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HMIS

Courtesy By

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Introduction

The Government of Gujarat has identified the **quality health services** and the **efficiency of Government managed hospitals** as a key contributor for building trust and confidence for the general hospitals in the hearts of the citizen of the state.

In order to be able to take prompt decisions at appropriate times required a holistic view of the functioning of all district level hospitals at the state head quarter level which mandated integrated information system deployment across the hospital processes.

The Hospital Management Information System (**HMIS**) has been envisaged to not only help the administrators to have better monitoring and control of the functioning of hospitals across the state using **decision support indicators** but also assist the doctors and medical staff to improve health services with readily reference patient data, **work flow enabled less-paper process** and parameterized **alarms and triggers** during patient treatment cycle.

The HMIS monitors pre-defined health indicators and the embedded exception reporting facilitates decision making by the hospital management and state level administrators for policy and strategic decisions.

HMIS is state-of the-art healthcare solution to provide better care to patients by addressing all the major functional areas of the hospital & the entire gamut of hospital activities.

Each hospital is unique in its requirements and priorities. HMIS is end-to-end solution to the healthcare industry which offers the flexibility of allowing a hospital to choose from various modules as per the hospital specific needs.

One of the major concerns of most hospitals is confidentiality of reports and records. HMIS provides multiple levels of security in the software, so that data pertaining to various functions of the hospital remains confidential. A role based access control mechanism is deployed for restricting / permitting the form level data access.

Situation before Initiative

- Earlier the government was getting the reports from each hospital at the end of the month which was the statistics for the month and the consolidation of the same was done in the next month. The problem that officials face was that within the month if they want to know about how the hospital was performing, how many deliveries took place, how many births / deaths took place at each hospital and the most important the outbreak of an epidemic was unknown on real time basis.
- Also for the hospital administrators it was difficult or rather did not get the information of each department, resource scheduling, online patient clinical Data, and patient's demographic details online. For fetching the same lot of time and manpower was wasted.

Strategy Adopted:

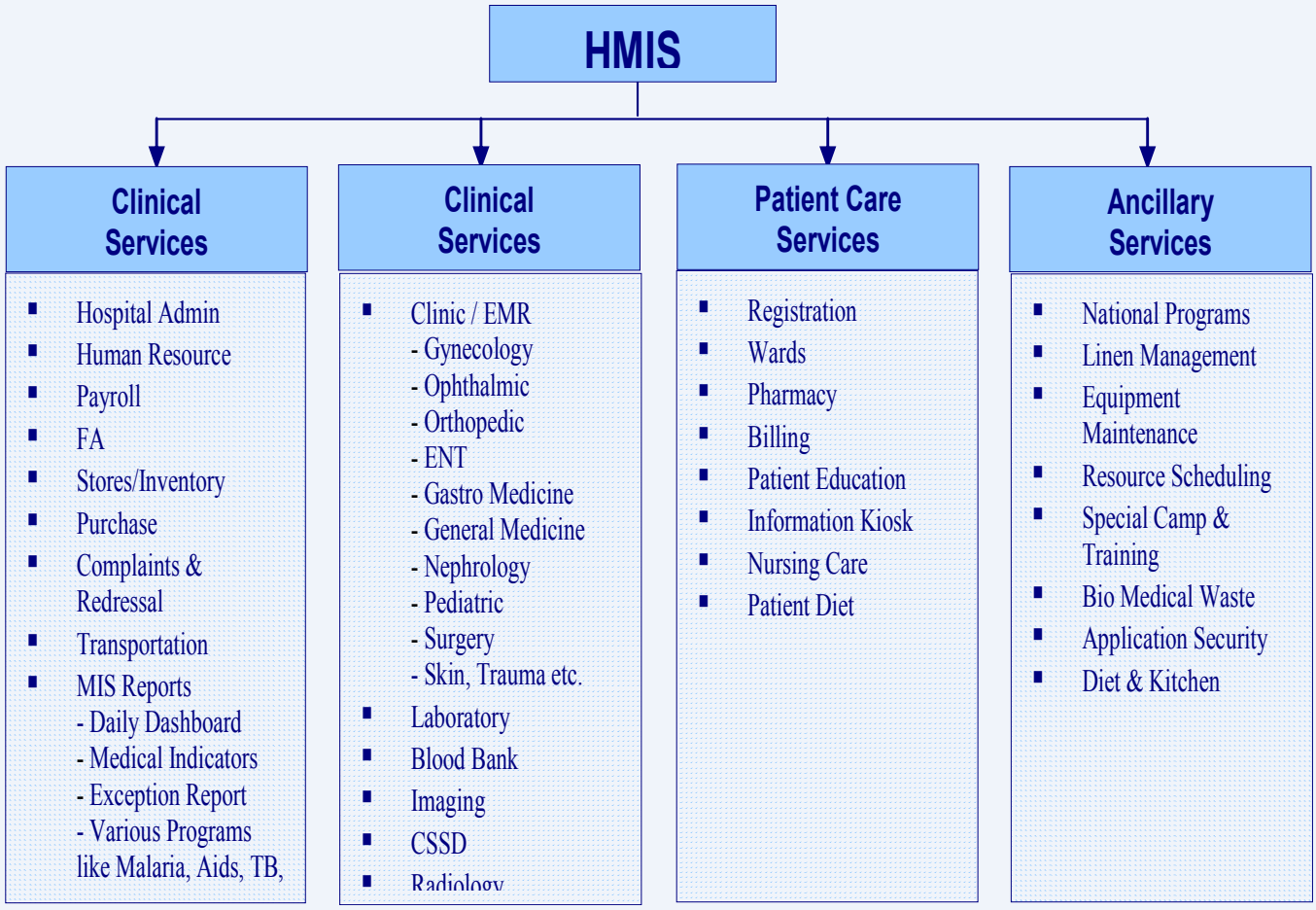
The strategy adopted for implementation of HMIS project has been as follows:

- Selection of Tata Consultancy Services Ltd (TCS) as an IT partner, who had proven expertise and full fledge solutions with ready- to-deploy HMIS framework
- Identication of SSG, Vadodara as teaching and Gandhinagar Civil hospital as district hospital for pilot sites
- 250+ users from across the roles and hospitals interviewed, observations documented and Proof-of-Concept replayed to these users prior to their approving for roll-out to other Hospitals.
- On site hand holding team, regular reviews at Civil Surgeon level as well as Commissioner level for ensuring progress and change management

Backgraound

Gujarat state has 30 district hospitals which are classified as minor and major hospitals. Minor is termed for non-teaching hospitals and major for the teaching hospitals. There are 24 non-teaching hospitals and 6 teaching hospitals. Amongst the 30 hospitals Gandhinagar General hospital, a non-teaching hospital, and Vadodara SSG hospital, a teaching hospital, were taken as pilot hospitals.

There are 26 different modules in HMIS. They are as follows:



- Requirements collected from HFWD, SSG Hospital, Vadodara (125 Users) and Gandhinagar Civil Hospital (92 Users)
- Common Gap Analysis document prepared. This Gap analysis document was explained to 42 users at Vadodara and 40 users at Gandhinagar. They confirmed that the gap analysis was in line with the requirements given by them.
- Acceptance on Gap Analysis for 26 modules received from individual departments as well as final sign off from medical superintendent, I/C medical superintendent.

- Acceptance on 24 clinical specialties functions from IT –Committee doctors.
- Acceptance on 14 national programs from respective Program Owners at HFWD.
- HMIS was customized & developed based on requirements & gap analysis.
- HMIS was implemented at Vadodara and Gandhinagar in the initial phase as pilot.
- At present, HMIS has gone Live in 24 non-teaching District hospitals and 5 teaching major hospital.
- Users training completed in all 24 District hospitals and 6 teaching major hospitals.
- After Go Live, support is being provided for hand-holding for the system to the users as well as to provide answers to user queries.
- **All the Go Live Hospitals being connected to the Central Server located at Health Commissioner Office to enable performance tracking system, analysis of daily records, identify focus areas and enable taking policy decisions.**

Issues & their solutions

The major challenges/issues involved in getting HMIS project to current stage were as follows:

- Overcoming Initial Medical Staff Resistance
- Ensuring availability of requisite infrastructure consisting of computer hardware and connectivity for all hospitals
- Having a modular design for easy maintainability
- Awareness creation and training to all concerned Medical Staff

- Fluctuations in Requirements
- Wide Spread of Area
- Data Replication to Central Server
- Master Data Collection

The benefits accruing due to GPR in terms of degree of reduction man days/time to deliver a service (manual v/s new) are as follows:

- Patient spends less time in waiting queues at registration. OPD, laboratory and pharmacy service counters
- Using HMIS Health department gets immediate online reports from hospitals which was dependent on hospital administration staff
- Hospital Administration can view daily reports online
- Doctors can online view patient history and reports like laboratory investigations reports, which saves patients treatment time.

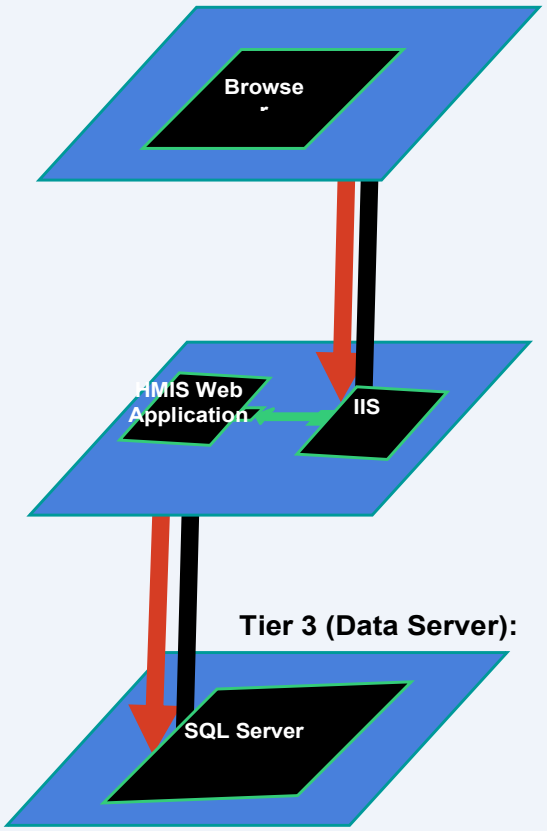
Components & Technology Required For HMIS

HMIS is developed on Microsoft .NET technology with SQL Server 2005 as the data store. The HMIS solution has three tier distributed architecture accessible over Internet. Crystal reports and SQL Reporting services are used for the reporting purpose.

- **Hardware Requirements**
  - Xeon Based Application Server
  - Xeon Based Database Server
- **Software Requirements**
  - Microsoft Windows 2003 Enterprise server
  - Microsoft SQL server 2005
  - Microsoft .NET Framework

- **Technology Architecture**

➢ The below figure explains an overview of the technical architecture that HMIS is built on:



Tier 1 (Presentation Logic):
Includes simple controls and user input validation.

Tier 2 (Application Server):
Includes business processes logic and the data access

Tier 3 (Data Server):
Provides business Data

Advantages of three-tier architecture:

- Easier to modify or replace any tier without affecting the other tiers.
- Separating the application and database functionality means better load balancing.
- Adequate security policies can be enforced within the server tiers without hindering the clients.
- Ease of administration
- Scalability of servers
- Performance (including both processing and network load)

- **Management Standards:**
  - ➢ HMIS has complied to the QCI (Quality council of India) standards for NABH (National Accreditation Board for Hospitals & Healthcare Providers)
  - ➢ HMIS takes care of ICD standards for diseases and CPT coding techniques which are WHO standards.
  - ➢ Blood Bank is complied with the Food & Drug controls.
  - ➢ Business Continuity Measure included Firewalls, Antivirus, IDS, Automated back up etc.

Features of HMIS

Broad features of HMIS are:

- **User Friendliness**

  HMIS is very easy to use because of the extensive assistance provided using customize-able templates. The software is Menu-driven, and help is provided for screens.

- **Graphical User Interface (GUI)**

  A good GUI, helping users navigate with smooth flow. HMIS Graphical User Interface enhances all the user friendly features of the system. The point and click features of the mouse reduces excessive usage of the keyboard, thus making most tasks easy- to-do and hassle free. This saves time and makes information easy to store and access when required.

- **Security**

  One of the major concerns of most hospitals is confidentiality of reports and records. HMIS provides multiple levels of security in the software, so that data pertaining to various functions of the hospital remains confidential. A role based access control mechanism is deployed for restricting / permits the form level data access.

- **Online Help & User Manual**

  What would life be without an A-Z list of easy to do steps? HMIS capitalizes on this function by providing a thorough and comprehensive bilingual (English and Gujarati) online help [Content based help, Index based help, search based help], resulting in easy understanding and usage of the system. Thus, it is not necessary to be computer savvy to use HMIS.

- **Integrated System**

  The user-interface and screen layouts in all the modules have the similar look-and-feel, making an adoptable application. The HMIS also supports data exchange integration with other biomedical equipments and applications.

Objectives & Benefits of HMIS

HMIS is built with objectives taking in to consideration the Streamlining of Operations, Improved Patient Care and Effective Administration and Control. The objectives of HMIS are explained as follows:

- **Streamlining of Operations**
  - ICD 10 standards compliance while categorizing diseases in patient records by doctors.
  - Creating templates for data recording of investigation, treatment and prescription for ease-of-use by doctors.
  - Helps achieve less-paper flow and avoids duplication of entries.
  - Seamless integration between functions for smooth patient movement within various service departments.
- **Improved Patient Care**
  - Each patient is assigned a unique identity number. This number enables user-friendly maintenance and retrieval of electronic medical records during life-time follow-up visits.
  - Easy access to reference records.
  - Online medical procedures for effective and timely patient care.
  - Faster information flow between various departments.
  - Online patient monitoring based on threshold values supporting alarms and triggers to doctors.
  - Hardcopy discharge summary by option, patient-wise, for future references.
- **Effective Administration and Control**
  - Monitoring cost of per-patient quality services, rate of bed occupancy, doctor's efficiency and performance, lab technician and equipment performance, average time spent to get health service patient-wise and so on.
  - Issue of pharmacy patient-wise, stock status and re-ordering of medicines, inventory carrying cost and expiry date monitoring.

- Pro-active monitoring of quality health service indicators for decision support.
- Availability of timely and accurate information.
- Access to updated Management Information.
- Controlled administration using features such as communiqué, centralized purchases, holding/ withdrawing sub-standard medicines from issuance, camp management and epidemic controls and so on.

Benefits

Along with the objectives that HMIS provides, the following benefits are given by the system to State administrators, Medical Superintendents, Health care staff viz. Doctors, Nurses, etc., and the Citizens:

- **State Administrators, Medical Superintendents:**
  - State-wide holistic view of hospitals' day-to-day functioning
  - Monitoring of pre-defined health indicators
  - Decision support based on exception reporting using alerts and triggers
  - Management Information System comprising of status update reporting
  - Monitoring of effectiveness of National Programs and identifying areas of improvements

- **Doctors and Healthcare staff:**
  - Increased efficiency due to easy access to electronic medical records (EMR), templates for treatment recording cycle and ICD10 codification support.
  - Can be well-appraised for all patients using parameterized SMS alerts
  - Can record observations using features such as editing, zooming images and different views of the image, video streams in cases of plastic surgery or open heart surgery.
  - Overall reduced time-to-serve patients, with quality patient care
  - Building knowledge-base for research & development support by individual doctor or organization.
  - Keeping track of and manage bio-medical waste as per FDA guidelines and color codes.

- **Citizens:**
  - Efficient health services at hospitals due to digitized history records
  - Quality health services as the doctor's skills are used optimally using electronic patient data.
  - Reduced per visit time to receive health service.
  - Standardized charges for health services.
  - Less waiting time.
  - Longer life of patient records.
  - History available on finger tips – so better care and treatment.
  - No need to carry bulky files along as all the information is available online through the application.
  - Online Information about doctor availability.
  - Easy to find various services in the hospital through map on information kiosk, Information to the relatives about the patient.
- **Service Orientation:**

  The system takes into account the various areas of services that can help the hospitals to perform efficiently. HMIS has taken care of users, citizens etc. in a way that the loop holes of the manual system which obstructs the smooth functioning of hospitals are removed.

  The patient is facilitated by the following ways through the HMIS system:
  - Standardization of workflow across all hospitals
  - Providing adequate privacy for patient information.
  - No need to carry bulky files along as all the information is available online through the application.
- **Efficiency**

  The efficiency of the system can be counted in terms of time, prompt response, robustness and flexibility. HMIS is built on those lines. The description below explains the efficiency.
  - Adopt accepted International and National Standards in the solution framework.
  - Be Open and Scalable for enhancement.

- Lowering of the annual operating and support costs.
- Minimize the manual efforts/operations while enhancing automation.
- Provide a browser based solution thereby largely eliminating installation and maintenance issues.
- Providing fast and effective access to the information.
- Seamless migration to the new system ensuring no loss and continuous availability.
- Use accepted technologies

- **User Convenience**

  The user facilities are given high importance by the HMIS system. The facilities not only include a good Graphical User Interface but the following ones also:

  - The users are eased for the searching facilities as the data would be available at the click of the mouse.
  - The write up for the certificates will be automatically populated as there is data flow between departments hence reducing the rework.
  - The physical file maintenance is gone as everything is backed up using back up facility.
  - User Friendly to enable ease of use for the end user.

- **Reduction of Touch Points**

  The frequent movements of the patients from department to department are reduced by implementing the single source of information. The following points describe the same:

  - Establishing single source of information
  - The establishing of civic center within the hospitals can reduce the worries of patients to collect their various RMO reports
  - Instead of going to collect their Laboratory investigations report from the respective labs, a consolidated report can be availed from a central location.

Current Status

Health & Family Welfare Department, Govt. Of Gujarat - Status Summary	
Hospitals completed 1 Year Live Support (4)	
Gandhinagar – 26th Jun, 06	Jamnabai – 15th Nov, 06
Nadiad – 19th Apr, 07	Sola – 23rd Apr, 07
Hospitals using Live HMIS (25)	
Valsad – 29th Jun,07	Navsari – 21st Jan, 08
Godhra – 9th Jul,07	Bharuch – 22nd Jan, 08
Patan -9th Jul,07	Petlad – 4th Feb, 08
Rajkot PDU – 1st Jun, 07	Palitana – 4th Feb, 08
Amreli – 21st Jul, 07	Himmatnagar – 7th Feb, 08
Mehsana – 13th Aug 07	Rajpipla - 12th Feb, 08
Junagadh – 16th Aug 07	Ahwa – 14th Feb, 08
Bhuj – 30th Aug, 07	Surat – 03th Mar, 08
SSG Vadodara – 08th Oct, 07	Jamnagar - 7th Mar, 08
Palanpur – 28th Nov, 07	Dahod – 10th Mar, 08
Surendranagar – 14th Dec, 07	Porbandar – 10th Mar, 08
Jam Khambadia – 31st Mar, 08	Rajkot PKG – 26th Mar,08
	Bhavnagar – 26th Mar,08

Sustainability

The following are the areas where the HMIS system has proved sustainable:

- **Training**

The training is provided to all the users across the state. Required executives/manpower deployed in all the live sites where the system has become operational. Currently the live sites are Gandhinagar, Jamnabai Vadodara, Sola Civil Hospital – Ahmedabad, Rajkot, Valsad and Nadiad. The training has been currently provided in 28 out of the total 30 hospitals.

- The trainings are taken by the users in a passionate manner.
- There are some challenges during the initial days of training but as the user comes to know about the benefits he gets involved.
- A briefing of the system is given to the users of each department and all their doubts are cleared.
- The sessions being interactive makes it sustainable enough to mature the system through various queries.
- After the training each user is given hands on experience on the system.
- The queries are solved and the user is easily able to cope up with the system.

- **Internal Sustainability**

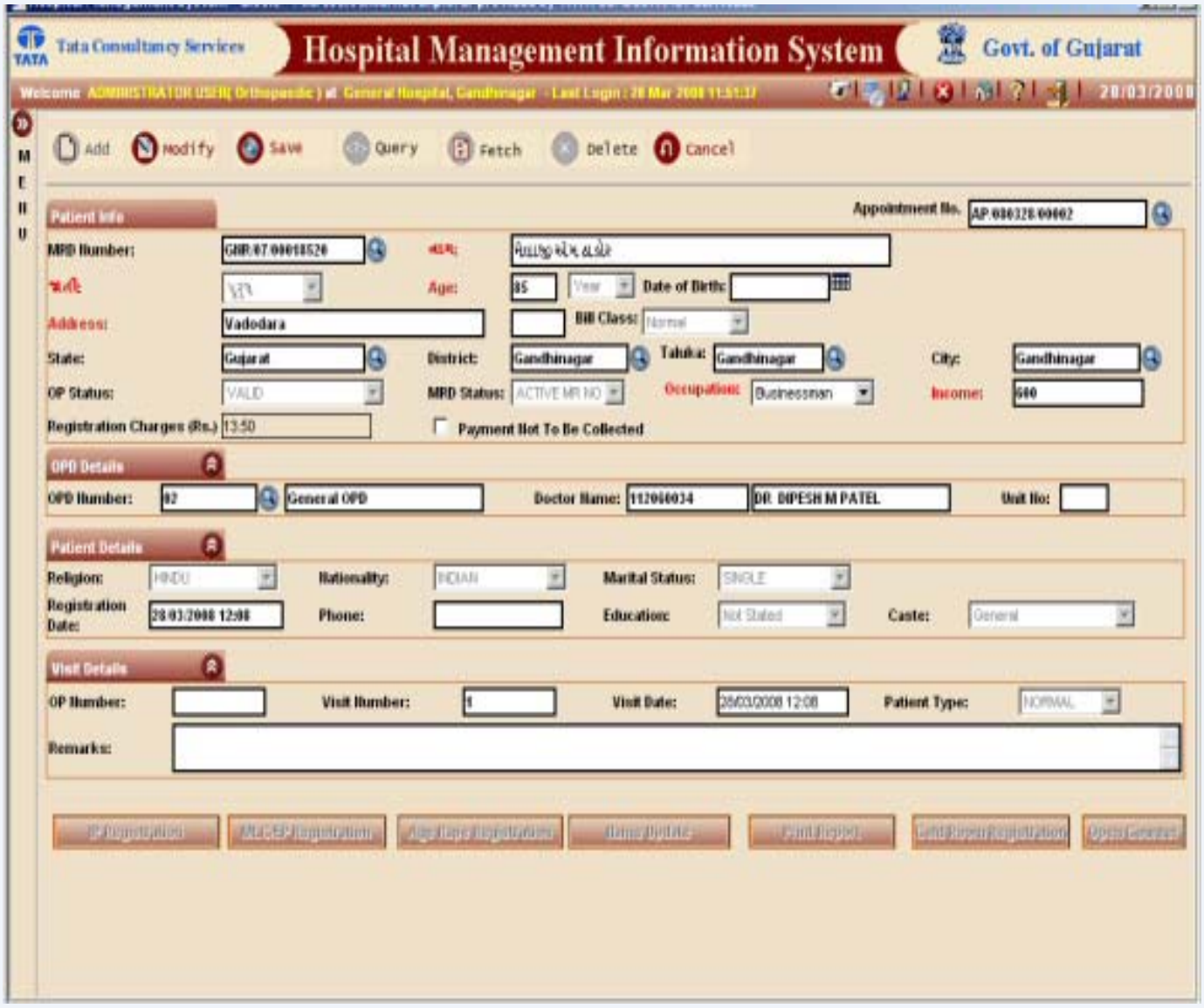
- The users are able to map their manual system to the HMIS very easily due to the friendly Graphical interface.
- The users' interest to make HMIS more effective helps the system to grow mature and this is possible due to the flexible nature of the system.
- The help menu provided on each screen facilitates self problem solving mechanism. The help is provided in both Gujarati and English.

- **External Sustainability**

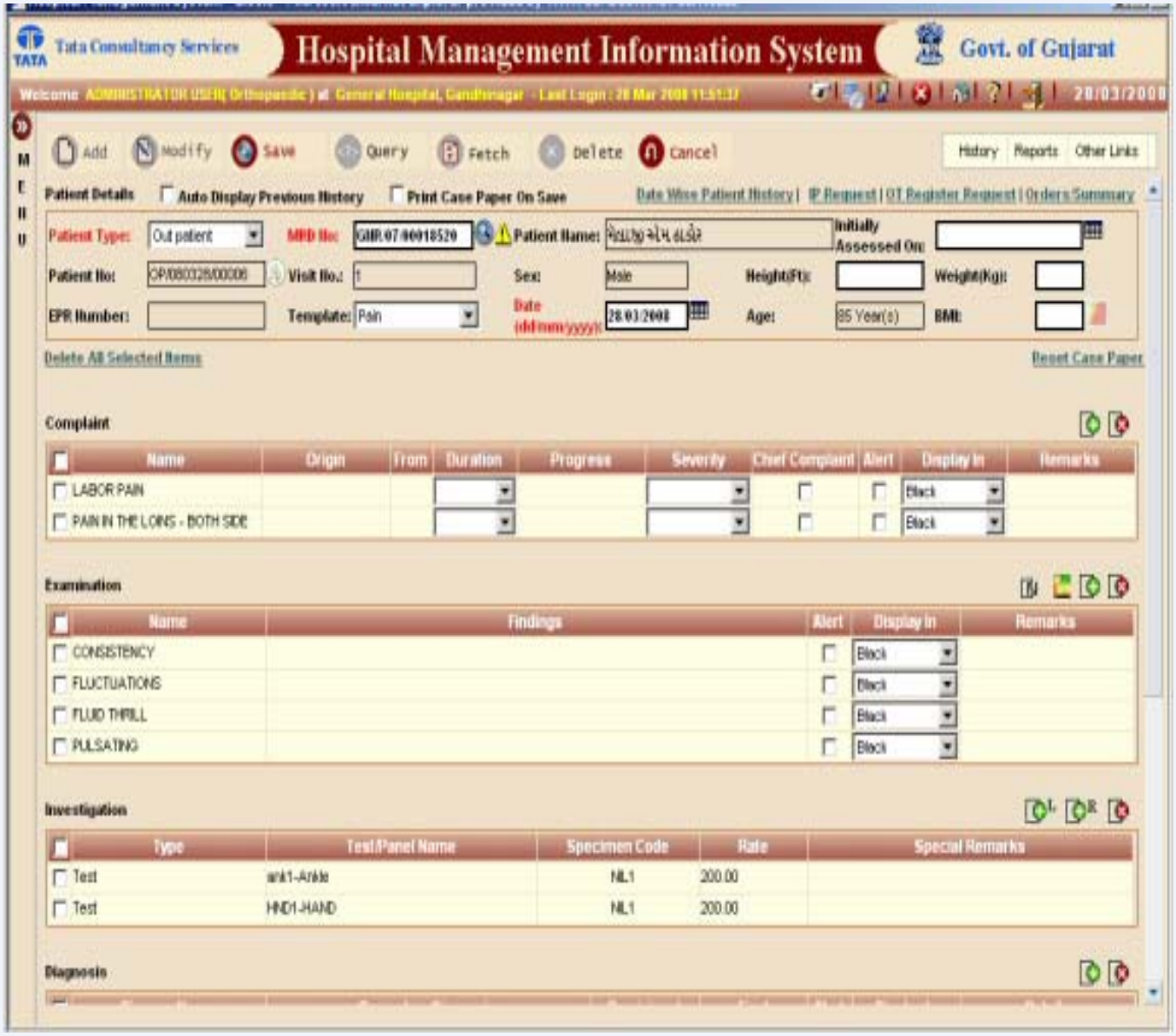
- The citizens are eased by fewer movements.
- The reports are available within very less time.
- The patient's relatives can find the patient's location within the hospital on real time basis.

Screen Shots

Home Page

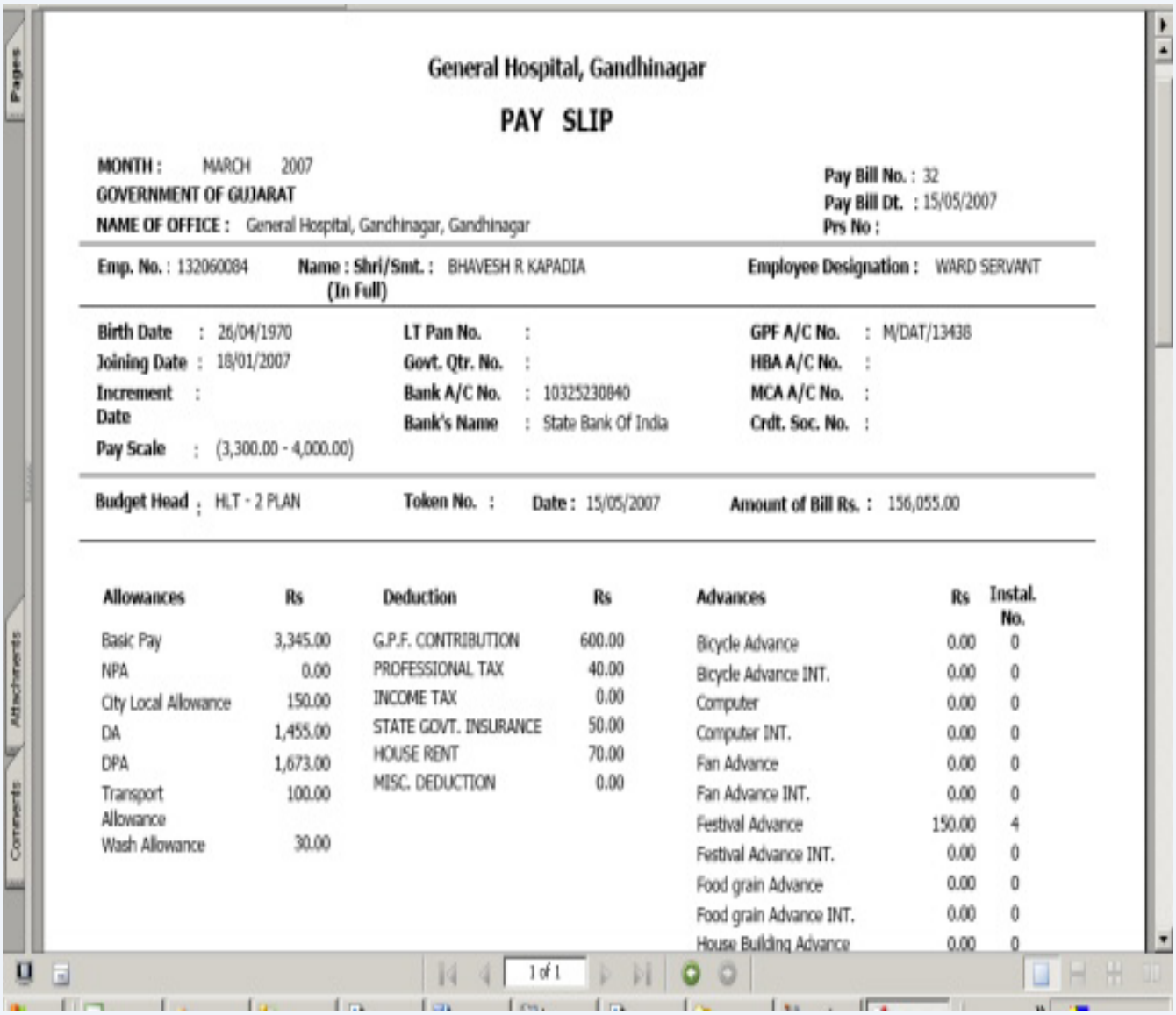


Patient Registration


Tata Consultancy Services
Hospital Management Information System
Govt. of Gujarat
Add
Modify
Save
Query
Fetch
Delete
Cancel
History
Reports
Other Links
Patient Details
Auto Display Previous History
Print Case Paper On Save
Patient Type:
Out patient
Patient Name:
Sex:
Male
Age:
Complaint
Name
Origin
From
Duration
Progress
Severity
Chief Complaint
Alert
Display In
Remarks
LABOR PAIN
PAIN IN THE LOINS - BOTH SIDE
Examination
Findings
CONSISTENCY
FLUCTUATIONS
FLUID THRILL
PULSATING
Investigation
Type
Test/Panel Name
Specimen Code
Rate
Special Remarks
Test
ank1-Ankle
NIL1
200.00
HND1-HAND
Diagnosis

Case Paper

Date wise patient's History



General Hospital, Gandhinagar

PAY SLIP

MONTH : MARCH 2007
GOVERNMENT OF GUJARAT
NAME OF OFFICE : General Hospital, Gandhinagar, Gandhinagar

Pay Bill No. : 32
Pay Bill Dt. : 15/05/2007
Prs No :

Emp. No. : 132060084 Name : Shri/Smt. : (In Full) BHAVESH R KAPADIA Employee Designation : WARD SERVANT

Birth Date : 26/04/1970
Joining Date : 18/01/2007
Increment Date :
Pay Scale : (3,300.00 - 4,000.00)

LT Pan No. :
Govt. Qtr. No. :
Bank A/C No. : 10325230840
Bank's Name : State Bank Of India

GPF A/C No. : M/DAT/13438
HBA A/C No. :
MCA A/C No. :
Crdt. Soc. No. :

Budget Head : HLT - 2 PLAN Token No. : Date : 15/05/2007 Amount of Bill Rs. : 156,055.00

Allowances	Rs	Deduction	Rs	Advances	Rs	Instal. No.
Basic Pay	3,345.00	G.P.F. CONTRIBUTION	600.00	Bicycle Advance	0.00	0
NPA	0.00	PROFESSIONAL TAX	40.00	Bicycle Advance INT.	0.00	0
City Local Allowance	150.00	INCOME TAX	0.00	Computer	0.00	0
DA	1,455.00	STATE GOVT. INSURANCE	50.00	Computer INT.	0.00	0
DPA	1,673.00	HOUSE RENT	70.00	Fan Advance	0.00	0
Transport Allowance	100.00	MISC. DEDUCTION	0.00	Fan Advance INT.	0.00	0
Wash Allowance	30.00			Festival Advance	150.00	4
				Festival Advance INT.	0.00	0
				Food grain Advance	0.00	0
				Food grain Advance INT.	0.00	0
				House Building Advance	0.00	0

1 of 1

Employee's Pay Slip

eGovernance News

Government of Gujarat organized JOB FAIR for "NAC Round-1" candidates

Government of Gujarat and **NASSCOM** jointly introduce **NASSCOM Assessment of Competence (NAC) - an assessment-cum-certification program** for candidates who aspire to be a part of the ITES-BPO industry. **Gujarat Informatics Limited (GIL) - the nodal agency of Govt. of Gujarat, for promotion of Information Technology** in the state & NASSCOM, the premier trade body and 'voice' of the IT-BPO industry in India, Organized Two days **ITES—BPO Job Fair on 26th and 27th April, 2008** at St. Xavier's College, Navrangpura, Ahmedabad. Over **15 companies** are participating in the fair including industry giants like **Genpact, Infosys BPO, Firstsource, Wipro BPO, Deloitte, Hi-Tech Outsourcing, Magus Customer Dialog, Motif India Infotech, Stream International, Azure Knowledge Center, Etech Inc, Ace Infoway, Minacs Adityabirla, iCall India** and **Unisys Global Services**.

NASSCOM, with active participation of ITES-BPO industry players, designed NAC, which is aimed at creating a robust and continuous pipeline of talent by transforming the "trainable" workforce into an "employable" workforce. As working with the ITES-BPO industry involves working primarily for global clients, that too in a global environment, the preferred language (medium of instruction) is English.

NAC is to become a national-level certification program and its first administration at Gujarat took place in the month of August 07.

eGovernance News

Public release of free Gujarati Software Tools & Fonts CD

Department of Information Technology, ministry of Communication & Information Technology, Government of India carry out **TECHNOLOGY DEVELOPMENT FOR INDIAN LANGUAGE PROGRAMME** association with **CENTER FOR DEVELOPMENT OF ADVANCE COMPUTING (CDAC)** organized event for **Public release of Gujarati Software Tools & Fonts CD** at the hand of **PASMASHREE DR. KUMARPAL DESAI (Former Precident, Gujarati Sahitya Parishad)** & **SHRI. E.K. Bharat Bhushan (Joint Secreatary & Financial Advisor, Department of Information Technology, Government of India)** on **1st may, 2008.**

WEB CORNER

Website for Health & Family welfare Department

http://www.gujhealth.gov.in/

Official Portal for Government of Gujarat

http://www.gujaratindia.com/index.aspx

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