collected and sent to the NIC where they tested positive for influenza A(H1N1)pdm09. The RRT provided technical guidance on case management for seasonal influenza, facilitated further laboratory investigations, and shared health messages with the school and neighbouring communities about preventing and controlling influenza. International action helped vaccines to be deployed within 48 hours of the request - see ‘Participating in the simulation increases real-life preparedness’ on p39 for more on this quick deployment. This comprehensive and rapid response prevented further transmission and contained the influenza outbreak. The capacities used in this outbreak will help the country to respond to outbreaks of influenza viruses with pandemic potential when needed.

"The capacities built at the sentinel sites play a pivotal role in influenza outbreaks in the country, where they serve as the first line of call. For example, the sentinel site, Kumasi South Hospital, was the first point of call during the influenza A (H1N1)pdm09 outbreak among students of Kumasi Academy in November 2017."

Sally-Ann Ohene,
Disease Prevention and Control Officer,
WHO Country Office, Ghana

Elijah Paa Edu-Quansah,
Senior Research Assistant and Field Epidemiologist,
National Influenza Centre, Ghana
Influenza surveillance data used to establish epidemic thresholds

The national ILI and SARI surveillance systems have been an important source of influenza disease trends for public health decision-makers in Madagascar. The weekly data from 54 ILI sentinel sites and 18 SARI sentinel sites provide information on virus circulation and seasonal fluctuations in disease activity. The NIC plays an important role in sustaining the quality of surveillance, and PIP has helped strengthen these systems through activities including sentinel site planning and monitoring.

Based on the surveillance data that have become available in recent years, Madagascar is in the process of establishing epidemic thresholds for influenza. Epidemic thresholds are important to compare disease severity between years and can be used to determine what is normal/expected, versus what is unusual or more severe. During a pandemic, these thresholds and baselines for seasonal influenza will help public health authorities to assess severity and to take the necessary response measures as the event unfolds.
Mozambique

POPULATION: **27,978,000**
TOTAL PIP FUNDS SPENT IN COUNTRY: **$100K**
NATIONAL INFLUENZA CENTRE: **NO**

A dual approach to influenza surveillance

Mozambique has implemented a sentinel influenza surveillance system in Maputo City with two SARI surveillance sites and one ILI surveillance site to provide quality data. Surveillance staff were provided with training and supplies to facilitate their work in influenza case identification, specimen collection, and data reporting. This sentinel system supplements the nationwide EBS used to detect influenza and other respiratory disease events, including those at the human-animal interface. The two systems are now recognized as key sources of accurate and timely information on circulating influenza viruses in the country.

Provincial Surveillance and Response Teams (SRTs) established

Using PIP funds, six of the 10 provinces established provincial SRTs. Twenty-five staff were trained to detect, monitor and respond to influenza disease events. They were also provided with logistical support to facilitate rapid coordination. These teams benefit pandemic preparedness by being part of the national early warning alert and response system, which also advances Mozambique’s implementation of IHR (2005) core capacities.

Improved laboratory capabilities

At the national laboratory, staff were certified as shippers by completing ISST, which enables them to ship samples to WHO CCs and improve participation in GISRS. Importantly, PIP funds also helped set up a laboratory quality management system (LQMS) to help control, assure, and manage the quality of the laboratory’s activities. Tangible progress is being achieved, as measured by the WHO LQMS audit checklist.

Mozambique shares their pandemic influenza preparedness experiences during a regional meeting, Ghana. © WHO

Provincial Surveillance and Response Team analyzing the respiratory illness records from logbooks during a site visit and training, Mozambique. Photo credit: Gabriela Pinto
Surveillance was re-established after the Ebola outbreak

PIP support and capacity building was interrupted early by the Ebola outbreak, which took place from 2014 to 2015. During this time, sentinel surveillance was halted, supplies weren’t regularly procured, sample testing was interrupted, and there was a reduced health workforce. Despite the devastation, sentinel surveillance was restarted after the outbreak, and the health workforce at all four sentinel sites were trained on data collection and specimen handling. Surveillance data collection and advocacy materials were provided, monthly supportive supervision visits were conducted by the national team, and quarterly sentinel surveillance review meetings were held with all sentinel sites. Laboratories were also provided with supplies and training. These efforts have improved surveillance quality and maximized commitment. Currently, ILI and SARI surveillance are functional and Sierra Leone contributes to GISRS; a major accomplishment in a short time period considering the impact of the Ebola outbreak on Sierra Leone.

Q&A with Florence Max-Macarthy, Ministry of Health and Sanitation, Sierra Leone

What is your role in the implementation of PIP?
I serve as the focal point for influenza surveillance to oversee the smooth functioning of the system.

What are you especially proud of as a result of PIP implementation?
Surveillance for influenza is now seen as part of routine activities at the sentinel sites, and both clinical and laboratory personnel are now becoming conversant with the case screening protocols.

What have been the broader benefits of PIP funds?
Capacity building of personnel involved in surveillance, and the availability of a forum to discuss surveillance findings and to provide supportive supervision.
Improved surveillance quality and timeliness

The United Republic of Tanzania used PIP funds to add three new sentinel surveillance sites, review the national influenza surveillance protocol to update data collection procedures, and facilitate national surveillance managers to conduct 12 supportive supervision visits to sites to troubleshoot activities and orient new staff. Together, these activities have positively impacted the surveillance system with increased case enrollment. Additional equipment and data management training has also helped surveillance site staff to upload their data into the national database, which has increased system timeliness and accuracy.

Increased surveillance efficiency

Influenza surveillance was integrated into the national IDSR reporting system with weekly reporting from sentinel SARI sites into IDSR. This integration has helped build core capacities for real-time surveillance under IHR (2005), and will maximize system sustainability. Other system efficiencies are also being operationalized. For example, the influenza surveillance protocols are being adapted for the surveillance of other viral diseases such as dengue fever and chikungunya. The national team plans to establish sentinel surveillance for these diseases at the existing influenza sentinel sites, preventing redundancies in data management and specimen transportation.

Progress towards system sustainability

The cost of laboratory-based influenza surveillance is considerable when factoring in the need for reagents, consumables and specimen transportation. The United Republic of Tanzania transitioned its specimen transportation system from staff delivering specimens to the NIC by public buses, to the use of a courier (Expedited Mail Service). This has reduced the turnaround time for transportation from an average of five days to two days, and lowered overall costs. The government has now started to cover the cost of specimen transportation from sentinel sites near the NIC, however, further external resources remain necessary to fund courier services from distant sites.
Zambia

POPULATION: 16,212,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $370K
NATIONAL INFLUENZA CENTRE: YES

Expanded sentinel surveillance
In 2017, Zambia expanded their surveillance system by adding three additional sentinel sites. Site selection involved consultation with animal health authorities to identify high-risk locations for influenza events at the human-animal interface. The staff at the new sites were trained on case detection, specimen collection and handling, and data management. The addition of these sites was a major achievement that expanded ILI and SARI surveillance in high-risk areas, improved geographic representation by bringing the total number of sentinel sites up to nine, and operationalized One Health surveillance by bringing the animal and public health sectors together in preparedness for influenza viruses with pandemic potential.

Decision-making supported through better data management
All Zambian sentinel sites received computers and data management software. Trainings were conducted on data collection and analysis, and a Supervisory Visit Checklist was developed in November 2016 and was used after trainings to help sites ensure quality of these capacities. These activities will better support decision-making in the future.

Big plans for the recently WHO-recognized NIC
Zambia’s newly WHO-recognized NIC at the University Teaching Hospital Virology Laboratory is continually expanding its range of capacities. Staff benefited from ISST to ensure the availability of certified shippers in-country, and there are plans to train staff in virus sequencing. The expanding capabilities and the recent NIC recognition by WHO will increase Zambia’s participation in GISRS and contribution to global pandemic preparedness.
Regional and country implementation

Pandemic Influenza Preparedness Framework
In the Region of the Americas, the Pan American Health Organization (PAHO) has used PIP funds to advance influenza surveillance. Notably, SARINet was introduced, which is a regional network of more than 600 hospitals and 30 laboratories. This collaborative network supports countries to strengthen their surveillance systems, promotes influenza virus sharing, provides support on vaccine effectiveness and timing, and facilitates effective use of data for policy-making. SARINet provides countries with technical expertise, as well as support for data management and analysis. This network allows PIP priority countries (as well as other countries in the Americas) to share best practices and to access regional support, including during emergencies.

Using PIP funds, PAHO also developed and disseminated several documents that have advanced surveillance. This includes new influenza surveillance standards, a laboratory assessment tool and a sentinel site assessment tool. These regional guidance tools have proved beneficial for countries to achieve international standards with respect to sample collection and shipment, operation of sentinel sites, and laboratory capabilities. Countries were also supported to develop intersectoral work plans that have strengthened surveillance at the human-animal interface.

Assessing national capacities

In 2016–2017 alone, PAHO undertook 22 surveillance site assessments and 11 laboratory assessments to build national capacities.

PAHOFlu was developed and implemented in several countries, which has advanced sentinel surveillance and data reporting. PAHOFlu is an information system that enables countries to integrate their SARI laboratory and epidemiological data, and stores current and historical epidemiological and laboratory data at a national level. It allows for automatic generation of weekly monitoring reports based on WHO and PAHO standards, and in both English and Spanish. The system also transmits data electronically to FluNet and FluID in a timely manner. The reports generated from the system support continuous influenza monitoring and evidence-based decision-making across the Americas.
Surveillance was improved due to new analyses that helped inform planning and capacity building. First, a regional landscape analysis of laboratory and surveillance capacities was completed. This identified laboratory and surveillance gaps and needs according to regional and international standards. Using this information, PAHO was able to better direct resources and tailor interventions across countries. Second, PAHO also conducted an analysis of genetic sequences from four countries. This informed a technical report for the Southern Hemisphere vaccine strain selection meeting in 2017, and made a valuable contribution towards better vaccine development.

PIP support also helped facilitate a range of other activities in the Americas, which have improved overall emergency preparedness. There are several examples of this including: better outbreak investigation and control due to RRT trainings; improved laboratory capacities that supported actions during the Zika outbreak in 2016–2017; and enhanced surveillance which has led to better data and reporting for other respiratory infections.

### Progress in key capacities for PIP priority countries in the Region (2014–2017)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory testing algorithm applied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance bulletins published</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional event-based surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluNet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional HAI coordination mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active ILI surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active PCR testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National RRTs trained yearly and ready for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SARI surveillance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of countries (N=8)

0 1 2 3 4 5 6 7 8

### Performance against indicators for all 35 countries in the Region (2017)

- **FluID** 49%: countries consistently shared epidemiological data through WHO FluID
- **FluNet** 74%: countries consistently shared influenza virological data through WHO FluNet
- **Virus sharing** 83%: countries routinely shared seasonal influenza viruses with GISRS
Plurinational State of Bolivia

POPULATION: 10,725,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $270K
NATIONAL INFLUENZA CENTRE: NO

Expanded SARI surveillance

Since 2014, the Plurinational State of Bolivia has established 10 sentinel SARI surveillance sites. This has advanced influenza monitoring and surveillance throughout the country, such as through better epidemiological information and improved identification of circulating viruses on an annual and seasonal basis. Importantly, SARI sentinel surveillance was incorporated into the national health system to facilitate long-term sustainability.

Enhanced capacities at the national reference laboratories

The national reference laboratories (NRLs) have undergone several capacity assessments and have increased their performance, including in the area of diagnostic capacities. This effort has improved capabilities to correctly detect influenza as well as other respiratory pathogens.

Preparedness for unusual disease events

The Plurinational State of Bolivia conducted workshops where primary care physicians were trained to address unusual respiratory events as they emerge. This work has built momentum, leading to increased interest in learning how to react to these respiratory disease events at both the national and local levels.
Chile

POPULATION: 17,948,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $690K
NATIONAL INFLUENZA CENTRE: YES

Strengthened laboratory capacities

Chile undertook a range of activities to enhance laboratory capacities, such as immunofluorescence training for respiratory viruses, and procurement of laboratory equipment and reagents. SARI, ILI and laboratory surveillance were better integrated, improving analysis capacities and facilitating epidemiological information sharing on a weekly basis.

On-the-ground support for surveillance sites and enhanced data

Surveillance officers from national, regional, and local levels visited SARI and ILI sites. During these visits, officers evaluated the quality and timeliness of surveillance activities as well as personnel skills. The visits raised awareness among sentinel site surveillance staff about good data management and analysis at a local level, which consequently improved surveillance capacities and data quality. These on-site visits also complemented other ongoing activities, such as implementing PAHOFlu at all SARI sites.

Improved virus sharing

In 2017, Chile shared 150 positive influenza samples with GISRS.

National meeting to review and update influenza surveillance practices

In November 2017, approximately 80 representatives working in the area of national surveillance gathered to discuss several topics, including subnational surveillance, experiences and lessons learned from respiratory disease outbreaks, and results of laboratory testing. Training was also conducted on WHO severity indicators and alert thresholds. This meeting helped Chile maintain up to date surveillance protocols and practices.

Health education materials used during the 2009 H1N1 pandemic. © WHO/Harold Ruiz
PAHOFlu enabled national information sharing

Costa Rica initiated the use of PAHOFlu which has helped streamline data collection and analysis, improve information sharing, and integrate national and epidemiological laboratory data. Importantly, PAHOFlu has facilitated communication and reporting between departments in the Costa Rican government. This improved national influenza surveillance.

Strengthened laboratory capacities

With support from PAHO, Costa Rica utilized PIP funds to strengthen national laboratory capacities. Training was provided in genetic sequencing and virus culture techniques. As a result, laboratory workers are now able to diagnose influenza, which will help the country to more rapidly identify the virus and respond at the time of a pandemic.

Sentinel influenza surveillance sites evaluated

WHO recommends that influenza surveillance systems be periodically evaluated to maximize performance and data quality. PIP funds supported a comprehensive evaluation of sentinel surveillance sites across the country. This identified issues to be addressed and resulted in an updated list of sentinel sites in Costa Rica.
Q&A with Delia Nais Castillo, Ministry of Health, Dominican Republic

What is your role in PIP implementation?
I am responsible for the surveillance of influenza and other respiratory viruses.

What are you especially proud of as a result of PIP implementation?
I am proud of having participated in updating surveillance procedure documents and adapting an instrument for the evaluation of SARI hospital surveillance. I feel that with this update, surveillance has been strengthened and formalized both in practice and at the institutional level.

What have been the broader benefits of PIP funds?
The biggest benefits of the PIP funds have been primarily in the areas of laboratory and epidemiological surveillance. In the laboratory area, the infrastructure of the national reference laboratory’s virology unit was improved and molecular biology techniques for the diagnosis of respiratory viruses were updated. In the area of epidemiology, two major benefits were the updating of SARI surveillance procedures and the adaptation and implementation of an evaluation instrument for hospital SARI surveillance.

What do you hope to do in the future to prepare for an influenza pandemic?
In 2017, I had the experience of leading the rapid response team to respond to three outbreaks of avian influenza in different parts of the country. This provided me with further evidence of the need to prioritize and strengthen human-animal surveillance in the country.

National priorities adjusted to include pandemic influenza preparedness
In recent years, the Dominican Republic has undergone significant changes within the MOH, including the creation of a National Health Service. During this transformation, PIP funds were leveraged to highlight influenza preparedness as a priority. As a result, the country has developed a single reference centre for influenza. While PIP funds previously supported routine monitoring visits to sentinel sites, this is now a part of the MOH’s operating budget. This is an important achievement as it furthers the sustainability of influenza preparedness in the country.

Improved diagnostic capacities
With the support of PIP funds, infrastructure at the virology unit in the NRL has improved. Specifically, new equipment was acquired and supplies were procured. Better infrastructure has enabled laboratory staff to gain new skills; for example, individuals responsible for diagnosing respiratory illnesses have been trained on molecular biology techniques thereby improving the laboratory’s capacity to detect an influenza virus.

SARI surveillance procedures updated and implemented
With PIP support, the country updated and standardized influenza surveillance case definitions, procedures and protocols. The Dominican Republic also adapted an instrument for the evaluation of SARI surveillance, which the MOH uses in its monitoring visits to sentinel sites.

Dominican Republic

POPULATION: 10,528,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $240K
NATIONAL INFLUENZA CENTRE: NO
Ecuador

**POPULATION:** 16,144,000  
**TOTAL PIP FUNDS SPENT IN COUNTRY:** $360K  
**NATIONAL INFLUENZA CENTRE:** YES

**Strengthened laboratories for SARI surveillance**

One of Ecuador’s major achievements was strengthening the SARI laboratory component of the influenza surveillance network. Supplies were purchased for the NIC, and PIP resources supported quality and performance evaluations of national laboratories. Strengthening laboratory capacities for surveillance has resulted in high-quality virological information being integrated with epidemiological surveillance data, and reports are now sent to FluNet via PAHOFlu.

**Enhanced capacities for intersectoral coordination and surveillance**

Personnel from the animal health and public health sectors participated in a training workshop that was supported by PIP funds. The workshop aimed to enhance capacities at the human-animal interface by creating the opportunity for national authorities to meet and build a solid foundation for human-animal interface policies, including those on intersectoral coordination and joint surveillance.

Haiti

**POPULATION:** 10,711,000  
**TOTAL PIP FUNDS SPENT IN COUNTRY:** $310K  
**NATIONAL INFLUENZA CENTRE:** NO

**Expanded epidemiologic surveillance**

Prior to HLIP I, Haiti had four sentinel surveillance sites in the country’s capital, Port au Prince. However, with increasing evidence of influenza in other parts of the country, epidemiological surveillance was implemented in two additional provinces. These new sites are functional and send samples to the National Laboratory, where they are tested. PIP funds also supported training for national authorities in SARI surveillance, and in the detection of unusual respiratory illness. These training sessions have helped maintain and enhance Haiti’s routine surveillance, and this will better prepare the country if pandemic influenza emerges.

**Moving towards NIC recognition**

Fulfilling the terms of reference to become a WHO-recognized NIC is a considerable investment. In Haiti, laboratory personnel were trained on biosafety and molecular diagnostic techniques. PIP funds also helped to provide reagents and other supplies. Increased capacities are evident due to the growing number of samples tested. As a result of this work, the National Laboratory has begun the process for NIC recognition, and is committed to continue strengthening capacities to achieve this goal.
Nicaragua

**POPULATION:** 6,082,000

**TOTAL PIP FUNDS SPENT IN COUNTRY:** $620K

**NATIONAL INFLUENZA CENTRE:** YES

---

**Better capacity to diagnose influenza**

PIP funds have helped to improve diagnostic capacities at the NRL and sentinel sites. This was achieved by increasing the number of sites across the country that can conduct PCR analysis, acquiring new equipment and supplies, and training staff. Additionally, a new sentinel unit was established in the north of the country, comprised of two SARI sites and one ILI site. Furthermore, infrastructure at another sentinel site was improved by adding a laboratory for immunofluorescence that enables the diagnosis of influenza and other respiratory viruses. These achievements have improved laboratory surveillance, and increased national capacities to correctly diagnose influenza, which is needed to detect seasonal and pandemic viruses.

**Enhanced outbreak response**

Capacities for responding to influenza events or unusual disease events have improved as a result of better communication and collaboration between human and animal sectors. Notably, the human surveillance sector has begun to participate actively in animal sector outbreak response drills. The country’s decision-makers have also become more involved in risk communication for national and international outbreaks, which improves outbreak awareness, preparedness and response.

**Influenza data reporting capacity established**

With support from the Regional Office, Nicaragua has developed a template for more timely and consistent reporting of influenza surveillance data. This is a highly useful resource to consistently report data, and to inform national and regional situational analyses and risk assessments. All sentinel sites are also now developing weekly influenza reports.
**Suriname**

**POPULATION:** 543,000  
**TOTAL PIP FUNDS SPENT IN COUNTRY:** $380K  
**NATIONAL INFLUENZA CENTRE:** NO

---

**Enhanced virological surveillance**

Several activities have improved virological surveillance in Suriname. Laboratory staff were trained on virus isolation, infectious sample shipping, and real-time PCR (RT-PCR). As a result, Suriname has sent its first shipment of samples to the WHO CC at US CDC, and consistently reported to FluID and FluNet since 2015. Three hospitals were designated as SARI sites, and ILI was reintroduced at an outpatient clinic. Staff training on SARI and ILI surveillance improved awareness, detection, and investigation of unusual respiratory events. Finally, a team from PAHO evaluated two of the SARI sentinel hospitals, and provided recommendations and technical support to strengthen quality of case identification, data collection and reporting. Together these accomplishments improved virological surveillance and have increased country capacities to detect, monitor, and respond to influenza.

> I believe that establishing partnerships and increasing the awareness among stakeholders, are the most important cornerstones on which to build pandemic influenza preparedness. PIP has done this exactly. I hope to not only support Suriname but also other countries in the future with the experience that I have gained during these three years.

---

**Response teams trained for influenza outbreaks**

A five-day training course for RRTs brought together sixty-three participants from different geographical areas, disciplines and sectors. This was also the first time that the regional IHR, Emergency Operations Centre, and influenza teams came together. These groups shared their experiences and helped strengthen the RRTs to prepare for, respond to, and recover from, an acute health event. The training focused on unusual respiratory events, and included a two-day simulation on pandemic influenza. The workshop was evaluated with a pre- and post-knowledge questionnaire, and the result indicated a 40% increase in knowledge.

---

“With PIP funds, we achieved considerable laboratory strengthening as several persons were trained in biosafety, shipping of biological substances, virus isolation and more. This resulted in improved biosafety procedures in the laboratory, the presence of an IATA certified shipper, and expanded laboratory diagnostic techniques.”

---

**Robert Mohamed,**  
Medical Doctor,  
PAHO-Suriname Country Office

**Malti Adhin,**  
Head of the Molecular Laboratory,  
Institute for Biomedical Sciences,  
AdeK Universiteit van Suriname
Specimen collection from a patient. © WHO/Harold Ruiz
Eastern Mediterranean Region

**PIP FUNDS USED FOR REGIONAL CAPACITY BUILDING: $2.7M**

**PIP FUNDS USED IN PRIORITY COUNTRIES: $4.6M**

**TOTAL PIP FUNDS SPENT ACROSS THE REGION: $7.3M**

The Regional Office for the Eastern Mediterranean supported countries to improve pandemic influenza preparedness through regional and global collaboration. One of the most notable achievements was the commitment of Member States to enhance epidemiological and virological influenza surveillance. Six PIP priority countries in the Eastern Mediterranean have successfully established and sustained an extensive network for SARI and ILI surveillance, and improved their influenza diagnostic capacities. This progress is evidenced by five NICs from PIP priority countries that have performed and achieved a 100% score on the latest EQAP. As a result of the stronger surveillance capacities, the number of shipments and influenza isolates shared with WHO CCs increased. This has meant that PIP priority countries are actively contributing to the global vaccine virus selection process and are informing better seasonal vaccine composition. Countries/areas in the region have also improved their surveillance; 19 out of 22 countries/areas have functioning influenza surveillance systems, and some countries/areas are establishing baseline and epidemic thresholds.

Having disease trends and thresholds enables use of surveillance data for evidence-based disease control measures.

Another success was improved data management and sharing which was achieved through developing and maintaining the Eastern Mediterranean Flu Network (EMFLU). This is a web-based regional platform for countries/areas to share epidemiological and virological influenza data. EMFLU also links with the country and the global platforms FluNet and FluID. Currently, 14 countries/areas in the region including six PIP priority countries are using EMFLU for data entry, management, and sharing. As a result, countries/areas have rapid access to analyses on influenza trends, geographical distribution, intensity and impact. The analyses enable countries/areas to advocate for continued influenza surveillance and better pandemic influenza preparedness policies.

Capacity building for influenza preparedness has also advanced IHR core capacities to directly improve monitoring and response for high-threat pathogens.
For example, all PIP priority countries improved their ability to diagnose circulating influenza strains, and in this process improved laboratory surveillance for other IHR notifiable diseases like Middle East Respiratory Syndrome coronavirus (MERS-CoV). RRTs have also been trained to investigate and respond to potential epidemics of emerging and re-emerging infectious diseases.

Moreover, the expanded influenza surveillance system in PIP priority countries has indirectly helped the national and regional collaboration among public health professionals in human, animal, and environmental health sectors through increased information sharing, which enhances preparedness for influenza and other outbreak-prone diseases.

### Progress in key capacities for PIP priority countries in the Region (2014–2017)*

<table>
<thead>
<tr>
<th>Capacity</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory testing algorithm applied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance bulletins published</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional event-based surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluNet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional HAI coordination mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active ILI surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active PCR testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National RRTs trained yearly and ready for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SARI surveillance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Indicator data for six PIP priority countries are as of 2017 and one (Djibouti) is as of 2015.

### Performance against indicators for all 21 countries in the Region (2017)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FluID</td>
<td>14%</td>
</tr>
<tr>
<td>FluNet</td>
<td>52%</td>
</tr>
<tr>
<td>Virus sharing</td>
<td>57%</td>
</tr>
</tbody>
</table>

countries consistently shared epidemiological data through WHO FluID

countries consistently shared influenza virological data through WHO FluNet

countries routinely shared seasonal influenza viruses with GISRS
Sharing information to strengthen GISRS – the EMARIS Network meeting

The 4th meeting of the Eastern Mediterranean Acute Respiratory Infection Surveillance (EMARIS) Network was held in combination with the first scientific conference on acute respiratory infections (ARIs) in the Eastern Mediterranean region. This was held in Jordan in December 2017.

The EMARIS meeting allowed NICs, WHO CCs, and other network institutions to review progress made in surveillance and response capacities for seasonal and pandemic influenza. The meeting covered progress and challenges in influenza surveillance, action points to overcome challenges, and ways to improve collaboration between countries largely for pandemic influenza preparedness.

The scientific conference brought together 150 young scientists, health researchers, and public health professionals from 20 countries, to present their latest research findings on ARIs, influenza surveillance, laboratory detection, and collaboration at the human-animal interface. Thirty-eight abstracts were presented, and will be published in a special issue of *The Journal of Infection and Public Health*.

Q&A with Amal Barakat, WHO Regional Office for the Eastern Mediterranean

**What is your role in PIP implementation at WHO?**

I work closely with the NICs and other influenza laboratories throughout the region to expand their testing strategies for influenza and other respiratory viruses. This includes providing technical guidance, mentoring, training and follow-up to EQAP. I also support NICs in virus shipment, specimen collection, and transportation.

**What are you specifically proud of as a result of PIP implementation?**

The functionality of 16 NICs and three influenza laboratories in the region, including six NICs in PIP countries. NICs in the priority countries are able to perform RT-PCR, influenza virus isolation, antigenic characterization, and detection of novel viruses. For example, Afghanistan, Morocco, Jordan and Egypt NICs can perform RT-PCR and cell culture in-house, and Morocco and Egypt NICs can additionally perform sequencing. The results speak for themselves - EQAP performance for from all NICs in the region improved from 80% to 100% score.

**How did you advocate for improved influenza pandemic preparedness?**

Surveillance remains the critical source of information for proper public health planning including pandemic preparedness. Improving the functionality of NICs will help them play a frontline role in the response to the pandemic or other public health emergencies.
Afghanistan

**POPULATION:** 32,527,000

**TOTAL PIP FUNDS SPENT IN COUNTRY:** $1.2M

**NATIONAL INFLUENZA CENTRE:** YES

---

**Influenza surveillance established**

Nine ILI and SARI sentinel or surveillance sites were established across all regions of Afghanistan. Site staff were trained in case identification, data collection, and specimen handling and shipment. The surveillance sites now also serve as the platform for other respiratory disease surveillance including RSV. Together with strengthened laboratory diagnostic capacities, Afghanistan is now sharing virological and epidemiological data on the regional (EMFLU) and global surveillance data platforms (FluNet and FluID).

**Restored involvement in GISRS**

After a five-year hiatus for several activities at the NIC due to country conflict, laboratory capacities are being re-established. Currently the NIC is capable of detecting and diagnosing all circulating influenza viruses including novel viruses. SOPs for quality control and good laboratory practices were developed, and capacities for cell-culture and virus isolation were built. The channel for shipping influenza isolates to the WHO CC at US CDC has also been re-established. NIC achievements enriched the quality and volume of data available for national decision-makers, including on antiviral susceptibility. This also increased the availability of viruses for GISRS to inform twice-yearly vaccine strain selection.

**RRTs established across the country**

With the help of PIP funds, over 130 individuals were trained for RRTs, which are now available in all of Afghanistan’s 34 provinces. These RRTs function as outbreak investigation and response teams for influenza, as well as for other outbreak-prone diseases.

---

**“Despite complex challenges and ongoing chronic conflict in the country, Afghanistan has been able to achieve most of its objectives for implementation of the PIP Framework.”**

Mohammad Hafiz Rasooly, National Influenza Surveillance Coordinator, Ministry of Public Health, Afghanistan

---

National Influenza Centre staff performing virus isolation procedure, Afghanistan. © WHO/Prasanna Yergolkar

Pandemic and epidemic preparedness and response training for rapid response teams, Afghanistan. © WHO/Mohammad Nadir Sahak
Regional knowledge sharing enhanced national surveillance

Djibouti received support from the WHO Regional Office for the Eastern Mediterranean and technical experts from Morocco to improve their surveillance system. In 2014, Moroccan experts visited Djibouti to help assess the influenza surveillance capacities. This led to several accomplishments. An action plan was generated, national commitment to influenza increased, and SARI surveillance was initiated. This progress led to a greater number of sentinel surveillance sites, with three added in 2014 and four added in 2015. Finally, staff at the National Institute of Public Health were trained on influenza data management, analysis, and interpretation. These investments improved the representativeness of influenza surveillance and the capacity for feedback, monitoring and risk assessment.

Improved laboratory skills and networking

Several trainings and investments improved laboratory skills. Staff were trained on detecting influenza and other respiratory viruses using RT-PCR, virus sequencing and hemagglutination inhibition assay. Djibouti was able to send samples for analysis to the NIC in Morocco, which then facilitated sharing of the isolates with WHO CCs for further testing and consideration in vaccine strain selection. Thanks to regional collaboration, Djibouti was able to share specimens with GISRS.
Egypt

POPULATION: 91,508,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $940K
NATIONAL INFLUENZA CENTRE: YES

**Improved sustainable influenza preparedness**

PIP funds helped to mobilize strong commitment within the Egyptian Ministry of Health and Population. Activities to strengthen influenza surveillance and pandemic preparedness included organizing 30 training workshops for health care workers, holding meetings with key stakeholders to update the national pandemic influenza preparedness plan, and conducting seven training sessions for surveillance officers and five for local surveillance staff on new surveillance methodologies. Designated staff for epidemiological surveillance at the district and governorate levels were also trained on outbreak investigation and disease control. EBS was established in 2015, which is a testimonial to the capacity building success and the broader impact of pandemic influenza preparedness for strengthening IHR core capacities.

**A One Health approach promoted across the country**

Animal and human health sectors were brought together to identify unusual influenza events and take joint action. A platform – ‘Four Way Linking’ – that connects animal and human health data and risk assessment was applied, ultimately increasing intersectoral coordination. This was also enhanced through quarterly meetings between sectors. As a country that experiences sporadic avian influenza events, these efforts will continue to support authorities in effective programming for challenges at the human-animal interface.

**Enhanced analyses to support decision-making**

Egypt adopted a number of WHO-recommended methods for influenza surveillance data analysis. A key success was that statistical methods were applied to assess seasonal influenza severity, specifically epidemic and intensity thresholds. This will enable Egypt to assess severity according to WHO protocols during a future pandemic.
Jordan

POPULATION: 10,154,934
TOTAL PIP FUNDS SPENT IN COUNTRY: $790K
NATIONAL INFLUENZA CENTRE: YES

Enhanced coordination at the HAI
A collaborative technical committee of human and animal health professionals was established to enhance zoonotic disease surveillance, data sharing, and joint response. PIP funds helped to catalyze the One Health approach in Jordan, by providing resources for the development of a One Health Framework linking disease control and prevention at the human-animal interface.

EBS established to improve detection and monitoring capacities
EBS for ARI was established to improve detection of influenza viruses with pandemic potential and other outbreak-prone diseases. This included establishing EBS procedures and electronic reporting tools, as well as training to increase knowledge and implementation of EBS in all hospitals. EBS will increase the sensitivity of the surveillance system to provide early warning and consequently rapid response to any acute respiratory infection that is potentially a threat to the population.

Pandemic influenza preparedness and response integrated with national emergency plans
Jordan has faced a number of emergency response priorities including a huge number of refugee populations and their pressing health needs. In the face of such challenges, Jordan updated its Pandemic Preparedness and Response Plan, and integrated this within the Jordan Emergency Operation Plan. This ties influenza planning to other emergency management frameworks. The key benefit of this approach is that expectations and potential actions between all levels of government are better aligned – from municipal, to governorate, to national. In the event of an emergency, including an influenza pandemic, the country is better prepared to direct government resources for a coordinated response.

“Jordan is one of the PIP priority countries in the region with the capacity to detect, monitor and share novel influenza viruses.”

Nader Sheikh Ali,
Surveillance Officer,
WHO Country Office, Jordan

Ghazi Kayali,
Chief Executive Officer of Human Link,
consultant on OneHealth

Regional and country implementation
Lebanon

POPULATION: 5,851,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $690K
NATIONAL INFLUENZA CENTRE: YES

Improved SARI surveillance and sustainability

Lebanon established sentinel SARI surveillance in 2014. An expert group was convened to advise on scientific aspects of SARI surveillance. The process led to a surveillance protocol and the selection of the two pilot sentinel sites. Training was provided on data collection, reporting and basic data analysis at the pilot sites. With this demonstrated proof-of-concept and the MOH’s desire to estimate influenza disease burden, sentinel surveillance expanded to include 11 sentinel sites in the six districts of Lebanon. Over time, reliance on PIP funds reduced as Memoranda of Understanding were developed between the Ministry of Public Health (MoPH) and each sentinel site to incorporate SARI surveillance into routine MoPH functions. The MoPH also incorporated costs for training and specimen transportation from sentinel sites to the NIC into its own budget. This steady approach towards building the surveillance system, along with strategic planning, will enhance surveillance sustainability for years to come.

A successful response to an outbreak of avian influenza

Influenza response plans were tested, and found to be highly effective, after avian influenza was detected at a chicken farm.

On 20 April 2016, a farm in the Beqaa region reported mass chicken deaths with symptoms resembling avian influenza. Specimens were tested and avian influenza A(H5N1) virus was confirmed. Within 24 hours, the outbreak response plan was activated. Thousands of birds were culled and disposed, and samples were taken from the region and across the country. A total of 185 exposed persons were identified: 180 received prophylaxis; 181 were monitored daily; and 41 suspected symptomatic cases were reported. With PIP support, all of the specimens collected were tested at the NIC using PCR, and were found to be negative. This efficient effort resolved the outbreak within six weeks. Findings and lessons learnt were published in a peer-reviewed journal.

Q&A with Mona Al Buaini, National Influenza Centre, Lebanon

What is your role in PIP implementation?
I am responsible for assuring quality in the detection of influenza viruses and to improve capacities to detect, monitor and share influenza viruses.

What are you especially proud of as a result of PIP implementation?
A number of achievements: virus sharing with WHO CCs, weekly reporting to FluNet, strong bonds between the SARI surveillance focal points and the NIC team, and advancing NIC capacities from simple PCR techniques to advanced laboratory-based surveillance including virus cell-culture and sequencing.

What have been the broader benefits of PIP funds?
The NIC team’s capacities have increased as a result of training in techniques such as culture, sequencing, biosafety measures, and use of infection prevention for better laboratory practice.

Mona Al Buaini, Director, National Influenza Centre, Lebanon
Morocco

**POPULATION:** 34,378,000

**TOTAL PIP FUNDS SPENT IN COUNTRY:** $590K

**NATIONAL INFLUENZA CENTRE:** YES

---

**RRTs prepared to respond**

PIP support has strengthened Morocco’s RRTs with 21 teams trained, including three national, 12 regional, and six provincial RRTs. These are multi-disciplinary teams that consist of the head of the Prefectural/Provincial Epidemiology Unit, a laboratory technician, a doctor, an environmental health technician, and a communications officer. This contributes to Morocco’s goal of establishing 96 RRTs to cover the whole country.

**Enhanced disease surveillance to detect and monitor influenza**

In 2014, integrated ILI and SARI virological and epidemiological sentinel surveillance was established. Quality surveillance activities at Morocco’s eight sentinel sites were supported through the regular organization of progress review meetings, capacity building sessions on influenza surveillance (including establishing epidemic thresholds), and laboratory training to facilitate diagnostics and biosafety. The eight sites benefited from improved communication across the laboratory network as well as improved outbreak preparedness. Protocols for event-based SARI surveillance, including coordination between the human and animal health sectors, were developed to build bridges between stakeholders involved in preparedness.

“The broader benefit of PIP has been strengthened capacity for detection of emerging viruses that can constitute a public health emergency at the national and regional level, as well as the establishment of a network of laboratories that will coordinate actions in case of a pandemic or public health emergency.”

Fatima El Falaki, Scientist, National Institute of Hygiene, Ministry of Health, Morocco

---

Rapid response team training organized by the Ministry of Health, in collaboration with the National School of Public Health and WHO, Morocco. © WHO

Meeting on influenza procedures among surveillance officers, clinicians and administrators from three sentinel sites, Morocco. © WHO
Yemen

POPULATION: 26,832,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $290K
NATIONAL INFLUENZA CENTRE: NO

Enhanced influenza surveillance despite adversity
With a complex emergency and disrupted healthcare services, preparedness is key to supporting vulnerable populations. Yemen established four SARI and ILI sentinel sites that are distributed geographically. These sites are part of Yemen’s early warning system (eDEWS). eDEWS collates surveillance data on 31 outbreak-prone diseases from 1,982 healthcare sites, and it relies on mobile cellular reporting to maximize the speed and efficiency of data collection, analysis, and public health response to disease events. Influenza and ARI data from the four sentinel sites feed into the eDEWS weekly surveillance bulletin to facilitate national monitoring and to help protect Yemen’s population from spreading influenza outbreaks and respiratory infections.

Influenza laboratory services boosted
The central public health laboratory continued to test for influenza as a result of the supplies, equipment and training provided using PIP funds. Staff were trained in PCR, virus culture, and laboratory biosafety. This has enabled the laboratory to provide the necessary diagnostic support when events were identified through eDEWS, as well as to inform regional and global situational analyses on influenza transmission.

Rapid response capacity maintained for respiratory disease events
PIP funds supported trainings for Yemen’s national RRT and SARI/ILI focal points on SARI/ILI case management and infection control measures. The funds were additionally used to train local healthcare workers and 115 RRT members on early detection, recognition and response to respiratory disease outbreaks. The country also established a multisectoral coordination mechanism involving community leaders to address disease events including at the human-animal interface. These measures advance Yemen’s pandemic influenza preparedness, and will also serve the country for other outbreak-prone diseases.
The WHO Regional Office for Europe used PIP funds to advance country laboratory and surveillance capacities in four complementary areas: laboratory, surveillance, outbreak investigation, and clinical management.

The Regional Office mentored and provided peer-support to both PIP priority countries and non-PIP countries to improve several laboratory capacities. Training courses were organized regionally and in collaboration with WHO CC London, and focused on areas such as influenza virological techniques and laboratory quality management. In 2017 alone, regional trainings were held for 23 specialists from 14 NICs to expand their knowledge on virus isolation and antigenic characterization, 25 laboratory specialists achieved certification as infectious substances shippers after attending WHO’s ISST, and eight specialists from four NICs attended one to two week courses at the WHO CC that were tailored to their specific needs. From 2014 to 2017, more than 300 laboratory specialists in the region were trained through 36 trainings, and more than 100 national experts were certified as infectious substances shippers. Additionally, new virus isolation capacities were introduced in two PIP priority countries (Armenia and Turkmenistan).

Notable progress was achieved in the area of influenza surveillance. During the 2016–2017 influenza season, 48 of the 50 countries in the Region that are performing influenza surveillance consistently reported epidemiological and virological data to the regional influenza surveillance platform (The European Surveillance System, or TESSy) as well as global influenza surveillance platforms (FluNet and FluID). Based on surveillance data submitted to TESSy, the joint influenza update, Flu News Europe, from the WHO Regional Office for Europe and European Centre for Disease Prevention and Control (ECDC) was published on a weekly basis.

Increased virus sharing
Since 2014, seven additional countries shared viruses with GISRS, bringing the total to 46 European countries sharing influenza viruses in 2017.
basis in English and Russian throughout the influenza season. Coordinated influenza surveillance between animal and health sectors also improved in PIP priority countries through a series of national intersectoral meetings. This gave countries a forum to share updates on the epidemiological situation, address any challenges and solutions, and engage multiple surveillance stakeholders.

Five PIP priority countries in the Region enhanced clinical management and outbreak investigation through guideline development and training. The Regional Office supported PIP priority countries to develop and roll-out national guidelines on outbreak investigation and response and SARI clinical management. More than 100 members of RRTs were trained in outbreak investigation and response, and over 200 adult and paediatric intensivists received clinical management training. These capacities are vital for investigating and controlling outbreaks of influenza viruses with pandemic potential.

The guidelines developed in each country are also applicable to the investigation and response for other infectious disease outbreaks, which has advanced IHR core capacities in these countries. Sustainability of these capacities is being built by integrating the training curricula into post-graduate education courses.

### Progress in key capacities for PIP priority countries in the Region (2014–2017)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory testing algorithm applied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance bulletins published</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional event-based surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluNet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional HAI coordination mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active ILI surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active PCR testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National RRTs trained yearly and ready for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SARI surveillance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Performance against indicators for all 53 countries in the Region (2017)

- **FluID**: 87% - countries consistently shared epidemiological data through WHO FluID
- **FluNet**: 91% - countries consistently shared influenza virological data through WHO FluNet
- **Virus sharing**: 89% - countries routinely shared seasonal influenza viruses with GISRS
Joint WHO Regional Office for Europe and ECDC Influenza Surveillance Meetings

With partial support from PIP funds, two joint WHO Regional Office for Europe and ECDC influenza surveillance meetings were held in 2014 and 2016. These convened national experts and key stakeholders from 53 Member States, including national focal points for influenza surveillance, and representatives from WHO CCs. Regional project teams, such as the European Influenza Monitoring of Vaccine Effectiveness (I-MOVE), the Vaccine European New Integrated Collaboration Effort (VENICE), and the European Monitoring of Excess Mortality for Public Health Action (EuroMoMo) attended this meeting, as did international partners including US CDC.

The meetings facilitated the coordination of influenza surveillance activities in the Region, and provided a platform for discussing technical and operational issues for influenza surveillance, seasonal influenza vaccination, risk assessment, and outbreak response. These meetings provided an excellent opportunity to maintain and strengthen contributions to the Flu News Europe bulletin. They also strengthened pandemic preparedness by encouraging collaboration and information-sharing among influenza network members in Europe and beyond.
Armenia

POPULATION: 3,018,854
TOTAL PIP FUNDS SPENT IN COUNTRY: $700K
NATIONAL INFLUENZA CENTRE: NO

Improved surveillance highlighted by the weekly bulletin

Armenia now has a sentinel influenza surveillance system that supports weekly data collection and reporting. Activities that led to this well-functioning surveillance system included: an evaluation of existing surveillance, the introduction of pilot sentinel surveillance sites, the development of an electronic data management system designed specifically for ARI and influenza surveillance, and training staff on data collection and analysis. Notably, these activities were initially funded by PIP and are now partly financed by the state. Using the improved influenza sentinel surveillance system, national experts can automatically generate an ARI/influenza bulletin on a weekly basis, which informs decision-making among health authorities.

National Virology Laboratory worked towards WHO NIC recognition

Substantial work was done to strengthen the National Virology Laboratory in Armenia. Several trainings were conducted, including on shipment of infectious substances, laboratory quality management, PCR testing, virus isolation (a brand new capacity for the laboratory), biosafety, and biosecurity. After these trainings, the Regional Office visited the laboratory in 2017 to conduct an on-site assessment. The Regional Office found that the National Virology Laboratory satisfied the requirements for a WHO NIC, and recommended that the laboratory be recognized as a NIC by WHO.

“Laboratory practices of the National Virology Laboratory have substantially improved. This sets high standards for other laboratories, and other laboratories of our National Reference Laboratory will become motivated to receive international accreditations.”

Liana Torosyan, Head of Department of Epidemiology of Especially Dangerous and Airborne Diseases, National Centre of Disease Control and Prevention, Ministry of Health, Armenia
Kyrgyzstan

POPULATION: 5,940,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $490K
NATIONAL INFLUENZA CENTRE: YES

National electronic influenza surveillance system developed

A new national electronic system for influenza surveillance was developed and implemented; it provides automated data updates on respiratory infections from hospitals, which has facilitated accurate and reliable data reporting and analysis. Additionally, health workers and epidemiologists were trained in data collection, analysis, and reporting, and can utilize this system. This has been a big step forward in advancing national surveillance in Kyrgyzstan.

Enhanced NIC laboratory skills

Several activities strengthened laboratory capacities and ensured that the NIC remained highly functioning. First, there was an assessment of the laboratory service capacity. Second, technical support was provided by laboratory specialists from other European countries. Third, laboratory SOPs were developed for PCR, quality control and biosafety. Fourth, a manual was developed on the collection and transportation of specimens from sentinel surveillance sites to the NIC. Finally, courses were conducted on PCR, transport of infectious materials, molecular methods, and virus isolation and characterization. These activities greatly improved laboratory skillsets, and ensure that the NIC contributes to national surveillance and GISRS.

Outbreak investigation and response capacities enhanced

With support from PIP funds, a National Guideline on Outbreak and Investigation Responses of Communicable Diseases was developed, and included training modules for infectious disease outbreak response. A three-day training for implementing the guidelines was conducted for national staff. It included training of national trainers who will conduct training at sub-national levels in the coming year.
Tajikistan

POPULATION: 8,742,800
TOTAL PIP FUNDS SPENT IN COUNTRY: $780K
NATIONAL INFLUENZA CENTRE: NO

Influenza surveillance established and viruses shared

In 2014, Tajikistan had no operational influenza surveillance system. With the support of PIP funds, sentinel surveillance was established for both ILI and SARI. This included developing two ILI/SARI sites, improving laboratory staff surveillance capacities, and establishing a new national influenza data management system. A WHO mission to Tajikistan in 2017 found that influenza surveillance is operational, and that professionals including doctors, epidemiologists, laboratory and monitoring specialists are actively engaged. Furthermore, the system has become more sustainable, with integration of PIP activities into the State Sanitary and Epidemiological Surveillance Service. Overall, this is a substantial development for Tajikistan that advanced in-country preparedness.

Weekly influenza data published

National electronic data reporting was developed. Both virological and epidemiological data are now reported weekly and data are published in a national influenza bulletin. Data are also shared with WHO and published in Flu News Europe. These achievements are a result of continued support through PIP in the area of data management and bulletin development.

Enhanced outbreak response capacities

The outbreak response capacities in Tajikistan were strengthened with support from PIP funds through the development of the National Guideline on Outbreak and Investigation Responses of Communicable Diseases. This was coupled with extensive training of national RRTs, who will also cascade the training further to regional and local levels. In total, more than 50 national and regional experts were trained, and the national core trainers successfully held their first sub-national training. Enhanced capacities in Tajikistan strengthen not only pandemic preparedness but also the ability to respond to any infectious disease outbreak, thereby improving national IHR core capacities.

“When PC fund implementation in Tajikistan began, the country had no influenza operational surveillance capacity. PIP funds have helped establish operational and functional sentinel surveillance for influenza. Through daily technical support and work with PIP focal points, all involved specialists are advocating for improvements of the influenza pandemic preparedness in the country.”

Abdulakhad Safarov, PIP National Professional Officer, WHO Country Office, Tajikistan

Laboratory staff processing influenza specimens, Tajikistan.
© WHO/Hamidov Zafarjon
Turkmenistan

POPULATION: 5,374,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $720K
NATIONAL INFLUENZA CENTRE: NO

Laboratory capacities improved through SOP development and training

Laboratory SOPs were developed and implemented in Turkmenistan. Laboratory specialists were trained in virus isolation and cell culture (a new capacity in Turkmenistan), and the national influenza laboratory subsequently and successfully implemented these skills. As an illustration of achievements supported by PIP funds, for three years in a row Turkmenistan has achieved 100% correct results in the EQAP on influenza virus detection using PCR. Furthermore, PIP initially supported the purchase of laboratory supplies and test kits, but in a move towards sustainability the government now supports most procurement.

New electronic system for improved surveillance

Turkmenistan used PIP funds to introduce and sustain a national electronic data management system in October 2016. This system facilitates surveillance activities, and was made possible by the purchase of supporting technology such as computers, printers, and servers. PIP funds further supported a follow-up mission with international experts, and user feedback was incorporated which led to system improvements. This electronic system improves surveillance data quality and allows for a weekly bulletin to be developed and distributed.

“With the support of PIP funds, an electronic program on epidemiological surveillance of influenza and ARI was introduced, which facilitated and automated the process of collecting and analysing data on influenza and ARI at all levels (national, regional, peripheral). The project was piloted in 2016, and since, positive feedback was received from specialists using it. In a short period of time for implementation, significant and impressive results have been achieved.”

Gurbangul Ovliyagulova, Head of High Dangerous Diseases Department, Ministry of Health, Turkmenistan

Monthly bulletin development process, Turkmenistan.
© WHO/Ayjeren Myratdurdyyeva

Specialists meeting with sentinel surveillance site staff, Turkmenistan.
© WHO/Ayjeren Myratdurdyyeva
Guidance developed for clinical management

Uzbekistan developed the National Guidance on Treatment of Patients in Critical Conditions due to Influenza, which provides guidance for managing severe forms of respiratory illness and will be included in the training curriculum for post-graduate medical education. Trainings based on these guidelines were also conducted. See the story ‘Sustainable influenza clinical management in low-resource settings’ on p6 for more on this accomplishment.

Influenza surveillance enhanced

A considerable number of activities were conducted from 2014–2017 that improved Uzbekistan’s surveillance capacities. Notably, the national sentinel surveillance guidelines were revised to enhance the quantity and quality of data collected. Uzbekistan is contributing to regional and global influenza surveillance by submitting data to TESSy, which has enabled data analysis and dissemination through Flu News Europe.

Supplies and training strengthened laboratory capabilities and capacities

PIP funds helped procure laboratory supplies for specimen collection, storage, and transportation. Additional procurement support helped build capacities for molecular identification of influenza viruses, cell culture, virus isolation, and hemagglutination inhibition testing. By having the supplies to function and expand capacities, this support helped sustain Uzbekistan’s national influenza laboratories. In addition to procurement, PIP funds supported key training for laboratory personnel and infectious substances shippers. In 2016 and 2017, Uzbekistan had 100% correct results in EQAP, confirming the value of capacity building efforts.
South-East Asia Region

PIP FUNDS USED FOR REGIONAL CAPACITY BUILDING: $1.5M

PIP FUNDS USED IN PRIORITY COUNTRIES: $5.1M

TOTAL PIP FUNDS SPENT ACROSS THE REGION: $6.6M

PIP has supported efforts across the South-East Asia Region to strengthen influenza surveillance in all PIP priority countries. PIP funds were used in synergy with other resources and donor investments to focus on countries with limited capacities. As a result, infrastructure has been improved and human resource capacity has increased through trainings and mentoring support.

This has led to successes such as newly established surveillance systems, increased laboratory capabilities, consistent seasonal influenza virus sharing by most countries in the Region, as well as improved capacities for data management and reporting. Currently, all countries in the Region report virological data to FluNet, which assists in developing situational analyses and risk assessments.

Countries in the South-East Asia Region took several measures to improve planning and coordination for outbreak response. A One Health approach was used by many countries to advance national pandemic planning and enhance coordination between human and animal sectors. All PIP priority countries conducted RRT trainings to improve the quality and timeliness of outbreak response. In some countries, these capacities were operationalized when avian influenza outbreaks occurred. Capacities that had been developed proved effective with well-facilitated response and control measures. Together, regional and national efforts have enhanced pandemic influenza preparedness, as well as IHR core capacities for detecting and responding to all public health emergencies.
Progress in key capacities for **PIP priority** countries in the Region (2014–2017)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory testing algorithm applied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance bulletins published</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional event-based surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluNet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional HAI coordination mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active ILI surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active PCR testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National RRTs trained yearly and ready for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SARI surveillance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of countries (N=6)

Performance against indicators for **all 11 countries** in the Region (2017)

- **FluID**: 36% countries consistently shared epidemiological data through WHO FluID
- **FluNet**: 82% countries consistently shared influenza virological data through WHO FluNet
- **Virus sharing**: 82% countries routinely shared seasonal influenza viruses with GISRS
Upgraded laboratory capacities and virus sharing

Laboratories in Bangladesh gained capacities for sequencing as well as virus isolation. There were also investments for new equipment. Over 72 medical technologists were trained on laboratory techniques, including safe sample collection, handling, and transport. These efforts have increased the ability for laboratories in Bangladesh to diagnose influenza, and to share samples in-country and globally with GISRS through WHO CCs.

Improved outbreak response

There was substantial work that enhanced RRTs, including training for over 250 people. This has led to better detection and response for not only influenza, but also other diseases such as dengue fever and chikungunya. Infection control procedures also improved, such as through the correct use of personal protective equipment (PPEs), which is critical to protect health workers in any infectious disease outbreak. These investments will help Bangladesh respond to influenza outbreaks as well as other outbreak-prone diseases, in a manner that is safe and effective.
Improved laboratory capabilities

PIP funds are the fourth largest source of external support to the Democratic People’s Republic of Korea’s MOH, and the impact on laboratory capabilities has been substantial. To facilitate laboratory-based influenza surveillance, training was provided in diagnostic techniques including virus isolation. PIP funds helped to improve laboratory infrastructure and equipment, and to supply reagents and consumables. This has enabled the NIC to conduct regular influenza testing and reporting, and to share information globally through WHO FluNet.

Operationalized laboratory surveillance

The Democratic People’s Republic of Korea has a network of 42 sentinel sites in their surveillance system. Before investments in laboratory and sentinel site capacities, the surveillance system was primarily based on clinical data alone. However, several achievements have facilitated the country to shift to a laboratory-based system, which provides more pathogen-specific information that integrates with existing epidemiological data. For example, the WHO influenza surveillance standards were incorporated into national guidance, sentinel site staff were trained in specimen collection and handling, and equipment was provided for data management and analysis. These changes have improved the quality and availability of influenza surveillance data, as well as data for other outbreak-prone diseases.

Outbreak response capacities built and tested

PIP funds were used to establish and maintain RRTs in the Democratic People’s Republic of Korea. While these have been built to respond to influenza, RRTs are also able to investigate and respond to other respiratory infections. The impact of this support was evident in recent events. During seasonal rains resulting in floods, ARIs were monitored as part of the emergency response. Thirty RRTs were mobilized to conduct surveillance and to report on disease activity to inform any necessary control measures. These teams were effectively able to monitor respiratory infections while navigating an emergency flooding situation. This work showed that these teams are successfully integrated into the broader emergency preparedness context, and are ready to respond to influenza, ARIs or other diseases such as measles, polio and rubella.
Preparedness plans tested through simulation

Steps have been taken in Indonesia to improve pandemic influenza and emergency planning. First, Indonesia adopted WHO’s Pandemic Influenza Risk Management (PIRM) approach by linking the national influenza pandemic preparedness plan to the country’s broader disaster management plan. Second, provincial plans were also developed in four provinces, by adapting the national plan to local contexts. These plans have since been tested. In September 2017, a full-scale influenza pandemic exercise was conducted using a whole-of-society approach to risk management. This involved 800 participants from 100 organizations at all levels; local to national. The hypothetical scenario was the spillover of avian influenza from wild bird to domestic poultry, then to humans, which finally evolved to cause human-to-human transmission. Capacities tested included: animal health detection and response, command and coordination, resource mobilization including access to emergency funds, medical response, surveillance (including at live bird markets), pharmaceutical interventions, and non-pharmaceutical interventions including risk communications. This was a massive initiative, and over 500 national and international observers gained valuable insight from this simulation to further improve and update preparedness plans.

Sustainable surveillance established

As the world’s fourth most populous nation, Indonesia has an extensive and functional influenza surveillance network comprising 27 ILI sentinel sites, six SARI sentinel sites, six regional laboratories, and a NIC. With PIP support, capacities were developed within this network. This included training for sentinel site staff on influenza surveillance, case identification, sample collection and shipment, data reporting, and data analysis. Laboratory staff were trained in Good Laboratory Practices and Laboratory Quality Management Systems, which are global standards for assuring quality operations. Influenza surveillance review meetings and site monitoring were also conducted to share information and ensure good practices were maintained. This work has helped increase staff competencies to collect and test samples, and communicate results to stakeholders. While PIP assisted in catalyzing surveillance, it is now sustained by the MOH. This demonstrates national commitment for influenza surveillance into the future.

Q&A with Christina Widaningrum, Ministry of Health, Indonesia

What is your role in PIP implementation?

My role is to implement the national programme for preparedness and response for acute respiratory infections, including influenza surveillance and influenza pandemic preparedness. PIP is supporting the national programme for pandemic influenza preparedness and influenza surveillance.

What are you especially proud of as a result of PIP implementation?

The contingency planning funded by PIP has mapped the multi-sector resources for supporting preparedness and response to pandemic influenza.

What have been the broader benefits of PIP funds?

The 6 C’s; improved communication, coordination, collaboration, cooperation, contribution, and commitment for pandemic preparedness.
**Myanmar**

**POPULATION: 52,885,000**

**TOTAL PIP FUNDS SPENT IN COUNTRY: $440K**

**NATIONAL INFLUENZA CENTRE: YES**

---

**Enhanced detection and monitoring in sentinel surveillance**

PIP support contributed to six new SARI and ILI sentinel surveillance sites, bringing the total in Myanmar to eight. Surveillance also improved due to several additional accomplishments including better laboratory capacities such as for specimen collection and transportation, new surveillance guidelines, new national biosafety and biosecurity guidelines, and increased staff competencies to manage data and share viruses with WHO CCs. These developments have improved Myanmar’s timely detection and effective monitoring of influenza viruses.

“By strengthening influenza surveillance and response in context of overall public health emergency management, Myanmar can prevent, detect and respond to all public health events.”

— Nyan Win Myint, Deputy Director, Central Epidemiology Unit, Department of Public Health, Myanmar

---

**Laboratory capacities enabled successful outbreak identification**

Myanmar has integrated their laboratory and epidemiological surveillance capacities. As a result, Myanmar has improved early detection for SARI and ILI, developed standard practices for specimen collection and transportation, and procured essential reagents and equipment for timely diagnosis. These capacities have since come together for a successful response. From July to September 2017, Myanmar reported an increase in seasonal influenza activity raising concerns of an outbreak. Due to the previous capacity building work, the NIC was able to correctly identify the subtype and report the findings to stakeholders including WHO. This informed appropriate response measures, and showed the effectiveness of virus detection and identification in Myanmar.

---

**Better intersectoral preparedness for health emergencies**

PIP funds supported Myanmar to develop a One Health strategic plan. This plan brings together different sectors to monitor trends on zoonotic influenza and other diseases. Building collaboration between sectors has facilitated work outside influenza, including for antimicrobial resistance (AMR) surveillance. Additionally in 2017, Myanmar underwent a Joint External Evaluation (JEE) of its IHR core capacities, which provided additional direction and support for intersectoral collaboration and joint planning for all health emergencies.
Improved clinical management capacities

Nepal made significant strides to improve clinical management for SARI. Approximately 35 clinicians across Nepal were trained on clinical management, and additional trainings took place with nurses and public health professionals. The bulk of the clinical training was related to triage, infection control, and surge capacity procedures. However, there were also additional efforts to integrate clinical management into the hospital emergency preparedness and response procedures, which will be critical if a future influenza pandemic occurs.

Enhanced surveillance and laboratory systems

PIP funds supported Nepal to establish SARI and ILI surveillance sites. Sentinel site staff were trained in data collection and safe handling of specimens.

Virus isolation capacities were established, and a cadre of staff were certified as shippers to send influenza specimens to WHO CCs. In 2017, a thorough review of the surveillance and laboratory system helped Nepal to consider the next steps to improve surveillance, which includes a need for improved data analyses and better information sharing through surveillance bulletins. These are future directions to continuously enhance national preparedness.

One Health operationalized

Working with WHO and the Food and Agriculture Organization of the United Nations (FAO), Nepal used a One Health approach, and initiated joint training of veterinary and human health professionals in field epidemiology. Results from two pilot trainings showed that the bonds between the two sectors were strengthened for influenza preparedness, as well as other intersectoral priorities such as AMR surveillance.
**Influenza surveillance established for the first time**

PIP funds have transformed influenza surveillance in Timor-Leste. Following independence in 2002, much of the country’s health infrastructure was in poor shape. In 2014, the first SARI surveillance sites were established. Since 2015, PIP funds supported training of health staff on laboratory techniques and SARI surveillance processes. Currently, there is a network of eight functional sites, including five ILI sites and three SARI sites. Influenza surveillance data are now regularly collected and specimens are tested for influenza.

**Participation in global surveillance**

The progress made in recent years to build surveillance and laboratory capacities has catalyzed national momentum for influenza preparedness. In November 2017, as a result of the influenza surveillance capacities established, Timor-Leste commenced reporting of virological data to FluNet. With this achievement, Timor-Leste has joined global surveillance efforts.

**Intersectoral planning and RRTs for emergencies**

Timor-Leste developed an all-hazards health emergency preparedness and response plan that includes pandemic influenza. The plan triggered improved coordination and joint training among relevant sectors, and 30 professionals were trained for intersectoral RRTs. To improve outbreak detection, municipal level staff were provided with basic epidemiological skills. All of these activities have strengthened and coordinated outbreak surveillance and response capacities, not just for influenza, but also for other outbreak-prone diseases.
Surveillance systems in the Western Pacific Region were enhanced to support better public health decisions. To improve information sharing, the Region launched an online influenza dashboard in 2017. The dashboard is publically accessible, updated weekly, and linked directly to global surveillance systems. This dashboard captures public health events from a variety of sources, and has led to risk assessments that better link influenza surveillance findings with public health action. The Regional Office has worked with Member States to promote more regular and timely sharing of influenza viruses. Through active follow-up of zoonotic influenza cases and reporting of influenza events in line with the IHR (2005), national focal points have improved the timeliness of IHR (2005) notifications, which are central for fast and effective risk assessment and decision-making. These capacities are critical in the Western Pacific Region, where there is high-risk for influenza viruses with pandemic potential.

Laboratory capacities improved through several training workshops supported by GISRS, which focused on skills such as PCR testing, sequencing, bioinformatics, virus isolation, data management and analysis, and biosafety. These skills have also strengthened GISRS by improving the number, quality, and frequency of virus samples shared.

Enhancing these laboratory capacities is in line with the Asia Pacific Strategy for Emerging Diseases (APSED, 2010), a regional framework for building generic preparedness capacities for emerging disease threats. Combining the work to improve pandemic influenza preparedness with directions set by APSED assures that capacity building in the Region is strategic to meet high-priority needs for influenza, and other health emergencies.

**Eqap as a model**

The WHO EQAP for the detection of influenza viruses by PCR was used as a model for a new external quality assessment (EQA) for arboviruses in the Region. This began with dengue virus in 2013 and was expanded in 2016 to a global EQA that includes Chikungunya, Zika and yellow fever viruses. EQAP is one example of how influenza preparedness has served as a model for other disease programmes without the additional investment of PIP funds.
A regional EBS system was established, which captures and synthesizes information about potential outbreaks from multiple sources to optimize sensitivity, specificity, and timeliness of detection.

In 2017, the regional EBS system detected 269 influenza related events. Of these, 121 were related to animal infection with avian influenza, 88 were related to human infection with avian influenza, 13 of which were reported in IVTM, and 60 were related to seasonal influenza. Pulling on multiple data sources, the system facilitates robust risk assessment to inform timely decision-making and public health action.

### EBS system in action

The Regional Office conducted a pandemic risk assessment for A(H7N9) virus in China. Information was synthesized from numerous sources: national surveillance data, IHR notifications, WHO CC laboratory findings, clinical data, disease trends in animal populations from FAO and OIE, live bird trade industry data, and scientific literature. In light of this information, the Regional Office was able to assess the pandemic likelihood and potential impact of the virus within contextual vulnerabilities, and determined there had been no significant change in transmissibility and the fatality rate. These findings were consolidated and guided WHO recommendations to support national and global preparedness measures.

### Progress in key capacities for PIP priority countries in the Region (2014–2017)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory testing algorithm applied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveillance bulletins published</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional event-based surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent reporting to FluNet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional HAI coordination mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active ILI surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active PCR testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National RRTs trained yearly and ready for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SARI surveillance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of countries (N=5)

### Performance against indicators for all 27 countries in the Region (2017)

- **FluID**: 63% countries consistently shared epidemiological data through WHO FluID
- **FluNet**: 52% countries consistently shared influenza virological data through WHO FluNet
- **Virus sharing**: 56% countries routinely shared seasonal influenza viruses with GISRS
Cambodia

POPULATION: 15,578,000
TOTAL PIP FUNDS SPENT IN COUNTRY: $1.9M
NATIONAL INFLUENZA CENTRE: YES

Strengthened intersectoral coordination for controlling avian influenza outbreaks

As part of improving avian influenza detection and response, Cambodia conducted a tabletop exercise in 2017. This brought together animal and human health professionals at hospital, district, provincial, and national levels. The exercise refreshed detection and response skills for RRTs, and strengthened intersectoral awareness and coordination for events at the human-animal interface.

See the story on p17 for a more details on Cambodia’s improved preparedness and response.

Enhanced SARI sentinel surveillance

Cambodia’s SARI surveillance system has eight sentinel sites dispersed geographically throughout the country. Through training, supervisory visits and coordination between sentinel sites, laboratories, and public health units, the quality and timeliness of surveillance data have greatly improved. From 2014 to 2017, Cambodia has increased their detection and virus characterization on a yearly basis. This system now provides critical information on seasonality, influenza disease burden, and viruses circulating in the country. Decision-makers can use this up-to-date information for better decisions and policy development.
Preparedness capacities tested

In January 2017, Fiji’s Ministry of Health and Medical Services (MOHMS) collaborated with WHO to hold a two-day tabletop simulation (PanStop) to assess government capacities to detect, assess, and respond to an influenza pandemic. This simulation brought together over ten agencies from health, agriculture, foreign affairs, police and military, in order to focus on multisectoral collaboration. It allowed the agencies to work together to identify strengths that could be leveraged for pandemic preparedness, and identified areas for future improvement.

Training conducted for stronger outbreak investigation and response

Between July and August 2015, multiple three-day workshops were held in several regions across Fiji. The workshops supported members of local outbreak response teams to develop practical skills in outbreak investigation, documentation, and reporting. Moreover, in November 2017, MOHMS facilitated a four-day multidisciplinary training to enhance skills in communication, surveillance, epidemiology, laboratory principles, and outbreak response. These trainings have improved national knowledge and preparedness for influenza, and led to recommendations for the next steps to develop surveillance and response measures in Fiji.

Enhanced NIC capacities assist participation in GISRS

With WHO CC support, Fiji’s NIC gained capacities for cell culture and virus isolation. WHO CC staff helped the NIC to develop plans to improve laboratory workflow, and to identify the reagents, supplies, and equipment needed to enhance laboratory capabilities. PIP funds were used to purchase a RT-PCR machine and a -80°C freezer for specimen storage. In 2015 and 2017, NIC staff were trained and certified as infectious substances shippers, which sustained Fiji’s capacities to share influenza viruses with WHO CCs. These investments improved national laboratory preparedness in Fiji and increased its participation in GISRS.
Successful intersectoral outbreak response

The Lao People’s Democratic Republic (PDR) has demonstrated an increase in the country’s capacity to respond to potential avian influenza outbreaks. In 2017 alone, six highly pathogenic avian influenza outbreaks were investigated in poultry using a multi-disciplinary approach, and no human cases were detected. Two avian influenza simulation exercises were also conducted with approximately 100 participants from the animal and human sectors.

Strengthened data sharing

Over the past five years, the Lao People’s Democratic Republic strengthened its laboratory and surveillance capacities, including for SARI/ILI surveillance, EBS, laboratory diagnostic techniques, and RRTs. This has enabled the Lao People’s Democratic Republic to improve the quality of surveillance data and to share results globally since 2016. In 2017, an integrated influenza bulletin was developed and published on a weekly basis and distributed widely. As a result, country data are now more available both nationally and globally.

As a result of PIP implementation, I am particularly proud of strengthening influenza surveillance capacity at the country level by increasing community and clinician awareness, training multi-disciplinary RRTs, and improving laboratory capacity. This improved country capacity strengthens regional preparedness not only for influenza but other emerging infectious diseases.”

Bouaphanh Khamphaphongphane,
Chief of Epidemiology Unit, National Centre for Laboratory & Epidemiology, Ministry of Health, Lao People’s Democratic Republic

Activating new national response plans

In October 2016, the national Department of Livestock and Fisheries (DLF) notified the national Department of Communicable Diseases Control (DCDC) of a H5N1-positive poultry flock in Luang Prabang. This activated the Joint National Preparedness and Contingency Plan for Avian Influenza, which was operationalized for the first time. The next day a joint investigation team was deployed that, in line with the plan, consisted of representatives from DLF, DCDC, the National Centre for Laboratory and Epidemiology, WHO, FAO, as well as field epidemiology trainees. Poultry flocks in affected farms were culled, and enhanced surveillance for human infection was carried out in the affected villages for two weeks. During this period, 10 ILI cases were identified, but after testing it was confirmed that none were positive for influenza. This was a multidisciplinary approach that controlled an outbreak, which had the potential to become far more dangerous.
**Mongolia**

**POPULATION:** 2,969,000  
**TOTAL PIP FUNDS SPENT IN COUNTRY:** $1.2M  
**NATIONAL INFLUENZA CENTRE:** YES

---

### New regional virology labs established

During the 2009 pandemic, the NIC in Mongolia was overwhelmed by 200 to 300 samples that were being received daily. To prevent overburdening the NIC in the future, PIP funds were used to strengthen local surveillance and detection capacities. Regional virology labs were established in four provinces, and staff were trained to identify new and emerging diseases. Now, with four fully operational laboratories, the network across the country can monitor circulating influenza viruses at a national and local level, while simultaneously reducing the workload of the NIC.

### Disease detectives trained

Public health officers who have managed outbreak and emergency response know the time pressures involved. Large amounts of raw data arrive from different sources and are often unorganized. Supported by PIP, Mongolia’s Field Epidemiology Training Program (MFETP) is helping national and provincial epidemiologists, laboratory staff, clinicians and researchers to learn new analytical skills and to apply innovative software in data analysis. In 2016, MFETP introduced its trainees to ‘EpiInfo™7’, which is a free software used worldwide for outbreak data management and analysis. In 2017, as part of their leadership training, a three-day workshop was held in Ulaanbaatar to help 16 public health practitioners to improve their skills in coordination, communication, and visualization. MFETP is an investment in future public health leaders, including those who will be at the forefront of preparedness and response for pandemic influenza.

---

### Coordinated pandemic preparedness and response with an updated legal framework

In 2015, the Mongolian MOH led a multisectoral assessment of surveillance and response. It was concluded that among sectors, there was no formal coordination mechanism for event and information sharing or risk assessment. The lack of a formalized procedure could prevent an efficient response. As a result, legal frameworks were substantially adjusted to align with the IHR (2005), including a new regulation to ensure information exchange between sectors, which should facilitate rapid response during a public health emergency. More specifically for influenza, EBS was expanded beyond the human health sector to include emergency management and veterinary sectors. As a result, MOH decision-makers are now able to use multiple sources of data/information including clinical and laboratory data, wild bird surveillance findings, and information from the media to supplement data received from ILI and SARI sentinel sites. A dashboard was developed to provide real-time data on outbreaks and emergencies, and data are available for decision-making within two hours of event verification.

---

> The capacity of sub-national virology laboratory staff has been strengthened significantly in the last 4 years. Practical refresher trainings for the provincial laboratory that were started with PIP funds have become a routine activity.

**Human resource capacity is vital for pandemic preparedness – the capacity is not all about sophisticated equipment, you need the system and people to make changes.**

---

Badarch Darmaa,  
Head of NIC Mongolia, National Centre for Communicable Diseases, Mongolia
**Viet Nam**

**POPULATION:** 93,448,000
**TOTAL PIP FUNDS SPENT IN COUNTRY:** $1M
**NATIONAL INFLUENZA CENTRE:** YES

**Enhanced virus isolation**

The greatest impact on pandemic preparedness in Viet Nam as a result of the PIP funds has been strengthening the laboratory system. While several capacities were improved, including specimen collection and transportation and implementation of modern diagnostic techniques, one of the most notable achievements was advanced virus characterization at NICs. Before 2014, there were challenges with identifying and subtyping influenza. Since then, several training sessions were held for laboratory staff to learn virus isolation, identification, and characterization skills. NICs have also increased their capacities for virus isolation and genome analysis for subtype identification, due to bioinformatics trainings. Viet Nam has since identified the country’s first human case of A(H3N2)v, a type of swine influenza, in the north of the country. The impact of investments have been clear; at the National Institute of Hygiene and Epidemiology (NIHE), there was an increase in the rate of influenza isolation from 61% in 2014 to 77% in 2017.

**SARI surveillance in border provinces established**

With neighboring countries detecting cases of avian influenza, sentinel SARI surveillance sites were established in border provinces. PIP support has helped improve an extensive amount of health worker capacities, including: case identification; information sharing; data reporting; sample collection, storage, and transportation; laboratory testing; case investigation; and response. Staff can now appropriately respond to SARI cases, including suspected cases of avian influenza.

**Clinical management training incorporated into higher education curricula**

As a leading hospital in Viet Nam, the National Hospital for Tropical Disease (NHTD) was tasked to strengthen the clinical management practices for ARIs in the national network of hospitals from 2014 to 2017. With the support of PIP, NHTD worked with international leading experts on SARI clinical management to train 300 healthcare staff from almost all 63 provincial hospitals, as well as a few district hospitals across the country. The training curricula was certified by the MOH as continuing medical education, and it has now become an official function of NHTD to train hospitals in SARI case management. This process has embedded SARI clinical management in medical training, sustaining continued professional development of medical personnel in Viet Nam.

"What’s next? We need to strengthen the capacity for district hospitals in responding to pandemic influenza, as they are the first line of defense. Training should also emphasize collaboration between clinical and public health spheres in reporting and responding to potential influenza outbreaks, and improving knowledge on infection prevention and control to stop outbreaks in healthcare settings.”

Nguyen Van Kinh, Deputy Director, National Hospital for Tropical Diseases, Viet Nam