



Integrated healthcare management system: Enabling improved patient care through increased operational efficiency

The Client

The client is the ministry of public health of a developing country, aiming to achieve the full potential in health of their citizens contributing to peace, stability and sustainable development. The country had distressed healthcare systems with little or no access to appropriate medical treatment, Years of civil war has shattered the healthcare infrastructure.

Business Need

The client was an urgent need to build modern health support system — a comprehensive, knowledge-based system capable of providing information to all who need it to make sound decisions about health. As being a developing country, they do not have a well-developed health care infrastructure. There was an urgent need for foundational elements of effective healthcare such as medical records, IT infrastructure, trained medical professionals. Due to these missing key elements the ministry was struggling with their various healthcare initiatives and also with funds to provide better health care service delivery.

There were many NGO's and Non-profit organizations ready to fund the ministry of Health initiative to improve the health and nutrition status of the country but the missing modern IT enabled environment was restraining them to do so.

The government was looking for a cost effective open source technology based solution to meet their healthcare goals.

Client Challenges

Some of the keys challenges MoH faced

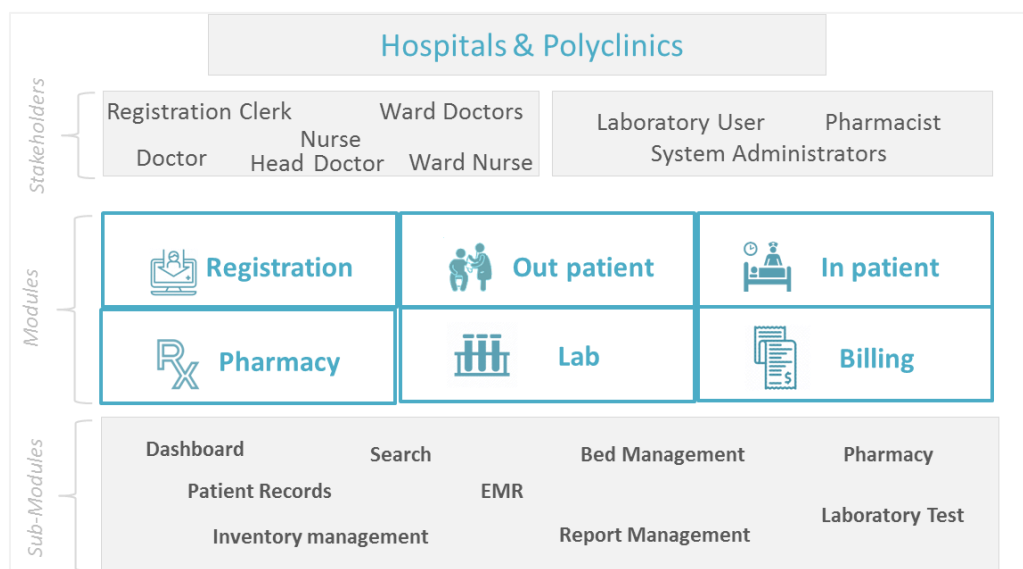
- **Implementation of standard operating procedures:** The government was working hard to implement, standard procedures and practices of effective healthcare as they were not followed in years. There was no proper documentation of medical records of the patient.
- **Awareness towards technology:** Devastated due to the civil war country's healthcare had no introduction to the information technology. Least use of computers and technology became the bottleneck in the growth and improvement of the country.
- **Skilled Workforce:** Being a war destroyed country it has very poor health care system, most of the medical professionals left the country. Hence the country is facing dearth of trained medical professionals. Training and development had become one of the major concerns.
- **Limited Physical & IT Infrastructure:** The Government was not only focused to improve the healthcare state of the country but also working to overcome limitations with infrastructure like electricity, internet access and roads.

Solution

To overcome the challenge of decentralized information, we proposed MoH to implement Integrated Healthcare Management System developed on the base of open source integrated information and medical technology – **Open MRS**.

To do this we have designed a complete, integrated solution to manage any healthcare centers (public and private hospitals, clinics, etc).

Solution Overview



The system is accessible to Registration Clerk, Nurse/Ward Nurse, Doctor, Head Doctor, Laboratory User, Pharmacist and System Administrators with roles specific user interface like Dashboard, Find Patient Records, Search Patient, Electronic Medical Record, Bed Management, Patient Visit Status, Hospitalization Ticket Status, Laboratory Test, Admitted Patients, Capture Patient Vital Signs, Patient Registration, Pharmacy, Inventory Dashboard and Report Management

Approach

Initially the ministry has decided to implement the proposed HMIS in polyclinics and public hospitals of a city, later it is deployed nationwide

To start with, we created the project steering committee and project management team in collaboration with MoH The steering committee was responsible for the weekly and monthly progress review. The team has decided to take the complete project in four phases addressing each of the challenge the Ministry was facing.

Phase 1- Requirement Gathering & Documentation: A team of implementation consultants performed the requirement gathering and analysis activities and shared detailed implementation plan illustrating:

- Workflows and process redesign

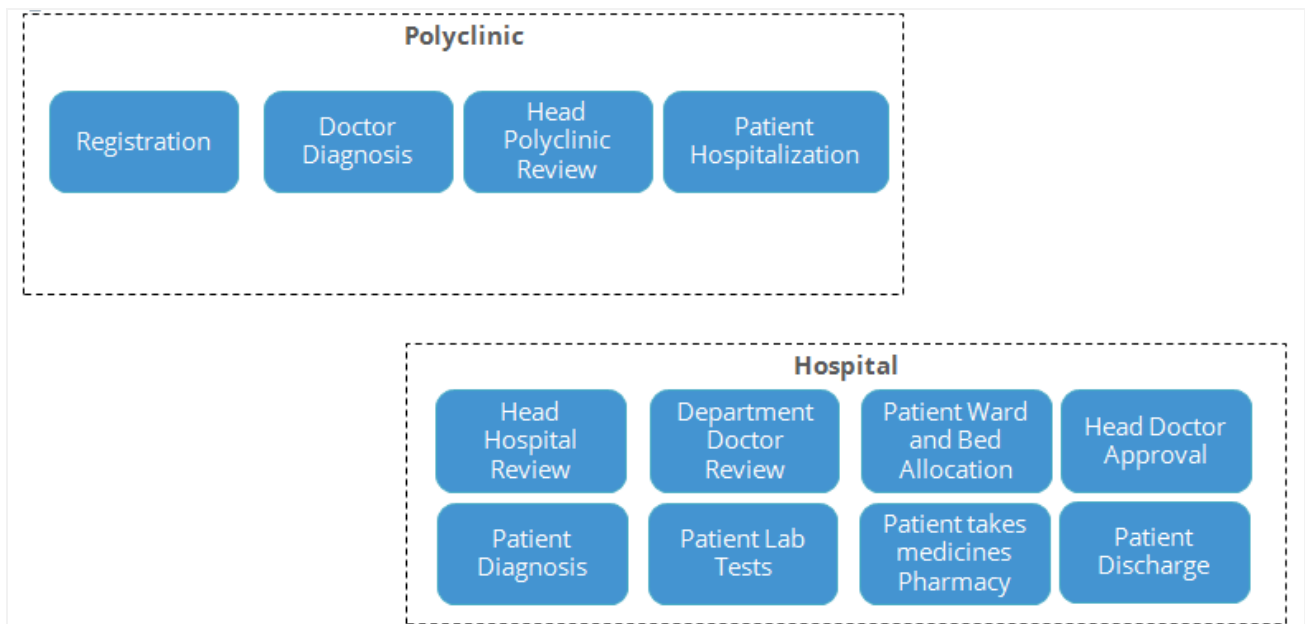
- Preparing for and installing hardware
- Network development/refinement
- Super user training
- End user Training

Phase 2- EMR Implementation: Once the requirement and implementation plan got approval for the steering committee, the team started the project with implementing the basic building blocks for HMIS- EMR. Required IT infrastructure has been created then with the help of medical practitioners and the staff paper based data is migrated to the Electronic Medical Record System. After EMR implementation we educated the staff on new processes involved in electronic record keeping.

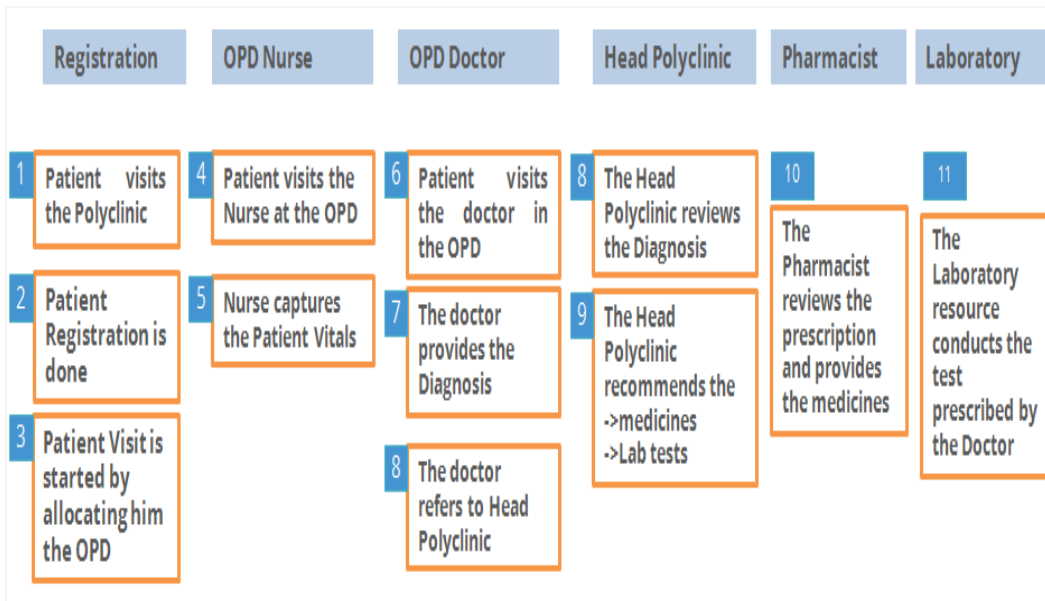
Phase 3-Implementation of other modules: After getting the EMR at place, we implemented other modules like Dashboard, Bed Management, Hospitalization Ticket Status, Laboratory Test, Admitted Patients, Capture Patient Vital Signs, Patient Registration, Pharmacy, and Inventory Dashboard. We developed the customized modules for analytics and reporting which helped them in better decision making and improved patient care.

Phase 4: - Training: Implementation of the HMIS is not the solution for all the challenges faced by the country. Educating stake holders and users about the standard practices and the implemented system was also very important. Once the system was implemented at both the levels polyclinic and hospitals we identified the user groups and conducted the training session to make the available workforce comfortable and compatible to the Information technology.

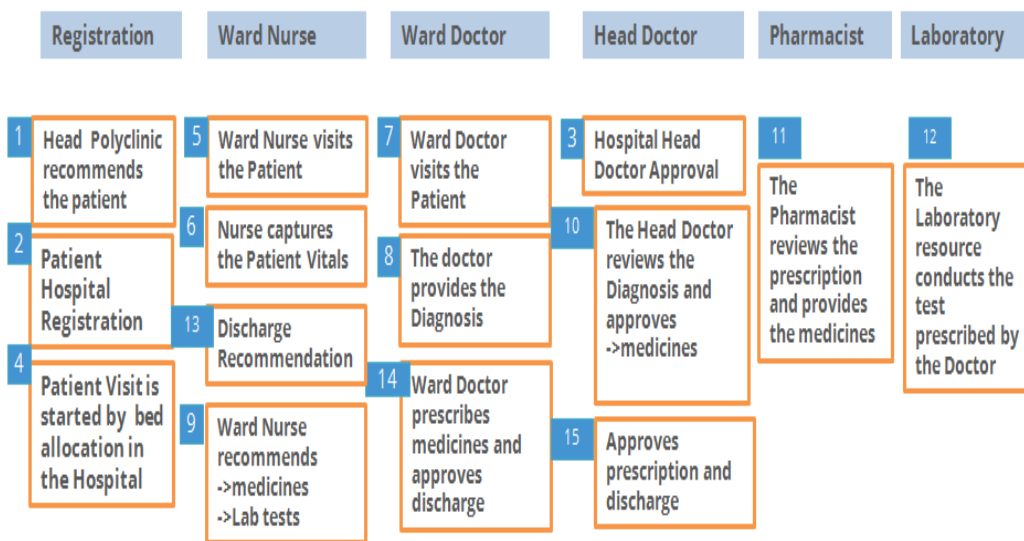
Work Flow of the HMIS System



High Level Work Flow Polyclinic



High Level Work Flow Hospital



Benefits

- Establishment of eHealth
- Improved public health infrastructure, able to generate more funds for the development of Healthcare
- Implementation of EMR has reduced unwanted hand transcribed errors which has eradicated the problem of lost or misplaced patient files.
- Implementation of HMIS has increased the number of patients served per day i.e. enhanced patient workflow and increased productivity

Specific Customization over Open MRS

User Interface	Improved and enriched User interface to give better user experience
Dashboard	User Specific dashboard to provide ease of access to patient data, Lap, Pharmacy, reports etc.
Enhanced Visit Flow	Detailed registration form for polyclinics and hospitals. New flow allows multiple upload of documents and multiple referrals to the departments
Admission Discharge Transfer	<p>Customized module as per the need of the client. Various roles and permissions can be configured for complete ADT process.</p> <pre> graph TD subgraph Polyclinic P_Doctor[Doctor] -- Recommends Hospitalization --> P_HeadPoly[Head Polyclinic Review Application] P_HeadPoly -- Approve/Reject --> P_Admin[Admin Staff Generate hospitalization ticket] end subgraph Hospital H_HeadDoc[Hospital Head Doctor Review Hospitalization ticket] H_DeptDoc[Department Doctor Examine Patient] H_RegClerk[Registration Clerk Allocates the ward and bed to the patient] H_HeadDoc --> H_DeptDoc H_DeptDoc --> H_RegClerk end P_Admin --> H_HeadDoc H_RegClerk --> H_HeadDoc H_HeadDoc --> H_HeadDoc2[Head Doctor Verifies and approves the request] H_HeadDoc2 --> P_Visit([Patient Visit Starts]) </pre>
Bed Management	Proactively manage bed occupancy, real time bed management as per the ADT
Patient Visit Status	<p>Customized the flow to showing current state of patient visit like:</p> <ul style="list-style-type: none"> • Pending on Doctor • Pending head Doctor • Pending on Ward Nurse • Pending on Nurse • Many more
Hospitalization Ticket Status	Specifically categorized and display records of those patient whose hospitalization ticket has been generated at Polyclinic end.
Capture Patient Vital Sign	Omit an extra flow of capturing the vital signs again and again. Only display “Capture Patient Vital Sign” page in case there is no recording.
Laboratory Tests	Dashboard listing to show the records of patient with recommended test to be done. It also allows to view or download the reports of the test already conducted.

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