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## Hospital Management System

- Introduction
- Vision
- Situation before initiative
- Objectives
- Advantages
- Technology
- Process
- Services
- Impact of Project
- Road Ahead
- Screenshots
- eGovernance News  
eIndia Awards 2009

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# Hospital Management System

(Application of Institute of Kidney Diseases and Research Centre and Institute of transplantation Sciences)



## Introduction

**Institute of Kidney Diseases and Research Centre and Institute of transplantation Sciences (IKDRC-ITS)** is a charitable institute located at Civil Hospital Ahmedabad.

IKDRC-ITS is a tertiary care twin institute of public sector rendering state-of-art services like dialysis, kidney/ liver transplantation, lithotripsy, etc to patients from all over the country, suffering from kidney and urological ailments. The three pillars of education, service and research on which this institute functions, are equally well developed, inter-dependent and strong. To make these areas more proficient, computerization was installed in 1998 first for transplant patient related services and research.

## Vision

Provision of quality healthcare for all sections of the society by making management of the public sector hospital efficient and paperless with effective through specially designed Information Technology solution capable of providing online data analysis, health indicators, policy making and management tools at every level.

## Situation before initiative

In older version of software, proper patient management and medical data management facilities was not co-ordinated with each other and single accounting for all patients and government scheme was not established at root level (Right from new patient registration to his entire hospital stay). This hospital gives a concession to economically poor patients, the procedure which patients has to follow was tedious and time consuming, medical records and laboratory machine integration was not possible with older software which was worked in fragmented module and not able to integrate with each other. In a final stage, to outcome from such a limitation in working area in administration and medical procedure," Hospital Management System" application has been designed to give more integrated patient services and administrative control and monitoring over the system, with the help of integration this software is cost and time saving. Each level of working environment is benefited with this system.

## Objectives

- Streamline the medical / administration work flow
- Reduction / Elimination of duplicate works
- Increased productivity
- Prevent Inventory Loss
- Patient tracking to increase productivity of inpatient allocation
- Instant Patient Billing (Accounting for various cashless tariff)
- Real-time management and accounting report.
- Creating templates for data archiving like investigation, treatment and prescription for ease-of-use by doctors
- Seamless integration between functions for smooth patient movement within various services
- Effective Administration and Control

Hospital Management System (HMS) has been upgraded to provide umbrella of services to all three areas viz services, research and education; and for administration. The aims were:

1. Streamlining the operations
2. a. Updated information for administration, on every OPD patient visiting the institute  
b. Updated information for treating doctors on every OPD/ IPD patient
3. Online and updated information on every procedure including surgeries performed on every patient
4. Discharge information
5. Complete records of all patients, which will help in generating statistical information as well as for research studies
6. Try to move towards paperless stage
7. Ensure smooth operations and user-friendly environment.

This has led to efficient data entry management, catering of services, identifying the problem areas and strategies to solve them. In addition to these it has led to transparency of the system with immediate availability of any kind of information related to the institute. Regular updating of the website of institute at 3 monthly intervals is also a task for this system.

HMS provides very effective policy decision making tools for middle & top level management. HMS provides strong front-end for hospital user for the customized and re-engineered processes to ensure optimum utilization of equipment and man power. The HMS monitors pre-defined health indicators and the embedded reporting facilitates decision making by the hospital management and state level administrators for policy and strategic decisions. The patient benefits the most by getting well managed hospital services, health care details and other related services. HMS system supports electronic workflow management.

## Advantages

**The major advantages of a workflow system are as follows:**

- Sharing of critical patient information among users of different modules with secure rights management
- Enhanced process quality and patient service mainly due to managed circulation of patient information across departments and greater control over decision-making
- Traceability of actions for a critical patient condition.
- Improved efficiency of hospital staff

- Elimination of unnecessary steps and self awareness amongst hospital users about his/her roles and responsibilities
- Hospital Staff feels completely involved in the entire process and capable of getting answers to important questions in a timely fashion
- Streamlines responsibilities of user and clarifies roles of every employee
- Provides optimized patient flow leading to improved treatment outcomes
- Saves time and keeps staff and patient connected with each other.

## Technology

System is built on end to end Microsoft architecture and satisfies the technical requirements of Digitalization of IKDRC -ITS

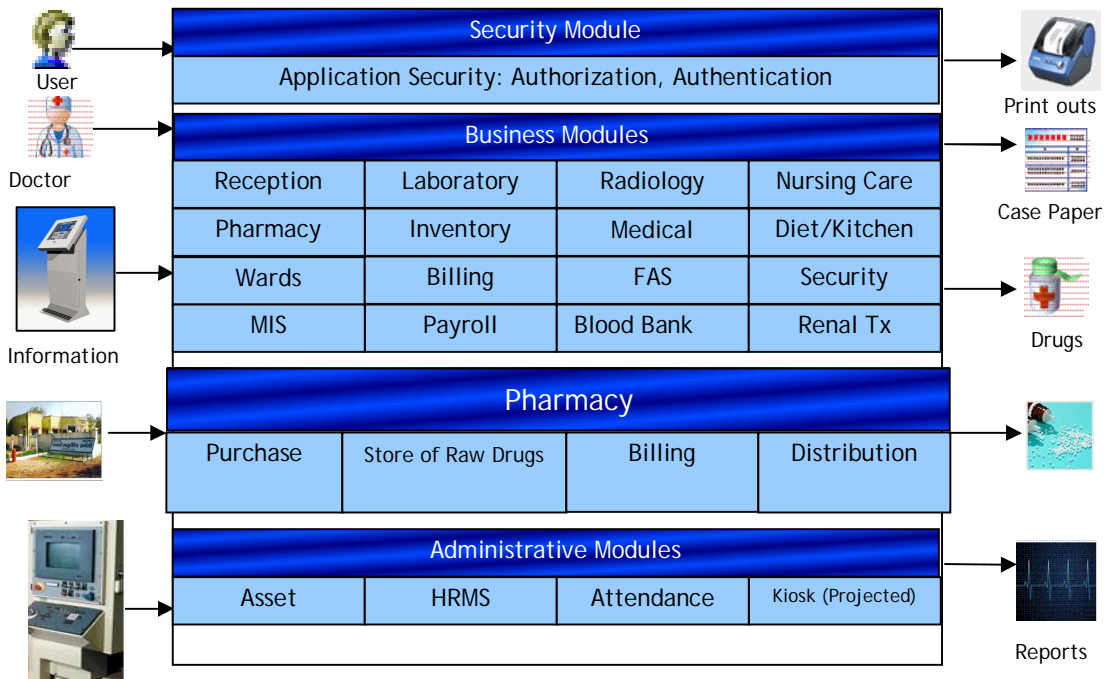
The following are major advantages of the proposed architecture

- Lower cost for training, upgrades, downtime, installation, operation, maintenance and skill building.
- Development, Maintenance, Administration features are richer than other RDBMS with better cost benefit.
- Other utility features like Analysis Services and Reporting Services which are inbuilt in SQL Server 2005 helps in reducing the cost.
- Inbuilt support for Network Load Balancing.
- Specific data can be generated as per requirement.

**The following are goals for technical architecture to be achieved.**

Criterion	Description
Scalable	The architecture should take care of high volume growth.
Flexible	The processing must be easy to adapt to different kinds of users or requirements
Manageable	The services provided at each layer must be easy to manage (with a clear interface for administration).
Extensible	It should allow easier development of new applications based on the existing components.
Interoperability	To be able to communicate with different systems that is currently in use.
Security	Minimizing the possibility of adulteration of data or unauthorized access. To maintain data confidentiality and integrity.

**Table 1**



## Process reengineering & legal reforms

### a. Major front end process changes

1. 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.
2. Easy access to reference records.
3. Online medical procedures for effective and timely patient care.
4. Faster information flow between various specialties.
5. Online patient monitoring based on threshold values supporting alarms and triggers to doctors.
6. Hardcopy discharge summary by option, patient-wise, for future references.

### b. Major back end process changes

1. 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.
2. Issue of pharmacy patient-wise, stock status and re-ordering of medicines, inventory carrying cost and expiry date monitoring.

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

## Services



The **Coverage and Usage for HMS** is as follows:

No. of System Users	150
No. of Permanent Doctor	91
No. of Module	18
No. of dept. specific modules	3
Size of Database	2.5 GB
No of Employees	458
Max Number of Simultaneous Users	93
No of Node/ Computers On Network	112

No. of Departments covered	17
<b>Average No. of Transactions(Daily)</b>	
Outdoor patients New/ followup Case	500
Pharmacy	450
Pathology	3000
Radiology	1100
Procedure	250
Operations	30
Indoor patients	300

## Impact of the Project

### a. Hospital

- Reduced repetitive paper work for doctors as well as other staff.
- Faster Access to more information as required.
- Good data for research and development on diseases and their cures.
- Better HRD management of employee data like payroll, insurance details, Leaves, transfer, allocation etc.
- Internal communication made easy with the help of worklist in place.

### b. Citizen / Patient

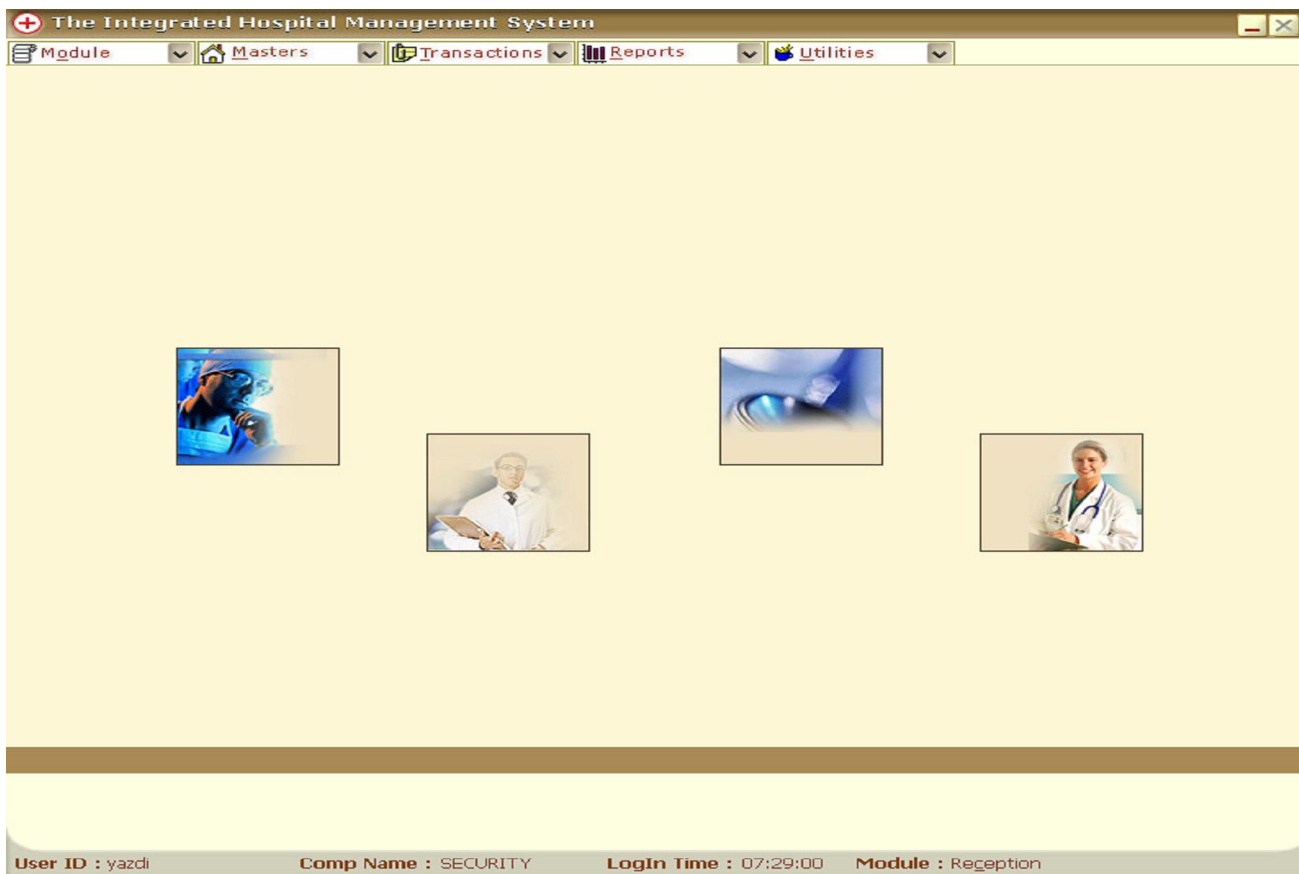
- Significant improvement in health care service by saving average waiting time for the out-patients; reducing the Average Length of Stay.
- E-database for every patient ensured organized record keeping and referral services for all the patients and effective patient care which has increased clarity and legibility of handwriting.
- Access to patient data at any time. E.g. Case papers and other diagnosis details made available as and when required.
- Information kiosk to provide hospital related and health promotion preventive care related information.

## Road Ahead

Following modules are to be included in HMS Application:

- SMS/E-mail alerts to patient/staff.
- RFID for capturing patient and doctor's data.
- Bar Code for inventory management.
- Management is planning to invite NABH & ISO certification Companies like KPMG, DNV for assessing computerized process at various levels.
- Online Appointments.
- Tele Medicine.

## Screen Shots



**Pharmacy Module**

The Integrated Hospital Management System

Module Masters Transactions Reports Utilities Save

**Sales Invoice** Type : IPD Class : Non-reimbursable Profile

Voucher No: [ ] Vou. Type: Cash Memo Class : Patient Voucher Date : 15/Sep/2009

Party Ledger : Pharmacy Cash Receipt CR No : 0154221 Zakirhusen Nanamiya Malek

Doctor Name : Ajay L. Nimavat Address1 : MAILEJ

Godown Name : Main Drug Address2 : MATAR

Del	B/M	Description	Quantity	Rate	Disc.(%)	Amount
<input type="checkbox"/>	M	Vivem 500 mg (Injection)	4	377.86	100	0
<input type="checkbox"/>	M	NS 100ml (Glass) (Injection)	2	9.78	100	0
<input type="checkbox"/>	M	Vasofix No-22 (Surgicals)	1	31.63	100	0
<input type="checkbox"/>	M	I.V Set (Infusion Set) (Surgicals)	1	4.31	100	0
<input type="checkbox"/>	M	5 M L (Syringe)	5	2.50	100	0
<input type="checkbox"/>	M					

Total Amt : 00.00  
 VAT Amt : 0  
 Rounding Amt : 0.00  
 Net Amt : 0.00

Advance Amount : 0.00

Narration : Sales To Zakirhusen Nanamiya Malek

User ID : mohmad445 Comp Name : DRUG3 Login Time : 10:00:00 Module : Medical Store / T / Sales Invoice

**OPD**

The Integrated Hospital Management System

Module Masters Transactions Reports Utilities Save

**OPD** Reports

**Do and don't... Acute Epilepsy taken on Valporin crono 700 mg/day**

Other Links

Do s and don't s

Family history

Follow ups

Diagnosis(ICD Code)

Medical records

Clinical Brief

Prescription

Treatment advised

Investigation

Procedure

Pathology

Radiology

Tx Advice

Tx Required

Nature: Renal Tx

CR Number : 0186641 OPD no. : 200909150054 Date : 15/Sep/2009

Patient name : Dayaram Chhaganlal Bhilale

Date of birth : 15/Sep/1969 Gender : Male Age : 40 yrs

Patient Class : Non-reimbursable

Occupation : General

Permanent Current Transfer Patient

Adr (1) : Piprad

(2) : Bhikangav

City : Khargon District : Khargon

State : M.p. Country : India

Pincode : Fax :

Tel (1) : 09617170429 Tel (2) :

Mobile : Pager :

Email : Web :

Total Test Amount : 460

### IPD Doctor Visit

The Integrated Hospital Management System

Module Masters Transactions Reports Utilities Save

Doctor Visit Discount View Report

**In - patient details**

Registration no.: 20090907010 Current Outstanding : 10

Patient: Tarachand Radheshyam Agrawal

Admission date: 07/Sep/2009

Block: Main Block

Floor: Forth Floor Ward: C.C.U

Consulting doctor: Hargovind Laxmishankar Trivedi(Doctors) Bed: C C U-4

**Doctor visit details**

Doctor: Hargovind Laxmishankar Trivedi

No.:  Test Priority: Normal

Type: Consultant 0

Date: 15/Sep/2009 Time: 10:59 AM

Diet/other instructions:

Conclusion:

Blood Bank  
Diet & Food  
Service / Item  
Medical Record  
Patho tests  
Radio tests  
Prescription  
Procedure  
Instruction for nurse

### IPD Nurse Visit

The Integrated Hospital Management System

Module Masters Transactions Reports Utilities Save

Nurse Visit Discount View Report Current Outstanding : 10

Registration No: 20090907010 Admission date: 07/Sep/2009 Type: General

Patient: Tarachand Radheshyam Agrawal

Last visit by doctor: Amit Trivedi On 15/Sep/2009 06:55 PM

Visit by nurse: Renuka Pankajbhai Shah On 15/Sep/2009 07:00 PM

Patho tests  
Radio tests  
Procedure  
Service / Item

Prescribed drug brand	Drug dose	Action taken or value
Fluzet 60ml	0-1/2-0	<input type="checkbox"/> Given
Candid-V3 Vaginal	0-1/2-1/2	<input type="checkbox"/> Given

Instruction / advice	Action taken or value	Advice details
Abdominal Girth Chart	Ok	12 Hrsly
Drainage Out Put Chart	500 MI	
In Take --- Out Put Chart	500/210ml	

Diet /Other Instruction:

Remarks: Light Diet |

# eGovernance News

## eIndia 2009 Awards

**eINDIA Awards 2009** Programme is held annually alongside the eINDIA conference proceedings. The Awards are open for all national and international government organizations, civil society organizations, bi-lateral, multi-lateral developmental organizations and enterprises who have transformed social development opportunities into a sustainable social enterprise through innovative use of ICTs.

The 5th e-INDIA 2009 Event **was held on 25-27 August, 2009 at International Convention Centre, Hyderabad.** The award ceremony was held on 26<sup>th</sup> August, 2009 evening.

Following two projects of Gujarat had won the awards:

1. **Gujarat Technological University** in the category of Digital Learning- ICT Enabled University of the year



2. **Ahmedabad Municipal Corporation** in the category of Municipal IT- ICT Enabled Municipal Initiative of the year



## Web Corner

**Institute of Kidney Diseases and  
Research Centre and Institute of  
transplantation Sciences**  
([www.ikdrc-its.org](http://www.ikdrc-its.org))

**Website for 5th eIndia 2009  
India's Largest ICT Event**

**<http://www.eindia.net.in>**

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