M-Health - Polio and Immunization Project

Largest Mobile Health Project with CHWs

A Joint Initiative of:
INTRODUCTION

Freedom Polio is a Holistic M-Health Solution designed for effective Community Level Health Management. The project is designed and developed by ZMQ Development (ZMQ), a Technology for Development social enterprise, in partnership with CORE Group Polio Project (CGPP), working in community-driven health and development. The project is implemented via an extensive network of over 1300 Community Mobilization Coordinators (CMCs). The CMCs conduct social mobilization activities in high-risk areas to promote implementation and acceptance of the oral polio vaccine (OPV), supplementary immunization activities (S.I.A) and routine immunization (RI) coverage. The CMCs also work with the Social Mobilization Network (SM-Net) that works with underserved communities in high-risk areas in coordination with district governments, National Polio Surveillance Project (NPSP) and other partners.

The Project is implemented on the ground through three NGOs partners of Project Concern International (PCI), Adventist Development and Relief Agency (ADRA) and; Catholic Relief Services (CRS) in 56 Blocks of 13 high-risk districts in Uttar Pradesh and West Bengal. The project is reaching annually to more than 21 million children under 15 years old.
IMPLEMENTATION STRUCTURE

The Project is implemented through CGPP partners PCI, ADRA and CRS, having a hierarchical network of over 1300 CMCs. The three tier network of CGPP mobilizers work towards sustaining the changed behavior of the communities and supports immunization activities.

These variety of Staff work in close association with Government implementation Structure and other partners and players implementing the program on ground like UNICEF, CARE, ROTARY etc. On ground implementation structures are:

- **District Mobilization Coordinators (DMCs)** - there are 14 DMCs. Each DMC is responsible for supervising the BMCs and conducting social mobilization activities throughout the district.

- **Block Mobilization Coordinators (BMCs)** - there are 97 BMCs. Each BMC is responsible for social mobilization activities at the block level and overseeing and leading the CMCs.

- **Community Mobilization Coordinators (CMCs)** - There are 1325 salaried CMCs. Each CMC is responsible for mobilizing about 500-600 households, including holding community meetings, bringing local influential people to home visits, and holding health camps. Each CMC maintains immunization status records for all of the under five children in their assigned areas and for those participating in vaccination campaigns.
KEY CHALLENGES and OBJECTIVES

In the developing countries, even today, some of the basic health care like maternal and child health, new born care, management of institutional deliveries, routine and specific immunization remains as the key health challenges. The proposed project was designed to address polio immunization, routine immunization and pregnant women care using a fully -Technology Linked Model (f-TLM) developed by ZMQ. The model integrates technology in the design, processes, management and implementation of resource constraint rural programs in a complete and natural way. The project was also setup in low-resource technology settings in 13 districts high risk communities in India. Apart from resource setting and selection of districts, there were many more challenges and constraints around which the solution had to be built. Some of the other key challenges were embedding holistic TLM model with minimum changes in existing programs processes, enabling technology based intervention in Community Health Workers (CHWs), mapping ground resources, and; above all implementing the project with available and low financial resources in the existing program.

In spite, of the constraints and resource limitations, ZMQ has set some clear roadmap of objectives before its self while designing, developing and implementing the project. Some of the key objectives of the program laid out were:

- Establishing a global shareable platforms and tools for scaling and replicating the model and platform.
- Effective strategy for reaching the high risk groups and vulnerable communities;
- Mapping and managing households, families, children (<5 and children >5 to 15);
- Creating a Methodology for local capacity building for implementation, using local and existing manpower;
- Tracking and management of children for effective health and immunization implementation;
- Tracking of pregnant women and new births, missed children;
- Building health system to deliver immunization programs in multiple modes- SIA and RI;
- Developing systems for community demand generation and social mobilization;
- Strengthening and integrating with national and regional immunization systems;
- Instant data collection, mapping, delivering care & support and provisioning digital advisory service delivery;
- Support timely documentation, reporting and use of information for decision making;
- Provides seamless integration with National Health Systems with a bottom up integration methodology;
- Extending platform for other Healthcare services like DOTS program for TB, MCH service delivery and family planning, to name a few.
ARCHITECTURE AND DESIGN

The solution is designed as a Universal model based on the new strategy shift from fixed site immunization to mobile vaccination strategies also called as ‘house-to-house’ immunization strategy in the final battles against polio and achieving higher rates of immunization.

Due to the nature of highly structured top down implementation, high on ground mobility of health workers for implementation of Supplementary Immunization Activity (SIA) and provisioning Routine Immunization (RI) it was important to integrate a platform with complete mobility tools for Community health workers capable of doing all ground activities. Also, the supervision level health officers needed mobility tools integrated in the design of the solution for monitoring, decision making and designing effective immunization in villages and community areas.

Solution - Modules and Component

The project is designed using open source technology with localization option to for region specific adaptation. The proposed solution will be built on scalable PHP/MySQL, Json/XML, JavaScript, Python platform and establishing network connectivity over CDMA and GSM networks with end tools developed rendered using variety of open source mobile technologies like Android, Open Java (Polish Java or J2ME) and BREW and SMS Push/Pull technology.

ZMQ team mapped every ground process in detail and developed a TLM (Technology Linked Model) for each process. All the connecting threads of every process modules were then woven together, seamlessly. During the design special attention was also given to making the tools simple to use, specially focusing the community health workers. It was important they could accomplish their complex task using a basic feature phone device. The platform was developed keeping in mind the universality of the project design, based on WHO standards. The platform was designed for managing global immunization activities organized at any country with specific needs like immunization plan, drug planner, dosage designer and structural hierarchy management.
The key ground activities conducted by the Community Health Workers (CHWs), also called Community Mobilizers (CMCs) in the CoreGroup Polio Project, are supplementary immunization activities, routine immunization activity, house hold mapping and sequencing, family registration, children (under 15) registration, new born registration, registration and follow-up of pregnant women, coordination with ANMs and ASHA workers, Micro-planning and social mobilization and organizing multi-group meetings and virtual village mapping. Based on the variety and complex nature of roles the ZMQ decided to develop a platform which will not only be a universal platform for immunization activities but will also support day to day activities of the CMCs on a basic (affordable) feature phone. Based on the design the following components were developed:

A. Universal Backend of MIS System with Reporting System

Universal MIS system has been put in place which carries the whole data, operations and management of the Polio management in the project districts. The carries all information of the communities, house-holds, families, children, pregnant mothers in each and every block of the Pilot districts. It also has the data of the Community Mobilization Coordinators (CMCs) who are directly interacting with the communities. MIS also carries the complete hierarchical information of its Block Mobilization Coordinators (BMCs) and District Mobilization Coordinators (DMCs). It resides on a dedicated Web Database Server (as an online infrastructure). It consists of following components:

a. Regional Hierarchy Designer (for example State- District-Block-Clusters in CGPP program);
b. Country level Designing System;
c. Organization Mapping and Connector;
d. Regional Hierarchy Designer and Mapping System;
e. Hierarchical Mode Organizational Staff Manager;
f. House-Hold Mapping System;
g. Family Mapping System based on 'shared kitchen fire';
h. Child Registration System – under 5 and between 5 and 15 years;
i. Family Structure Manager;
j. Universal Vaccine Designer;
k. Immunization Implementation Structure for RI and SIA;
l. Dynamic Data Manager for Routine and SIA immunization;
m. Pregnancy Tracker and Manager;
n. Macro and Micro Planning Designer - All levels;
o. Report Management System and other tools.
This is setup to manage clients, keep their records and analyze data. This is critical part of the system so as to provide emergency and critical assistance to patients.

B. Supplementary Immunization Scheduling System

The web based MIS has a universal tracker for the Supplementary Immunization Scheduling. The immunization scheduling is done a day prior to the start of the Polio round (Polio Sunday). The whole scheduling is done online and the community mobilization coordinators can start conduct the immunization process once the tracker is set “On”.

This backend System have a provision for Designing Scheduling of Immunization Camps at different Locations and regions. It will have following components:

a. Universal Immunization Planner;

b. Polio Vaccine Designer (Dosage);

c. Supplementary Immunization Activity Manager;

d. Regional level Camps and Immunization Scheduler;

e. Data Structures for Children Immunized under different Regions;

f. Missed Children Manager;

g. Phased Activity Manager;

h. Vulnerable Community Planner;

i. Staff Login Management for SIA activity;

j. Reporting Tools for Immunization Planner

C. Reporting System for Administrators and Partners

On the MIS is a detailed web system based system is a specialized section form which can be assigned to the administrators and donors to monitor the performance, and see the operations & transactions, which helps in evaluating the program success. It has a facility to monitor every minute detail of the system, may it be the number of houses visited and number of Polio drops administered.

This is the web interface for Administrative, Core-Group Staff and Partner Organization to manage its Activities and Monitor its on ground activity. The tool will also have flexibility of generating any type of reports based on Regional Activity of Partners, Districts, Blocks or even regions. The system has the following components:

a. User Login System;

b. User Specific Tools Generation;

c. Report Management System;

d. Top-Down Communication System for CHWs;

e. Reporting System;

f. Organizational Reporting System (Daily, Weekly and Monthly, Annual);

g. Partner Reporting System;

h. Flexible Reporting System Designer.
D. **Mobile Application for CMCs** (for basic java enabled feature phones)

This is one of the most vital components of the project as all the data capturing happens here. It comprises of a feature phone based Java application for the CMCs to do daily transactions during the Polio round. Once CMC can enter and manage a data of 500 house-holds. The data is also stored on the phone and on the first available connectivity it is submitted on the server.
This is the most important tools for CMC works. The CMC toolkit is designed to assist them perform all their ground duties.

Some of the key duties they perform using the toolkit are:

a. House-Hold listings and Family registration
b. Child registration
c. Setting Up Community Member Information
d. Data Entry of Child Records
e. Follow-up of Child and Mother Immunization Schedules
f. Sending Reminders to CMCs and Clients
g. Integrating with Local ASHAs and ANMs for Immunization Registration
h. Pushing Preparedness Messages to its Community Members.
i. Uploading data from Ground to Server
j. Designing Campaigns and House lists
k. Many More Features can be integrated.

Some of the Key components and modules of the CMC Toolkits are:

- CMC Information Module
- Registration Module – House, Family and Children
- Routine Immunization (RI) Module
- Supplementary Immunization (Polio) Module
- Pregnant Women Registration and Tracker
- Micro-Planner and Social Mobilization Module
Screenshots of CMC Mobile Application Modules:

Screen shots of CMC Information, Household Registration and SIA Child Tracking
This application has been developed for feature phones with standard GPRS. Also, the application will be later ported also ported for BREW CDMA platform devices using CDMA2000 / EVDO. Presently the CMCs are using basic/standard Java enabled feature phones. The Application is able to deliver mobile based assistance to their clients but also is part of the Revenue Share Model in delivery of digital / mobile content and services to clients / pregnant women.
E. Mobile Application for BMCs and DMCs (on Tablets/ Android Smartphone)

The application enables the Block and District officer to monitor the activities of its subordinate officers. The application is a single window application for both BMC and DMC with different management, tracking, follow-up and reporting modules.

Tablet/Smartphone Interface for BMCs and DMCs

BMCs Operations Menu

The DMC and BMC toolkit is developed for Android Smartphones and Tablets. Some of the key features of the toolkit are management of its staff, regional structures, mapping of high risk communities, monitoring of CMC and BMC areas for Supplementary Immunization Activities and Routine Immunization. The tool kit also provides assistance to CMC in organization and implementation of social mobilization and micro-planning activities. The reporting tool designed for both BMCs and DMCs both for analyzing reports and forwarding reports to relevant structures.
The toolkit also has a new GPS tool to map CMC areas to the level of each house see ‘Risk Pattern’ based on location layout of CMC areas. The tool helps the BMCs and DMCs to design and prioritize future immunization and other health services.

Risk Analysis of Vulnerable Communities using GPS (Google Maps)

F. Training of CMCs, BMCs, DMCs and PVO staff

Training of all tier staff in a large scale structured M-Health program is one of the most important components of the solution. An effective M-Health solution, specially designed to be driven by existing Community Health Workers, there is a need of rigorous and continuous training technology and de-training of redundant processes and retraining of process change.

ZMQ has established a special assistance wing for training the CMCs and is building capacities of implementing partners. A monthly training is conducted for CMCs in different Blocks and Districts. The BMC and DMC training is organized on bi-monthly basis.
PROJECT IMPLEMENTATION AND SCALEUP

The project has entered its 3rd phase of implementation. By the end of August 2013, the project will be fully implanted in all 13 districts, High Risk Areas as per Govt. of India and WHO-National Polio Surveillance Project designated criteria, under CoreGroup Polio Project. At present ZMQ is in the preparation stage for full blown implantation. In this stage more than 1370 CMCs will be operating with M-health solution and tools in with support from 56 Block Mobilization Coordinators (BMCs) and 13 District Mobilization Coordinators (DMCs) and 4 District Underserved Coordinators (DUCs). In this phase the project will cover over 1.2 million households covering over 2.8 million children (under 5) for complete immunization in the first year after implementation. Also, the project will monitor and provide support to over 250,000 pregnant women in the districts. The covered districts are:

a. Baghpat  
b. Barielly  
c. Howrah  
d. Mau  
e. Meerut  
f. Moradabad City  
g. Moradabad Rural  
h. Muzaffarnagar  
i. Rampur  
j. Saharanpur  
k. Sambhal  
l. Shahjahanpur  
m. Sitapur

In the first phase, the M-Health Solutions setup 3 districts namely, Meerut, Sambhal and Bareilly in UP.

- Duration of Phase I: 6 months
- No. of CMC engaged for M-Health implementation: 60 in 10 Blocks
- No. of BMCs trained: 10
- Total Trainings: 25
- Total no. children registered on the MIS: over 85,000
- No. of feature phones distributed on the ground: 60
- No. of tablets being used on the ground: 5

In the second phase, the solution was implemented in 4 more districts making the total of 7 districts. The new added districts were:

- Baghpat - ADRA (Block Chapparuali)  
- Muzzafarnagar - PCI (Block Khatauli)  
- Shahjanpur - CRS (Block Jaitipur)  
- Sitapur - CRS (Block Biswan)

OUTCOME AND IMPACT OF THE PROJECT

The project is in its final stage of full blown implementation. Some the results from the two completed phases are:

- Instant System Data generation for Instant Analysis and Action.
- Almost 0% Redundancy in operations for efficient management of program
- Provides Accurate and effective planning of Immunization and Pregnancy Tracking
- Top Level Data Analysis for designing new strategies and programs.
- Robust top-bottom management of processes and effective bottom-up integration and implementation of activities.
- Seamless integration with public health support system (ANM and ASHA level)
- Modular and integrated Monitoring and Evaluation of data set from the top;
- Effective and instant risk analysis, and instant epidemic management;
- Data sets generated are highly reliable, secure and easy to trace back for multiple foot prints.
- Highly reduced transaction, reporting and service delivery time;
- Health workers are able to focus more on the core activities like demand generation, planning, community training and workshops and social mobilization;
- Reduction in per day operation, as the cost is less very low (than 50%);
- Over all operation cost is 25% less, which can be further reduced with scale-up;
- Quickly scalable to other districts and states;
- Easily replicable to other immunization programs;
- Easy adoption by National Immunization Plan;
- Cost reduction by saving on Registers and Stationary by Rs. 2500/= ($ 50) per annum;
- Absolute reduction in drudgery;
- Operations are 100% paperless, making the project ‘Green’.

**FUTURE OF THE PROJECT:**

The project is designed with a holistic approach, based on fully - Technology Linked Development model (f-TLD) of ZMQ. The key system changing factor in the project is the **New Role of CMC**. In this role the CMCs will delivery not only of information and services but turn into mobile digital health centers. In future these mobile CMCs will perform screening, diagnostic services like hypertension, anemia (malnutrition), blood tests, diabetes, mental disorders depression and also distribute digital health content services for demand generation and behavior change.

![M-Health Services and Communication Dissemination Mechanism](image)

*On Ground Activity Diagram of CHWs*
In the future the project has immense scope not only for polio and immunization services but also beyond that.

**Scale-Up of Present Project**

- Mobile Training Kit for CMCs
- Mobile App Center for Community Programs like Mothers Meetings
- Developing Community level Digital Tools – for SMS, Feature phone and Smartphone based Gaming with Live Data for Training and Simulations
- Risk Pattern Analysis System – GPS and GIS Data Analysis
- Mapping Villages and house-holds and creating real-time maps for statistical needs and national surveys

**Holistic Scale-Up of the Project:**

- **Global Scale Up of the project:**
  As the project is designed with scalable parameters and it has modules like country specific immunization planner, country specific immunization tracker and admin & regional hierarchal system so it can be scaled for any regional implementation with single window application tools

- **Beyond Polio:**
  The project encompasses Polio tracking and management as prime project but it can also be scaled for any other disease prevention program with a possibility to design one’s own implementation strategy.

- **Integrator with National Health Programs:**
  The project offers a great potential to integrate with other national health schemes and programs. Some of them can be like NRHM, MCH, FP, RNTCP, NACP etc.

- **Beyond Health:**
  Integration with other national development index services like MNREGA, UID, Banking for bank-less, SSA, educational programs and others.

- **GPS Mapping Systems:**
  GPS Mapping of Villages for Surveillance for High Risk, other Behavioral Patterns and GIS Data Analysis of other diseases, risks and health conditions.

- **Setting up Mobile CMCs:**
  Setting up Mobile CMCs for Diagnostic services like hypertension, anemia (malnutrition), blood tests, diabetes, mental disorders depression and centers
ZMQ HOLISTIC MODEL APPROACH

As a technology for development social enterprise, ZMQ develops sustainable technology solutions with a system changing approach. It works with the approach of embedding technology naturally with the core of program and its processes, as against super imposition of technology with only limited threads with the program processes.

ZMQ provides T4D solutions for social and development programs with a holistic approach. It starts with the task of mapping the ground program and its key challenges. It works towards creating a sustainable model by partnering closely with organizations, and understanding the key challenges they face in implementing the program.

There are various challenges an organization faces in implementing a technology based solutions at different project stages vis-à-vis – design, development, implementation and continuation.

![ZMQ T4D Model Diagram]

Some of the other crucial building blocks for a successful and sustainable mobile technology program is mapping in detail the ground processes and forging strong partnerships across all program partners.

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