PROPOSAL

Proposal Name: “Open Source software for improving Mother and Child Health Services in Pakistan”.

Submitted by: WHO- Pakistan, Health Information Cell.

Please provide a description of the proposal (up to 500 words):

Pakistan’s health indicators for women and children are among the worst in the world. In the recent publication “countdown to 2015 Maternal, Newborn and child Survival 2010 report”. Pakistan is ranked among 68 priority countries. A Manual system (paper based) has followed during this survey, survey team send to different areas of Pakistan and filled the forms. Those forms would gather form analysis purpose. Old traditional system would not have more information about mother and child health information and its basics evaluation.

The status of maternal health is poor in Pakistan. An estimated 30,000 women die each year due to pregnancy related causes. It is estimated that about 500 maternal deaths occur per 100,000 live births each year in Pakistan. According to the United Nations Population Fund (UNFPA), 320 women die for every 100,000 live births in Pakistan but in reality it may be higher because of under registration of deaths in country and absence of cause of death information. The country’s Demographic and Health Survey (2006-07) meanwhile says that Pakistan has about 30,000 pregnancy-related deaths each year. Due to the severity of issue it has been included in MDGs as goal No 5 which binds all countries to improve maternal healthcare and reduce, by three quarters, the maternal mortality rate - a target Pakistan is highly unlikely to achieve by 2015.

Globally 15 out of 100 pregnant women suffer life threatening complication but most of them can be managed by effective and round the clock functional responsive system of Emergency Obstetric and Neonatal Care (EmONC). Pakistan's population currently is over 178 million and more than half of it's population consist of female and among them 40 million are in their reproductive age (15 – 49). It’s Progress towards achieving the fifth Millennium Development Goal (MDG) to reduce maternal mortality by three-quarters by 2015 is inadequate. According to PDHS 2007, 1 in 89 women die of maternal causes with a mortality ratio of 320 per 100,000 live births. Among women age 15-49 years, complications of pregnancy and child birth are the leading causes of death, accounting for 20 percent of all deaths for women of child bearing age.

To address this issue the use of OpenMRS has been considered as an important option. OpenMRS is a software platform and a reference application which enables design of a customized medical records system with no programming knowledge (although medical and systems analysis knowledge is required). It is a common platform upon which medical informatics efforts in developing countries can be built. The system is based on a conceptual database structure which is not dependent on the actual types of medical information required to be collected or on particular data collection forms and so can be customized for different uses.

It is believed that Free/Open Source Software (FOSS) for Healthcare will provide a viable and sustainable alternative in mainstream ICT for positive impact in health outcomes as adjunct to building a global knowledge society. Ability to share data in healthcare provides the greatest
potential for such impact. The need for interoperability, open standards and data exchange in FOSS technology is felt most in the developing world. Collaboration and not competition creates optimal and sustainable solutions. A sound health information system depends upon organized processes for gathering, sharing, analyzing and using health-related data for decision-making. Current paper-based data collection method used for monitoring evaluation and improvement has serious drawbacks regarding consumption of time and is full of errors like missing answers, wrong entries especially in skip pattern etc. There is great need to provide real time data to a central point where that can be analyzed quickly and decision maker can provide quick solution and ideas about how to further improve MCW health services in the country.

If implemented this would replace traditional method of paper based query that of paper free and rapid data exchange IT based method (e.g. open source, GIS, and etc). Compared to paper, not only data would be transferred quickly but also they can improve the quality of data by providing errors and completeness checking as well as eliminating the error prone data transcription process. Open source software is an attractive and useful platform for data collection.

### Describe and justify the potential public health impact\(^1\) of the proposal:

The vision of OpenMRS initiation the improvement of MNCH indicators could contribute to the development and implementation of low cost sustainable e-Health solutions for providing scalable and integrated health information systems. This would empower both Federal/Provincial/District Departments to improve the coverage, quality and efficiency of maternal and Neonatal Health Services based on stronger evidence. This adoption be done through a “broad-based participatory” approach and strengthen public health system by ensuring “Use of Information for Action”. At the core of this achievement would lie the use of free and open source software to provide low cost sustainable and scalable integrated e-health solutions for improving MNCH indicators.

It was expected that this Activities will allow health managers and service providers to identify the grey areas of MNCH program. The project will focus and study the gaps in the current system to introduce processes required to fully operational the computer based detection and monitoring ICT system to complement the existing detection systems in Pakistan. Once successful this program could be scaled up to the other districts of the country.

### Describe and justify the technical feasibility\(^1\) of the proposal:

The proposed project is being conducted as a proof of concept by developing and deploying the Open Source software in selected Health centers to evaluate the performance and outcomes in different infrastructural and socioeconomic contexts. Proposed research design will allow us to compare the performance and outcome of the Open Source deployed at the Health centers.

The software applications will be deployed on desktop computers at the Health facilities. The software will capture simple environmental attributes, which are features such as the season and the day of week that cause trends in the data, and response attributes, which are the remaining features such as syndrome, gender, and age. Project will provide training to the health facility Staff and Province/Federal level staff participating in the pilot; especially the Healthcare-Worker exposed to the OSS.

Every Medical Practitioner in the selected health facility attending a mother and child suffering

\(^1\) Principally CEWG criterion 1 but others may be relevant e.g. Equity/distributive effect including on availability and affordability of products and impact on access and delivery.
from a disease will immediately notify such a case to the responsible person of the respective area. The project will use a mixed methods design, where the quantitative component will assess successful transfer of regular information, proportion of successful and timely detection of outbreaks, and generating timely alarms to the correct people. The qualitative component will include in-depth interviews with the users, including healthcare providers at the selected health centers and responsible officers at the coordinating unit.

**Project Phases:**

The planned project activities would be accomplished in approximately 2 year’s time period. This would comprise of following three phases:

1. **Preparatory & Planning Phase (3 Months)**
2. **Program/Database Development Phase (6 months)**
3. **Limited installation and testing Phase (9 months)**
4. **Report Writing and Dissemination (6 months)**

1. **Preparatory & Planning Phase (3 Months)**
   This phase would consist of preparatory and planning meetings with the stakeholders, hiring of desired technical staff and coordination with provincial/district health managers. Setting of central and peripheral coordinating units would be another activity of this phase.

2. **Program/database Development Phase (6 months)**
   The project will develop computer program for MNCH data in a period of 4 months. This would be followed by interfacing the software with the Open-Source software called open MNCH in the next 2 months.

3. **Installation and Pilot Testing Phase (12 months):**
   Testing Sites and Number: Selected study sites in different pilot districts selected in consultation with provincial health departments and other stakeholders. This phase includes installing computers and software, acquiring and testing connectivity, and conducting a series of mocks to test validity of the program to analyze the data and generate alerts for the concerned authorities.

4. **Report writing and dissemination (3 months):**
   This phase would be used to develop the final report of the feasibility study with a dissemination workshop.

**Partner Contribution**

1) **Principal Investigator:** HIS Cell of WHO would take a technical lead for this project by engaging adequate technical experts in the field. Research team will give technical input to the project, conduct trainings and monitor monthly project activities, liaison with project partners and write the final report.

2) **HIS Cell, WHO- Pakistan:** HMIS Unit will work facilitator and extend direct supervision to the project. All rural health facilities in pilot districts would be asked to collaborate in this plan. The Unit will liaise with the district governments for the use of those health centers for implementing the plan.

---

1 Principally CEWG criterion 4 but others may be relevant e.g. Rational and equitable use of resources/efficiency considerations
Indicators on Which Information would be collected.

**Family Planning / MCH Service data would be gathered**

***On following indicators***:

- Ages of Male and Female couples (Normally between 15-49 years)
- Number of peoples who have adopted any method
- Number of peoples who were previously analysed (Follow up)
- Number of peoples who have adopted new advanced method
- Number of peoples who have used Condom (Contraceptive method)
- Number of peoples who have used Foam (Contraceptive method)
- Number of peoples who have used Pills (Contraceptive method)
- Number of peoples who have been injected (Contraceptive method)
- Number of peoples who have used IUCD (Contraceptive method)
- Number of peoples who gets surgeries (Contraceptive method)
- Other New Advanced methods adopted by peoples
- Conventional Method used by peoples.
- No. of pregnant women in the center.
- No. of children for growth monitoring.
- Total Births Registered
- Total Newborn Weighed
- Low Birth Weight Babies
- Total No. of Deliveries
- Deliveries by Trained Person
- No. of Still Births
- No of Abortions
- No. of Deliveries in Health Facilities
- No. of Maternal Deaths
- Family Planning Visits by Gender & Methods
- No. of Registered for Pre-natal Care
- Patients with Under 10gm HB at 1st Measurement
- Total Visits for Pre-natal Care.
- Health Facility Identification No
- GPS Health/Population facility location
- Institution Classification / Type
- Building Status
- Data Recording Instruments
- Availability of Basic Utilities (Electricity, Water, Toilet, GAS, Telephone, Internet))
- Transport
- Machinery
- O.T Equipment
Describe and Justify the financial feasibility¹ of the proposal:

<table>
<thead>
<tr>
<th>Broad Budget Estimate (USD)</th>
<th>Justification.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consultant 20000</td>
<td>This would cover the cost of time of the project manager, system administrator, and two district facilitators; professional cost for consultants providing technical assistance, goods &amp; services etc</td>
</tr>
<tr>
<td>2. Operational Expenses/ Field Costs 20000</td>
<td>Purchase Equipment, communications costs, local transport, and other expenses (utilities, infrastructure, etc)</td>
</tr>
<tr>
<td>3. Training Workshops/Mtgs. 30000</td>
<td>Organizational fees, airfare (local consultants), per diem, and local participant subsistence for the workshops/meetings: partner orientation (planning), user planning, training, evaluation, and closure.</td>
</tr>
<tr>
<td>4. M&amp;E/Field Coordination 10000</td>
<td>To prepare and conduct the assessments, analyze the results, and develop the technical report.</td>
</tr>
<tr>
<td>5. Operational Costs 20000</td>
<td>Accounting, administration, and other institutional expenses in relation to managing the project.</td>
</tr>
<tr>
<td>6. Software Outsourcing 20000</td>
<td>Hiring of Software company for open sources software.</td>
</tr>
<tr>
<td>Grand Total 150000</td>
<td></td>
</tr>
</tbody>
</table>

Describe in what way the proposal addresses cross-cutting issues²:

- This project would be able to setup a replicable model of an innovative data collection, analysis and response mechanism, where information is frequently accessible to the concerned Health managers.
- An effective information loop would be established where two way feedback system is maintained. This would not only support evidence based decision making, but also, support efficient execution and monitoring of the planned MCH activities.
- It would be able to generate very essential information about Mother and Child Health which would ultimately helpful for improving Mothers and Newborn Health.
- Success of proposed model will give us clear idea for replicating this model of rapid data collection to the other district of the country.

Identify key steps necessary to begin implementation and key issues to be resolved for implementation to begin:

- First action involves the developers and users collaborating on gathering and documenting

¹ Principally CEWG criterion 5 but others may be relevant e.g. Cost-effectiveness.
² “Cross-cutting Issues” refers principally to CEWG criteria 7-12, if not addressed elsewhere in the submission e.g. Potential for delinking R&D costs and price of products.
the User Requirements Specifications (URS).

- Developers will adopt the URS as a guide to produce the Software Requirement Specifications followed by a demonstration of the customized and retrofitted technology components.
- After incorporating the feedback from the demo and upon signing off on the finalized SRS the individual components will be integrated for internal testing.
- Developers will produce user manuals, training aids, and standard operational procedures.
- Users will be introduced to the technology and processes through a series of training workshops. Training will be a three fold exercise – 1) Training a set of trainers, 2) collective training users and 2) on site one-on-one training.
- Initial 2 -3 months of adopting the technology will be regarded as the learning period. A series of silent-tests and certification exercises will be conducted to ensure the competency of the users.
- Operational end-end technology and processes will be evaluated over, at least, a one year period with users submitting actual data from hospitals, health departments analyzing the data and making use of the tools to conduct the same routine activities, and utilizing the alerting/situational-awareness to share the health status in their region.