

INTELLIGENT HEALTHCARE



HEALTH MANAGEMENT INFORMATION SYSTEMS



Need for HMIS

Information and Communication technology (ICT) makes health systems function efficiently and effectively. In healthcare, data is critical and deploying technology facilitates the usage of data. Apart from improving the ability to collect, store, and analyze health data across the State, this also helps the patients in a long run, whenever they access the hospital.

Health Management Information Systems (**HMIS**) interfaces technology with the existing combination of people and procedures that make up the management of a healthcare system. Regular information systems do not provide intelligent data but HMIS does. It helps people involved in the process analyze information and produce meaningful results.

Hospital Management Systems (**HMS**) represents the IT infrastructure – the hardware and software. It helps streamline the functioning of the hospital by automating processes and aiding proper management of data. All activities, from registration of the patient to preparation of discharge summary, including online entry of diagnosis and prescription by the doctor in the examination room, maintenance of drug inventory in pharmacy, stores, maintenance of linen accounts, laundry, diet, lab services etc. are managed through the HMS. HMIS are distinct from regular information systems in that HMIS is used to analyze other information systems applied in operational activities in the organization and this term is commonly used to refer to the group of information management methods tied to the automation or support of human decision making, e.g. Decision Support Systems, Research tools and Executive information systems.

Scenario before introducing HMIS:

- Ineffective record maintenance
- All hospital records maintained manually – time consuming
- More funds towards manual registers, which are difficult to maintain
- Duplication of records – same patient registered twice, and old data may not be retrieved
- Maintenance of Equipment inventory, monitoring Equipment downtime, drug stocks auto indent, drug stock accountability, and monitoring for the drug expiry dates cumbersome
- For analysis of health care data, reliability of the collected data was questionable.

There were no snapshot/ dashboard view available to monitor the performance of the hospitals, prior to introduction of this system.

- Real time data transactions happening at the hospitals unavailable at the Institutional level, District level or the state level for decision making
- At the Institutional level, it was difficult to map the In Patient Disease classification to the International Classification of Diseases -10 which is recommended and followed world wide.





Implementation Schedule

Pilot --- 5 Hospitals --- HMS + HMIS --- **Activity Completed**

Phase 1 ---5 Districts (36 Hospitals) HMS + HMIS --- **Activity Completed**

+

272 Hospitals --- HMIS

+

5 PHCs --- HMS + HMIS

+

7 Hospitals undergoing accreditation process other than the five Hospitals covered under Phase 1 Districts

Phase 2 --- 222 Hospitals in 26 Districts + 15 PHCs --- **Activity in Progress**

Phase 3 --- 46 Institutions under the Directorate of Medical Education including 18 medical college Hospitals

System requirement study in Progress

+

University Automation system for Tamil Nadu Dr. MGR Medical University - in progress



BIRD'S EYE VIEW

HMIS (Four Major Modules)

- **Clinical:** OP, IP census and details of maternal, child health, immunization details, family welfare services and disease wise data of treatment and cases, etc.
- **Ancillary:** reporting forms for blood bank services, laboratory services, Stores / Inventory details for drugs and other consumables, diet details and biomedical waste management.
- **Programme Information:** National and State level programmes like Blindness control, Malaria, TB, Infectious diseases, School Health, etc.
- **Administrative Information:** Finance related forms for budget, etc.; and infrastructure related forms including buildings, equipment, vehicles, etc. This module also comprises establishment related forms for capture and reporting details of all the health department personnel including posting, transfers, training, leave, etc.

Security module handles all the access and privileges to be given to end users for each application and reporting.



HMS (Clinical Modules)

- Registration (outpatient, inpatient, casualty), Lab services, Pharmacy, Stores, Wards, Blood Bank, Linen management, Diet, Biomedical waste management, Equipment Inventory
- Clinical module covering patient Outpatient (OP) record, In patient (IP) record, Nurses notes, Operation notes, discharge summary, Ante Natal Records(ANC) record, Natal & Post Natal record, Family welfare services and Referral services.
- Reporting of the lab test results online
- Online indents and issues (for drugs)
- Online ward transfers, linen, diet and biomedical waste management related transactions
- Online day end/ periodic reports generation saving significant time for end users in collation and consolidation of data.
- Discharge Summary and the final disease diagnosis is mapped to **International Classification of Diseases- 10**





A white server rack with a perforated door. The door is open, revealing the internal components. At the top, there is a purple StorageTek drive. Below it is a multi-bay tape drive with several tape slots. The rack is mounted on a tiled floor with a vent.

A black server rack with a solid door. The door is closed. The rack is mounted on a tiled floor with a vent. The rack has several horizontal slots and a small display panel on the right side.

SALIENT FEATURES - SMART ARCHITECTURE

- Centralized web based software solution to minimize technology support and maintenance dependencies
- Connectivity through Tamil Nadu State Wide Area Network (TNSWAN), a 2Mbps dedicated leased line – hassle free, reliable and supported by Ms **Electronics corporation of Tamil Nadu Ltd. (ELCOT)**
- 2Mbps redundant broadband fallback connectivity
- **Centralized server** hosting the application and storing the entire data base at **State Data Centre**
- In coordination with **TN Electricity Board (TNEB)** we have ensured no power cuts during out-patient hours. The hospitals have been moved out of load shedding grid by TNEB. UPS with two-hours backup supplied to all hospitals in case of power failure.
- Requirements finalized with end-user inputs – entire application customized to suit their needs
- Open Source Software: No vendor lock in at any stage of implementation/future expansion.
- Simple, user friendly screens designed for ease of use.
- Institutional training for the end user: to ensure full participation and comfort of use.





Support services

- Centralized help desk to respond to users regarding hardware/connectivity related issues
- One IT Technical coordinator at each district to supervise and troubleshoot in case of hardware issues.
- M/s TCS which is our software solution provider and implementing partner has made available a team at the centralised helpdesk in order to respond to end users to clarify, solve queries related to application software
- M/s ELCOT is providing support for maintaining the TNSWAN connectivity and the central server hosted at the State Data Center
- PD, TNHSP conducted regular hardware / software vendors review meetings to ensure proper coordination among divergent group of vendors during the infrastructure setup process.

Innovations brought about by the project:

- Unique Patient identification Number (PIN)
- Unique Institution codes across all government hospitals and office
- Unique employee numbers/ user names and passwords – for access to system
- Re-use of drug codes (from other Central procurement agency)
- Re- use of the treasury codes for Finance related information
- Uniform and standardized reporting formats across all institutions.
- TNHSP has proposed to link the PIN to the UID that is to be developed by the Government of India.
- The Lab tests results are being given to the patient with test report reference values
- The final disease diagnosis is linked to International Disease Code- 10

Achievements

- GOTN has issued a Government order for pilot & phase I hospitals to do away with manual registers and maintain all the relevant data online.
- 41 hospitals across 5 districts currently live with the online system in a short period of 7 months. All end users are expected to use the system with NO data entry support. All Registration, Stores, Pharmacy, Wards, Lab, Doctors' Out Patient (OP) processes are fully online and no manual records are maintained.
- Real time data is available, 24/7 at these 41 hospitals. The doctors are making direct online entries for diagnosis, ordering lab tests and drug prescriptions. The HMIS reporting system covering Clinical, Program, Administrative including Finance, Personnel, Infrastructure modules provides, immediate online access to the Health Administrators at the Institutional level, District level and at the State Level on various critical data sets.
- After successful implementation of HMIS in 5 districts, approvals have been sanctioned immediately to extend this project to 222 secondary care hospitals across the remaining 25 districts in the state. The 18 medical college hospitals across the state will also be included during the Phase II implementation for which Software requirement studies & Hardware requirement studies are on going.
- Project awarded the "e -India 2009 award for category e- Health – Best Government initiative/policy for the year 2009" at the e- India event, held at Hyderabad during August 25-27, 2009.
- HMIS-paper was invited for oral presentation at & e-Asia 2009 conference, Colombo, Dec 2-4, 2009 and at Med-E-tel conference, Luxembourg April 14-16, 2010.

The Director of Medical & Rural Health Services
Reviewing the Hospital Performances online



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