Field Epidemiology & Laboratory Training Program (FELTP) Pakistan, June 2015 *(with updated figures Nov 2016)*

Executive Summary

The government of Pakistan established the Field Epidemiology and Laboratory Training Program (FELTP) in 2006 to address documented needs to: develop human resources in field epidemiology and response, establish disease surveillance and outbreak response units, develop a legal framework for disease reporting, and create a functioning public health laboratory network. Since then 88 field epidemiologists have graduated from the FELTP and 74 are currently enrolled. They are distributed throughout Pakistan. Outbreak response became more frequent and more timely through the activities of the FELTP. These outbreaks included responses to potentially pandemic diseases such as H5N1 avian influenza and MERS to relatively rare but fatal infections such as primary amoebic meningeal encephalitis to common but widespread problems such as waterborne disease and measles, and responses to natural disasters. The FELTP has partnered with all 4 Pakistani provinces and the federal government to develop disease surveillance and response units (DRSU). The DRSU are now becoming the principal surveillance points in Pakistan. FELTP fellows are now posted in these DRSU for their field training. The FELTP began building a public health network through 5 Sentinel surveillance sites for acute viral hepatitis, in collaboration with the Pakistan NIH. Pakistan Army and the National Agriculture Research Center (NARC) are also working with FELTP to have more encompassing trainings of field epidemiology for all concerned in Pakistan. Working with NARC is also allowing improved capacity to detect zoonotic diseases quickly. Among other impacts of the FELTP is the coverage of districts at high risk for polio through NSTOP which grew from 16 districts in 2011 to 52 districts in 2016. In these and other areas of importance in surveillance and epidemiologic response, the FELTP has made important improvements from 2007 until 2016.

Long Course: Regular 2 years FELTP, Short Course: Days to 4 weeks trainings

Title:
FETP Pakistan graduates Dr. Furqan and Dr. Muhammad Bilal Khan try to collect another water sample from a second source of community drinking water in the Punjab province in Pakistan 2013

FELTP at a Glance (updated by Nov 2016)

9 Cohorts (164 Field Epidemiologists):

- 88 graduates from the two year training program (6 cohorts)
- 76 fellows currently enrolled in three cohorts (7^{th} – 9^{th} cohort)
- 30 Fellows will join in Dec 2016 (10^{th} cohort)
- Over 1500+ government officials trained through short courses

NSTOP (National Stop Transmission of Polio):

2011: 16 FELTP trainees were deployed to 16 high-risk districts for polio as N-STOP officers in a new program designed by FELTP with partner's collaborations

2016: 65 NSTOP officers (deployed to 52 high-risk districts/areas and 8 to provincial EOCs). NSTOP remains one of the only government owned program within the Global Polio Eradication Initiative

Sentinel Surveillance for Viral Hepatitis (A, B, C, D, E):

In response to the request of Prime Minsters Hepatitis Control Program, the FELTP established 5 sentinel surveillance sites-one in each province and one in Islamabad to identify risk factors for all types of viral hepatitis with a laboratory component. Monthly reports are being shared regularly with all hepatitis control programs in Pakistan.

One Health:

To strengthen zoonotic disease surveillance system and enhance collaboration with human and animal health sector a cooperative agreement was done with the National Agriculture Research Center (NARC). Ten veterinarians are currently enrolled in the FELTP

Honors:

2016: Pakistan wins CDC Director annual FETP award for "Excellence in Outbreak investigation and Response" among 70 countries with FETPs

150 Abstracts in International Peer Reviewed Scientific Conferences

- EIS conferences (7)
  - 6 consecutive years of acceptance
- TEPHINET Global conference (**26) Two global prizes**

Program Timeline

2003: Federal Ministry of Health requested CDC to initiate FELTP in Pakistan

2006: FELTP launched in Pakistan

2007: National Steering Committee (NSC) of FELTP notified with Federal Secretary Health as chairman and all Director Generals of health (federal and provincial), provincial secretaries of health and other stakeholders as members

Pakistan FELTP launched first training

2009: Acute Viral Hepatitis surveillance launched

2011: NSTOP launched

2013: Veterinarian joined 2 years FELTP program

2014: Pakistan FELTP training is recognized as approved training in field epidemiology by Pakistan Army. Pakistan Army doctors joined 2 years FELTP program

Disease Surveillance and Response Units (DSRU) started being established at provincial DG Health offices (8 at this moment)

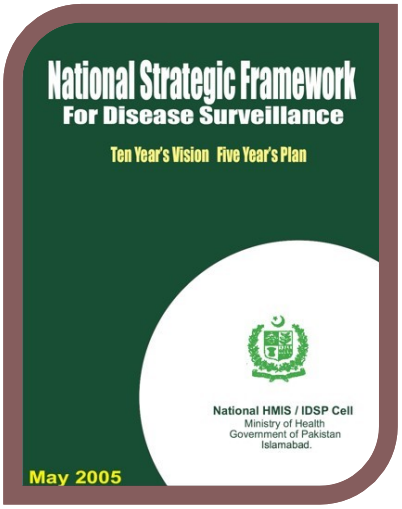
2016: NSC allowed Dental Surgeons working in public health to join 2 year program

National Strategic Framework for Disease Surveillance – Establishing Need

In 2005, a report from the Pakistan Ministry of Health (MOH) and international partners detailed a National Strategic Framework for Disease Surveillance. This report identified major gaps in Pakistan disease surveillance system:

- Fragmented surveillance systems
- Inaccurate data reporting
- Minimal cross-collaboration between vertically oriented disease surveillance systems managed by disease specific public health programs
- No mechanism of response to outbreaks
- Dependency on external financing
- Little planning for sustainability

Following were some of major recommendations from the National Strategic Framework for Disease Surveillance:



- Develop human resources in Field Epidemiology & Response through a structured program
- Establish a disease surveillance and outbreak response unit at each administrative level
- Develop a legal framework/legislation for disease reporting
- Create a functioning Public Health Laboratory Network

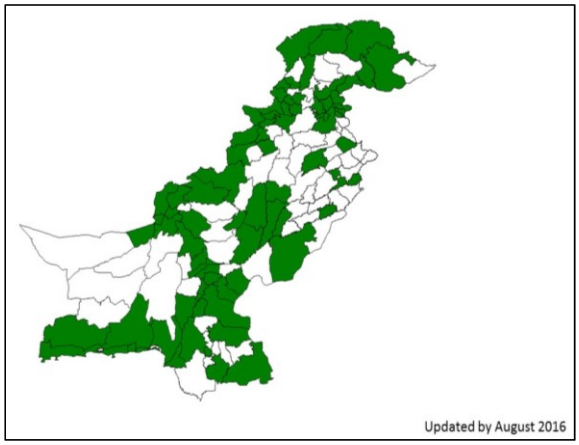
The report below primarily describes the actions and related impacts of the Pakistan FELTP in addressing the recommendations of the National Strategic Framework for Disease Surveillance. It also includes additional impact and accomplishments of the Pakistan FELTP.

5th cohort certificate distribution ceremony, Dec 2014 (left to right) Dr. Kamaluddin Soomro, Dr. Rana Jawad Asghar, FELTP/CDC Resident Advisor, Major General Asif Sukhera (Deputy Surgeon General Pakistan Army), Honorable State Minister for Health Madam Saira Afzal Tarar, Dr. Elias Durry, Senior WHO advisor on Polio Eradication, and Dr. Anna McCrerey, USAID Deputy Director Health

Impact of the FELTP in developing human resources in Field Epidemiology and Response

Direct impact of FELTP

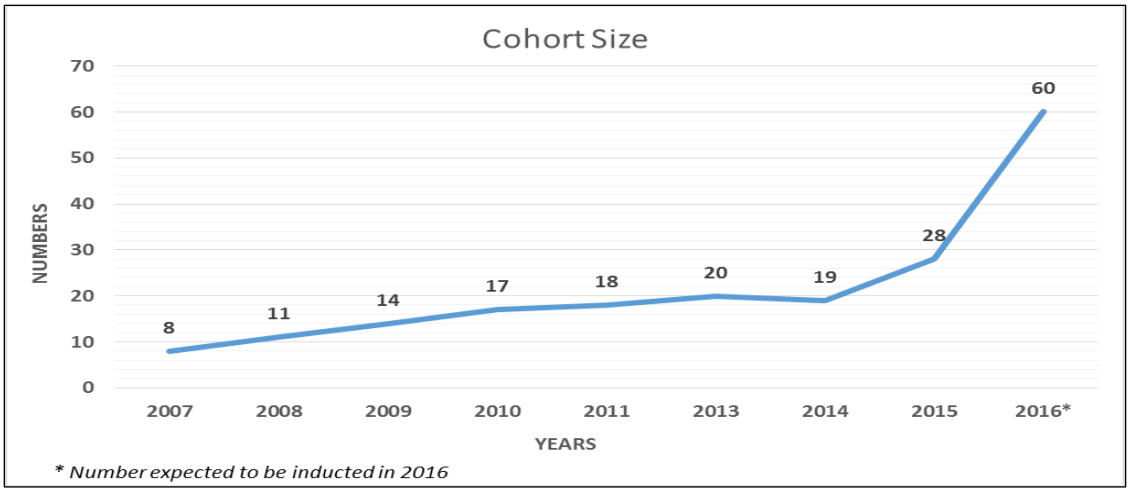
In 2006, the Pakistan FELTP was established at the request of Government of Pakistan (GOP) to address the gaps identified by the National Strategic Framework for Disease Surveillance. A key short-term goal of the program was the development of cadre of strong field epidemiologists who would support and integrate the fragmented surveillance systems in Pakistan and provide effective and timely responses to public health events.



The longer term goal of the program has been to strengthen disease surveillance systems through the development of disease surveillance and outbreak response units at the national and provincial levels.

To date, 9 cohorts have been inducted from all provinces in Pakistan, producing 106 field epidemiologists who are working at the provincial and district levels.

- 88 graduates from the two year training program (6 cohorts)
- 74 fellows currently enrolled in two cohorts (7-9th Cohort)
- 30 new fellows will join the FELTP as the 10 Cohort in fall 2016



Additional short course training

At the request of federal and provincial governments around 1,500 government officials have been trained through short courses in disease surveillance, outbreak response, bio safety, laboratory quality systems

Impact: Improved and timely outbreak response capacity

Increased number and importance of responses

In 2007 the first FELTP cohort was inducted. FELTP fellows worked on the Human Avian Influenza Outbreak as GOP officials. This was also the first FELTP assisted in an outbreak investigation.

Since then, FELTP fellows, who are regular employees of Provincial Departments of Health (DoH) and the Federal Government, have investigated more than 150 outbreaks mostly with the GOP's own resources

- *H1N1 Pandemic 2009:*
  - *Development of an Action Plan for pandemic preparedness led by a FELTP fellow*
  - *Ministries of Information and Religious Affairs were involved to protect pilgrims visiting KSA*
- *Middle East Respiratory Syndrome Corona Virus (MERS-CoV) 2012*
  - *Immediate contact investigation in Pakistan of the MERS-CoV case detected in UK with travel history to Pakistan by two fellows of FELTP*
- *Ebola suspect patients 2015*

FELTP Fellows investigated 6 suspect Ebola patients in three provinces

SOME OUTBREAKS INVESTIGATED BY THE FELTP

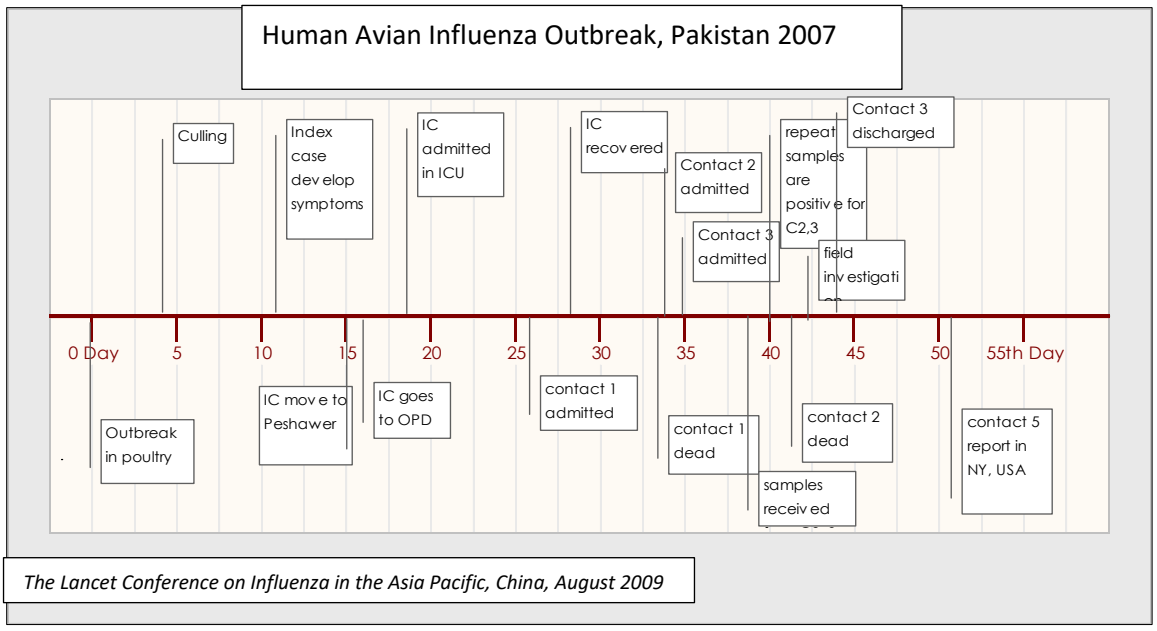
- Acute watery Diarrhea
- Measles
- CCHF
- Dengue
- Hepatitis
- Malaria
- Pertusis
- Pneumonia
- Polio
- Rubella
- Leishmaniasis
- Conjunctivitis
- Typhoid
- HIV

Reduction of time from outbreak reporting to outbreak response

Early detection of an outbreak saves lives, protects the community, and contains an outbreak to a small geographic area. Forty outbreak investigations conducted by FELTP Fellows were analyzed to estimate the delay from outbreak start to its detection and public health action. The FELTP had markedly quicker response times than international averages. Previously there were no reported data in Pakistan on outbreak response times.

Time line	**Outbreaks by FELTP Fellows** *(Pervaiz, A, et al.)*	**Global Scenario** *(Chan, E. H, et al.)*
Median time difference between estimated outbreak start dates to outbreak discovery	8 days	23 days
Median time difference between estimated outbreak start dates to earliest date of a public communication	11 days	32 days

**Pervaiz, A, et al. Capacity of Infectious Disease Outbreaks Detection in Pakistan: 2003-2013, for an Innovations in Surveillance – National Baseline mini grant: TEPHINET and the Skoll Global Threats fund (unpublished)*
**Chan, E. H, et al. (2010). Global capacity for emerging infectious disease detection. Proceedings of the National Academy of Sciences of the United States of America, 107(50), 21701-21706*



43 DAYS TO START FIELD INVESTIGATION AND DISEASE CONTROL ON THE GROUND IN PESHAWAR 2007
50 DAYS (7 DAYS MORE) FOR ONE SUSPECTED CONTACT TO BE ADMITED IN A NEW YORK HOSPITAL

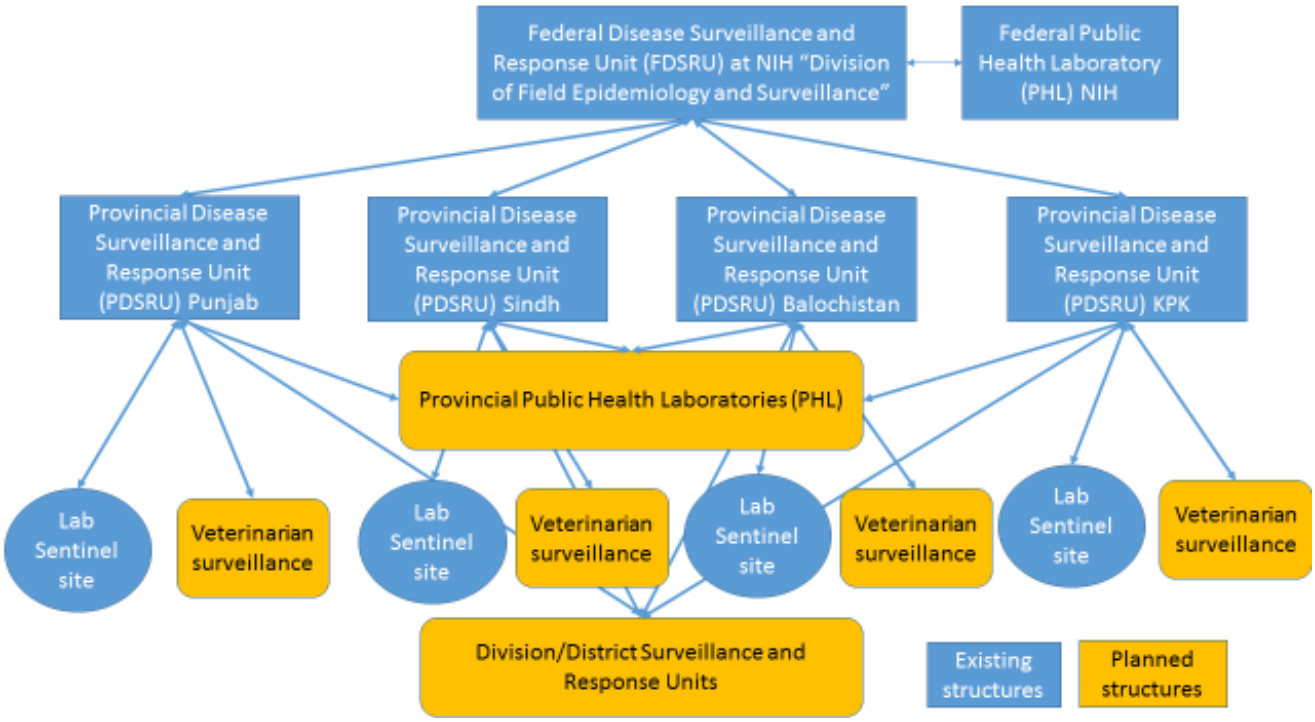
Impact toward a Sustainable Disease Surveillance and Response Capacity

FELTP establishes disease surveillance and response units

The FELTP Pakistan worked with the Federal Ministry and Provincial Departments of Health to develop a sustainable surveillance system with complete ownership of the GOP. This system is centered on Federal and Provincial Disease Surveillance and Outbreak Response Units (DSRU). These units are present in all four provinces and one in the federal capital. FELTP fellows work in DRSUs as part of their training. The DSRU has the mandate for disease surveillance and outbreak response in its respective provinces.

With GOP endorsement and leadership the FELTP will expand the DRSU system to other high risk districts/divisions. Sentinel laboratory sites (until provincial public health laboratories are established) in each province are now being linked to the DSRU. Additionally, the FELTP is working with the GOP to link a veterinary surveillance system to the DSRU.

A Sustainable National Disease Surveillance System at each administrative level



Disease Surveillance and Response Units (DSRUs) in Action

DSRUs are a new setup, however in less than a year of operation, they are engaged in some major public health response activities.

Activity (ongoing or recently concluded)	Number of cases	Initial findings	Recommendations/Action initiated
SINDH			
Outbreak investigation of *Candida auris* in a major hospital	19	First outbreak in Pakistan	Review of the infection control practices
Outbreak investigation of *Naegleria fowleri*	28	CFR* 100%, one pumping station responsible	Chlorination at the water pumping station reduced new cases significantly
Increased number of measles cases	22	64% cases unvaccinated	Immediate vaccinations campaigns initiated
PUNJAB			
Food-borne outbreak was investigated at a religious ceremony	121	Dessert was most probable cause	Inspection of all caterers for assessment of hygiene practices initiated
MDR-TB Risk Factor Analysis	45	43 had previous TB treatments	Risk factor analysis in progress
Infection control practices evaluated in health facilities in three districts of Punjab	73 facilities inspected	Under way	
Flood relief activities	Four districts		Vector control activities and training of health staff (45) on communicable disease surveillance in post flood scenario

Case Fatality Rate

BALOCHISTAN			
Investigation of CCHF Fever outbreak	13 cases (6 deaths)		Awareness campaigns Initiated
Investigation of Measles outbreak	65 cases (5 deaths)	Low immunization coverage	Enhanced vaccination activities with health education initiated
VPD surveillance data analysis (2014-2015)	821 measles, 29 pertussis, 09 NNT	Under way	
KHYBER PAKHTUNKHWA			
Outbreak investigation of measles underway	09	Active case finding ongoing	

CDC Director video conferencing with Balochistan Provincial DSRU team while visiting Federal DSRU in Islamabad 2015

Impact: Building a Public Health Laboratory Network

Sentinel Surveillance for Viral Hepatitis (A, B, C, D, E):

In response to the request of Prime Minsters Hepatitis Control Program, the FELTP established 5 sentinel surveillance sites-one in each province and one in Islamabad to identify risk factors for all types of viral hepatitis with a laboratory component. This Acute Viral Hepatitis surveillance system working is the first within the EMRO region. Monthly reports are being shared regularly with all hepatitis control programs in Pakistan to assist in developing effective hepatitis control strategies in the country.

FELTP also assisted and facilitated in the formation of the first Technical Advisory Group (TAG) for Hepatitis in Pakistan with collaboration of the CDC's Division of Viral Hepatitis (DVH).

Public Health Lab Network (PHLN) and Laboratory Quality Systems:

- A Strategic framework for PHLN and a proposal for integrated disease surveillance and response has been developed by NIH
- Multiple joint trainings by NIH, Armed Forces Institute of Pathology (AFIP) and FELTP on Laboratory QA and Bio-safety
- Collaboration with NIH for Laboratory Network Plan consisting of LQS cells at national, provincial, and district levels
- NIH would be used as hub for LQS under the proposed PHLN

One Health

- To strengthen zoonotic disease surveillance system and enhance collaboration with human and animal health sector a cooperative agreement was done with the National Agriculture Research Center (NARC).
- One federal and nine provincial surveillance and training units have been set up specifically for zoonotic diseases. These are managed by NARC
- The federal unit has diagnostic capability for Avian Influenza and Brucellosis
- 10 veterinarians are currently enrolled in the FELTP

Drs. Mumtaz Khan and Ehsan Ghani (5th Cohort) collecting ticks during an outbreak investigation of CCHF, Islamabad 2014

Impact: FELTP in Disaster Management

Pakistan's FELTP public health response to the 2010 floods

During historic floods of 2010, one of the first calls for help went to the FELTP. The MOH created a post-disaster National Infectious Diseases Task Force and contacted the FELTP, asking the program to be part of the taskforce. The taskforce drafted an overview of anticipated public health challenges and outlined requisite response measures.

In addition, 31 physicians were sent to help their provincial departments of health to handle the response and disease control efforts in this humanitarian crisis. These public health officers were sent into the camps, where they monitored health conditions and monitored for early signs of disaster related disease outbreaks such as cholera which can spread rapidly.

More than 100 public health workers trained by FELTP in short courses, helped provide vital public health services, including planning, coordination, data collection, analysis, and interpretation for emergency preparedness and response.

"THE INVOLVEMENT OF THE PAKISTAN FELTP FELLOWS IS OF PARAMOUNT SIGNIFICANCE TO OUR NATIONAL PUBLIC HEALTH RESPONSE."

DIRECTOR GENERAL HEALTH, 2011

FELTP Fellows, Graduates and N-STOP Officers Join Hands to Investigate and Control Measles Outbreak in Pakistan

In 2012 and early 2013 a massive measles epidemic struck much of Pakistan. FELTP Pakistan fellows and graduates responded with outbreak investigations, vaccination campaigns, and setting up surveillance. Fellows proved to be a vital resource to the provincial health ministries in investigating and controlling the measles epidemic. The fellows and graduates conducted epidemic surveillance, response, containment, and prevention efforts in 15 districts (3400 cases) throughout the country. One major finding was the low routine immunization coverage which fueled this outbreak.

"WE APPRECIATE AND ACKNOWLEDGE THE SUPPORT OF FELTP DURING THE MEASLES OUTBREAK."

DEPUTY COMMISSIONER OF SUKKUR

Partnership between the Pakistan FELTP and the Pakistan Armed Forces to Improve Skills in Applied Epidemiology and Outbreak Response in Pakistan

In Pakistan, as with many countries around the world, when a natural disaster occurs, the armed forces are normally called upon to assist. Recent examples in Pakistan include the earthquake in Kashmir in 2005 which killed more than 75,000 people. The devastating floods in 2010 which consumed 20% of Pakistan's total land area and affected 20 million people. In such national emergencies, the Pakistan Army's medical staff are among the first responders. The Pakistan Army's medical staff provides clinical and public health services to active duty forces, reserves, and retired military members and their family members. In certain geographic areas, the Army also provides all health services to the general population.

The Pakistan Armed Forces Post Graduate Medical Institute (AFPGMI) is the central medical training institute for the armed forces. In early 2014, the Pakistan AFPGMI requested the assistance of the FELTP to improve the training of the Army's medical officers in applied field epidemiology, specifically in the area of disease surveillance and outbreak response. The Pakistan FELTP arranged a 5-day workshop on Disease Surveillance and Outbreak Response at the Pakistan AFPGMI in March, 2014. Thirty-eight military medical officers from the Army Medical Corps participated in the first training. This training was a start of an ongoing collaboration between the FELTP and the AFPGMI. Now five medical officers from Army have joined FELTP two years program.

Ebola trainings arranged by FELTP Pakistan on request of Pakistan Army, 2014

2014: Pakistan Army joined regular FELTP 2 year's program by sending 2 officers

2015: Requested 10 training slots in 3 week annual course and 4 slots in the 2 year program

Impact: National Stop Transmission of Polio (NSTOP)

In 2009 the National Expanded Program for Immunization (EPI) and the GOP requested the FELTP to conduct a polio vaccine coverage survey in the Districts of Multan and Muzaffargarh where a cluster of polio cases was identified. After observing the methodological approach of the FELTP fellows, EPI and WHO invited the Pakistan FELTP to assist them in polio eradication work throughout Pakistan. A national version of the Stop Transmission of Polio (N-STOP) was launched in April 2011. N-STOP is a collaborative initiative of the Pakistan FELTP, EPI, WHO, United Nations International Children's Fund, CDC and supports Pakistan's National Emergency Action Plan (NEAP). The program is being supported by CDC's Global Immunization Division (GID) and is considered by GID to be a model for similar programs being planned in other countries.

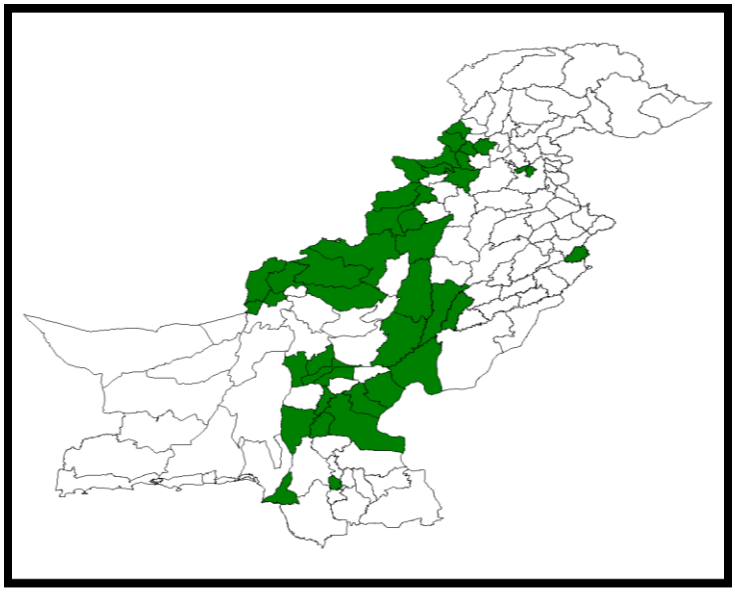
NSTOP TIMELINE

2011: FELTP trainees deployed to 16 high risk districts for polio

2012: Expanded to 31 high risk districts

2014: Expanded to 40 high risk areas/districts

2016: 65 NSTOP officers (deployed to 51high-risk districts/areas and 6 to provincial EOCs)



Nationwide snapshot of NSTOP impact:

- 20159 missed children identified and vaccinated
- 21520 refusals identified and vaccinated
- 301 New areas identified (previously uncovered)
- 19756 training sessions to Polio workers
- 7939 Teams & 4630 supervisors monitored in field

Impact: Small epidemiological steps bringing incremental changes

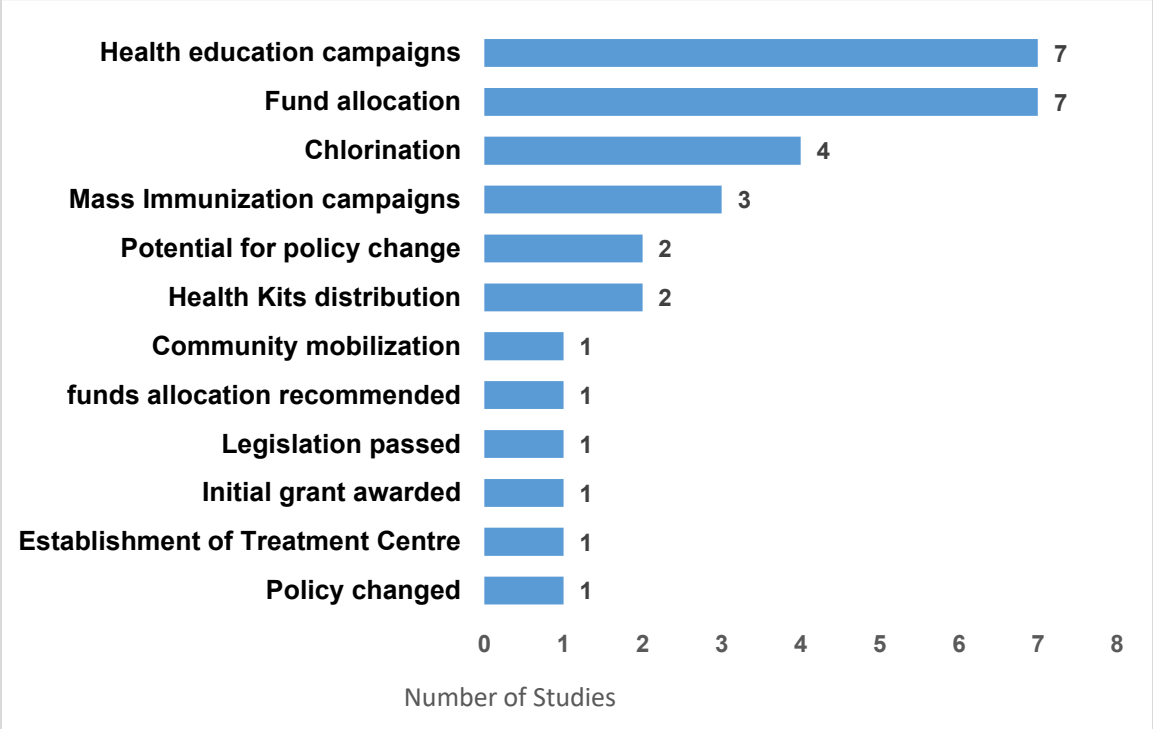
FELTP fellows' efforts have led to policy changes. Some examples include; fund allocation for public health infrastructure development, mini-grants to expand projects, vaccination campaigns, chlorination of water, and health education campaigns in the community etc.

Two studies have potential for policy change;

- IgG antibodies against measles in unvaccinated children under 9 month of age and its relation to feeding practices.
- Measles outbreak in low vaccination coverage; Flood-affected, District Dadu Southern Sindh – Pakistan November, 2010

Policy Message: Measles vaccination should be given at six months or even earlier to save the infant from this deadly disease.

Impact of Studies conducted by FELTP Fellows



Other Accomplishments:

IHR 2005 compliance:

Under the leadership of Ministry of Health, FELTP facilitated drafting legislation for disease reporting which also fulfilled requirements for IHR 2005 compliance. A legislative document was approved with provincial feedback by MOH.

Disease Surveillance Systems evaluations resulted in first inventory of existing surveillance systems:

Pakistan has multiple, vertically oriented and fragmented disease surveillance systems. FELTP fellows selected different surveillance systems in the country and evaluated them through an objective tool as part of their training program. This was also the first inventory of existing disease surveillance systems working in Pakistan. These findings were shared with departments/ Provincial Departments of Health with recommendations for strengthening.

Different Disease Surveillance Systems evaluated by FELTP Fellows