



A Whole New World

*One can never take away Bangalore's love for the Information Technology industry. **Nayantara Som** gives an insight into the new avenues and vistas opened up in Bangalore by the IT industry*

Imagine this. You are sitting in Chicago and for a long time, you had been contemplating hip replacement surgery. But many reasons stopped you from such surgery—sky-rocketing prices, the problems of getting an appointment, problems in zeroing in on the appropriate surgeon, problems in accessing details pertaining to your surgery and problems in getting an appointment for follow-up treatments. Indeed a never-ending process. You then browse the net. You come across the site of this renowned hospital in Bangalore. To your joy you can immediately fix an online appointment with a surgeon. Matters are made easier for you because the resumes and CVs of all the doctors are put up on the site.

Consider another situation. You underwent a cardiac surgery five years ago in Bangalore. At present, you are based in Texas. But that should not stop you from going for a follow-up treatment. You do not have the hard copy of your medical reports. However, there is no need to hit the panic button. The registration number given to you when you were admitted merely needs to be given to the concerned hospital and voila! you have all the details mailed to you just in time.

This is the magic created when there is a union of IT with healthcare: the magic of God-sent software called Hospital Management System (HMS) or the Hospital Information System (HIS) which has drastically changed the healthcare scenario in the Silicon Valley City.

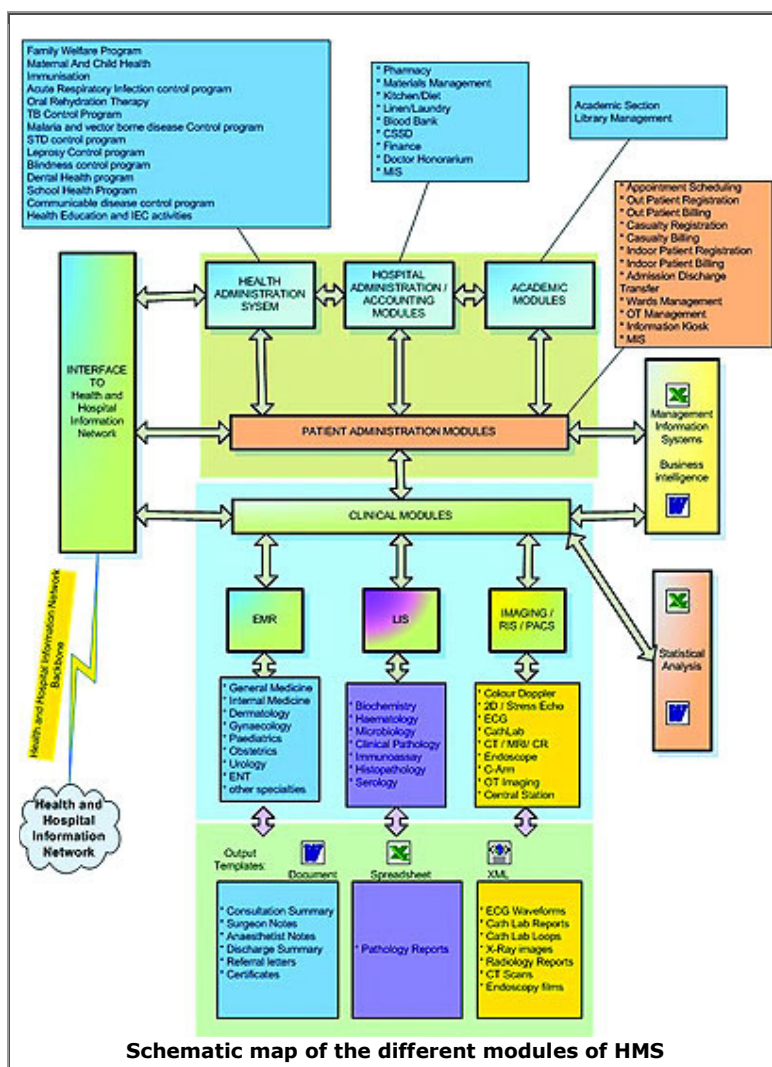
Faster Higher Stronger

Hospitals today, apart from being centres for medical treatment, are also driven by forces of increasing competition, and the need to channelise their specialisations and administrative data. However, with foreign patients streaming into the city, the primary focus is mainly on quality healthcare and streamlined patient-sensitive services. To bring about quality healthcare and prompt service under one umbrella, hospitals have now initiated HIS which today has become the backbone of almost all the private hospitals in the city. Vishal Bali, CEO, Wockhardt Hospitals, asserts, "In the present scenario where there is an increase in the number of patients in our hospitals, the speed of the IT systems becomes very crucial. The systems have to be extremely fast to keep up with the pace."

The incorporation of HIS into the hospital systems was a cakewalk because Bangalore city was always recognised across the world as the 'IT and knowledge hub'. For initiating HIS, most of the hospitals in the city did not have to follow any international models. Bangalore boasts of being the epicentre for the top IT companies in the world.

Moreover, it is these IT companies which have, over the years, become the backoffice for innumerable offices across the world. Herbert Albert, IT Head, Wockhardt Hospitals, Cunningham Road, Bangalore mentions, "As a part of the evaluation process, we looked at the international models so as to enhance the scope of the system. But Bangalore being the leader in IT and the fact that our own country has the best talent right here with us, the task was not at all difficult for us." Many IT experts across different renowned hospitals in the city echo the same opinion.

Above all with Bangalore finding its position in the medical map of the world, hospitals woke up to the realisation that in order to get worldwide recognition, technology that is instant, fast and patient-friendly ought to be adopted. An expert from Sagar Apollo states, "The IT protocol of our hospital is for the benefit of reach and convenience. The idea is to be more interactive with our patients and not to give a feel of a hospital to them."



What Is HIS?

The Hospital Information system (HIS) which is the latest buzzword in most of hospitals today can be compared to a huge umbrella which encompasses different modules pertaining to hospital administration and management.

Satish Kini, Chief Mentor of 21st Century Health Management Solutions, says, "The main modules that should be there in any well-designed and integrated HIS are patient administration and patient billing (PAS) HMS (hospital administration and accounting), Management Information System or Business Intelligence (MIS/BI) and most importantly clinical modules like Lab Information Systems (LIS), Blood Bank Management Systems (BBMS), Electronic Medical Records (EMR) in consulting rooms, wards, OTs, ICUs etc and PACS/RIS (Radiology Information Systems) for capture, diagnosis and distribution of Imaging data."

Different hospitals opt for the modules that they need and after a thorough study of their processes called Solution Mapping, HIS consultants customise HIS to suit the specific policies and practices followed by the hospital.

Kini adds, "Each main module has many sub-modules. PAS has sub-modules like OPD registration, OPD services billing, casualty registration and billing, indoor patient registration and billing, admissions transfers and discharge, appointments etc. Similarly, HAS has sub-modules such as pharmacy/drug store, purchase stores & inventory (surgical/general), CSSD, OT scheduling, linen, laundry, bed management & housekeeping, diet, kitchen, equipment maintenance and ambulance management." Further, LIS has sub-modules such as phlebotomy, reporting and workflow for each of the pathology labs like biochemistry, microbiology, haematology, immunoassay, serology, clinical pathology and histopathology. Similarly there are has sub-modules for reporting and workflow in different diagnostic departments such as CR/DR, CT, MRI, Colour Doppler, Sonography, Endoscopies and even wave forms such as ECG and Patient Monitors in ICU.

However, no endeavour is smooth sailing. As far as the prospect of IT in healthcare goes, there are challenges to be faced. Kini opines, "The biggest challenge has been to design an EMR system that can have unlimited sub-modules as per the specialities and super specialities ranging from General Medicine to Paediatrics, to Cardiology, to Neurology and Urology."

Speciality hospitals in particular over a span of a few years have witnessed a sharp rise in foreign patients. Manually maintaining patient records is next to impossible. To add to the complexity of the situation, each patient requires an entirely customised line of treatment. Pradeep Prakash, Assistant Manager Business Development, Bob Technologies, states, "HIS provides for a patient registration number. This number is distinct and unique. With this number, the most minute of patient details can be accessed. On a real-time basis, patient details can be passed on simultaneously between two departments making work easier and faster."



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- Satish Kini
Chief Mentor
21st Century Health Management
Solutions

It is a win-win situation for both doctors as well as patients. For instance, cash payments can be made to two different departments at the same time. This is known as single window cash payments. Two different departments can also check patient details at the same time if they have the patient registration number.

Tata Consultancy Services has developed the TATA HMS package, which encompasses all the major functional areas of hospital management. The package has been developed on the latest relational database system technology - Oracle 9i and Developer Forms 6i Release 2. The main modules in this package include registration, wards, laboratory, stores, billing, pharmacy, MIS, file management, security and administration. The registration module of TATA HMS is designed to handle in-patient and out-patient registration as well as online bed allocation. In addition to this, it can handle enquiries about the patient's admission and discharge details and the patient's movements within the hospital. The idea is to keep a record of each move of the patient. Even the billing module facilitates cashier and billing operations for different categories of patients and automatic posting of charges for different services such as lab services, consulting fees.



Another leading brand name in the healthcare market, Wipro Healthcare also caters to the top hospitals in the city. Kapil Khandelwal, Head Healthcare, Wipro Healthcare and Life Sciences says, "Wipro Healthcare caters proprietary solutions to its provider segments like Disease Management Platform, HL 7 Integration Platform, ehealthcare Portals, Pay-for-performance Platform, Revenue Cycle Management and Business Office

Management." Wipro Healthcare implements end-to-end consulting, technology and business, and clinical outsourcing solution suites across the entire healthcare chain. It has also formulated solutions and frameworks catering to operations, clinical and business improvement and integration needs for the proponents across the entire healthcare value chain, including healthcare providers. Hospitals like Wockhardt, Bangalore use the Tata and Wipro HMS.

Gone are the days of speculation and panic. IT has revolutionised healthcare to such an extent that a doctor sitting in his consultation room knows exactly what is happening in the Operation Theatre or for that matter before going in for a surgery the surgeon can monitor whether the life saving instruments which will be used in the surgery are properly sterilised. There is easy flow of information from one department to another. This is known as intra departmental information management.

Again for instance if the first blood test is conducted at 9:30 am HIS calculates that the maximum duration for a blood test is 15 minutes. Hence at 10:50 am the fifth test ought to be conducted. In addition to this there is no need for entry of patient details by the doctor. Prakash adds, "A doctor about to conduct a blood test merely needs to go to the blood test department and after the registration number is given, the data gives the patient's medical details and the type of blood test that should be conducted." There is no waste of time. Doctors need not give any random timings to the patients.

Lastly the Clinical Module which is by far the most important module typically includes sub-modules used by the medical and paramedical medical staff such as the pathology lab, doctors and surgeons, clinicians and nurses using Electronic Patient Medical Records (EMR) in consulting rooms, wards, ICUs and OTs. Each department has their own Management Information System (MIS). MIS enables easier management of departmental activities. Monthly and annual reviews and accurate analysis can be easily prepared. Appointments with the specific department are not a hassle through MIS.

Objectives For Incorporating HIS

- Management policies and practices get clearly documented
- Improvisation of services and speedy patient administration and billing processes to reduce patient anxiety and save time
- Gain better control over costs of manpower/ material/ medicine
- Manage much higher workloads effectively without adding staff in non-clinical departments
- Get higher productivity and satisfaction from doctors and hospital staff
- Proper use of clinical modules like LIS, EMR, RIS/PACS can help to increase productivity and satisfaction of clinicians, surgeons, pathologists and radiologists
- Proper use of MIS can help the management take prompt and informed decisions

Factors For Implementing HIS

The hospital management cannot take a hasty step of immediately incorporating HIS into their systems. Myriad factors need to be taken into consideration before incorporating HIS into hospitals. Kini points out a significant aspect. "Before implementing a tried and tested HMS, the hospital management must be clear why they are investing in HMS: what are the deliverables that are planned in what time frame." The market reputation and brand image of the vendor for ongoing support and enhancement is of utmost importance since the administrative wheels of the hospital depend on the HIS solution provided. "Market presence, reputation, experience of the provider; the solution should be highly parametric and should cater to all specialisations. Above all, the solution should work as an enterprise solution with capability to easily integrate the various intricacies of the industry," adds Albert.

Moreover, since it is the clinicians and doctors who will be mostly using the software, their adaptability is a prerequisite. As A Vijaya Rajan, Chief Information Officer, Manipal Health System puts it, "The most important factor is effective change management. Clinicians need to be involved in the decision making process. In addition there should be an effective need analysis and selection of the right application package."

Workload and Security

With patients both international and domestic flocking to city hospitals, the questions that will definitely arise are: Can HIS handle the increasing workload? Is it possible for a third person to access patient medical records? How reliable and secure are the IT systems?

As far as handling the workload is concerned, a good HIS is designed in such a way that it can handle the swelling workload and pressure. HMS is designed to handle up to 40 terabytes of workload. A terabyte is a measurement term for data storage capacity equal to 1024 gigabytes or one trillion bytes.

Arogya Raj, IT expert, Wockhardt Hospital, Bangalore states, "HMS is implemented to reduce workload, to increase work efficiently, and to provide accurate data. Hence it is definitely designed to handle the load." Albert points out, "Given that we have taken so much care to implement the right technology available, which includes the backend support like hardware, network, etc, HMS can handle a good amount of increase in workload." Khandelwal says, "There should be modularity and scalability through the IT architecture and adequate planning for IT infrastructure to support the increase in patient workload."

With Internet services made easily accessible and the number of hackers increasing by the day, security is a sine qua non for any IT department. Vijaya Rajan informs, "Manipal ensures security of stored data by following the practices of Information Security right from the design stages. We implement ongoing monitoring and corrective actions. We might even go for a BS7799 certification."

The security of the software is designed in such a way that that information can be accessed only by the patient or the doctor having the patient's registration number. Moreover, to access any medical details, one has to pass through various levels or security walls. This is an indication of the effort put by software companies in order to maintain the confidentiality of the information. Albert informs, "Every patient is identified by a unique patient ID. Confidentiality is maintained as the patient record is shared over this secure network and uniqueness is maintained with the help of this ID." The security and administration module in TATA HMS, for instance, controls access to information pertaining to patient medical records. Prakash informs, "Ideally when one has to access information, he has to go through various levels. In the first level the unique identification number has to be entered, once that stage is passed the username along with a password will again have to be given. In this way a person will have to pass through various security walls and levels."

This is not all. Every hospital IT department has software, which records the entries, timings, date and the department/level from where the entry was made. Prakash continues, "It is like an automatic log book which is there in most offices. Entries are made automatically for future reference. Hence if someone from the Pharmacy department enters a username and a password, the time, date and department is immediately recorded." Moreover for access to the Internet, there is an IP (Internal External Protocol) whereby the access to various sites is monitored by the IT department.

Telemedicine

After HIS, telemedicine is all set to take Bangalore by storm. Patients sitting in rural areas can easily consult experts sitting in a city. Yes it is all a reality. At present two major hospitals, namely Narayana Hrudayalaya and Manipal practice telemedicine on a daily basis. For Bangalore, it has indeed become a window to the outside world.

The Manipal Telemedicine Network, Bangalore is technically supported by Televital India. The hospital systems are connected to a remote node at one end and a specialist node in the other end. The connection between the two is made possible through V-SAT/ISDN/Leased Line. The remote node consists of devices such as an ECG machine, an A3 X-Ray Scanner and a Video conferencing camera. In addition to this there is a television and a personal computer through which communication is made. There is a Device Manager Software module, which communicates with the medical devices. The specialist node at the other end is connected to a television, a PC and a video conferencing camera. (see graphic). According to an official from Manipal Hospital, "The need for telemedicine arose from the need to introduce new trends in healthcare services."

At present Manipal Telemedicine Network is connected to private hospitals in Gurgaon, Kolkata, Goa and Mangalore. It also operates in far-flung places like Sikkim, Bijapur, Gaya, Hosur, Kasargod and Tumkur. It is affiliated to the Africa Telehealth Group (ATG), and is connected to Bangladesh, Pakistan and Sri Lanka.

Narayana Hrudayalaya



Narayana Hrudayalaya operates on similar lines. The brainchild of Dr Devi Shetty, the telemedicine system was started in 2002 to cater mainly to the rural sectors. Today the telemedicine network of the hospital is connected to countries like Malaysia, Mauritius, Pakistan and the African Telehealth Group (ATG). Being primarily a heart centre, most of the cases that come in are cardiac cases. Dr Vijay Singh, Medical Officer Healthcare Relations, Telemedicine, Narayana Hrudayalaya, points out, "We have a ECG networking of the family physicians, where an electronic ECG machine is connected to a telephone and a computer. The ECG reports can be transferred from the peripheral clinic to the specialist hospital and expert reports are sent back to the family physician at the remote end. This is done via the telephone line, broadband connection or satellite." Advice is given for 10-15 minutes and in a matter of 30-32 seconds, reports are prepared by the specialists and sent to the patient. Dr Singh jovially adds, "Even before the patient puts on his shirt the report is sent back to him." The hospital uses software, which is compatible with the telemedicine ECG machine manufactured by Schiller India, a Germany-based company.

In the telemedicine unit, conferencing takes place; transfer of data like audio/visual data, CT scans, MRIs, X-Rays, is done from remote places to Narayana Hrudayalaya. There is also a Coronary Care Unit. These units are based in remote cardiac hospitals, which are thereby linked to Narayana Hrudayalaya. The main function of these units is to handle emergency (cardiac) cases. Patients are controlled and stabilised before consulting cardiac specialists. At present, the hospital has 17 such centres.

The most laudable fact is that the telemedicine services provided by the hospital are free. Dr Singh proudly states, "We have got a positive response from the rural areas. The mortality rate there has decreased to a considerable extent." Till date the hospital has got 21,000 cases and telemedicine has become a "daily affair". Dr Singh adds, "Other than cardiac cases, the other cases over telemedicine are neurology, nephrology, Paediatric cases and ophthalmology. But nothing could have been possible without the guidance of Dr Devi Shetty over the past five years."

Apart from these two institutions, there are other hospitals in the city, which wish to initiate telemedicine services. Albert informs, "We have been very focused in our concept of telemedicine. As tele consulting has become synonymous with telemedicine, we have ensured that we do not remain with just that, but we also exchange vital patient data including images between the patient and expert end." The concept of telemedicine is still in its nascent stage. Keeping in mind the spirit of the city to venture out into new fields, there is hope that telemedicine will revolutionise healthcare prospects in the city.

Conclusion

The advent of IT in healthcare is definitely responsible for the boom in medical tourism in the Garden City. With the dawn of 2006, Bangalore has become the nucleus for healthcare only for the quality healthcare services rendered—courtesy the IT industry. Apart from this, IT in Bangalore has made a three dimensional change in our perspective towards hospitals and their services. Delayed services, patient records getting hacked, innumerable problems related to billing, problems in accessing your own medical details, problems in getting even your first appointment with a doctor—all these are passé. HIS that is user friendly and interactive is perhaps responsible for attracting many foreign patients into the country.

With the success story of HIS and Telemedicine, the most appreciable part is that hospitals are venturing out into new fields. True, as mentioned earlier, everything is still in its nascent stage but that should not be a reason for hospitals not to look ahead.

IT experts foresee that PACS is definitely the next big thing but with HIS just being implemented, hospitals have not really thought of experimenting with the so-called 'next big thing'. The trailer to yet another success story has just begun. It is time to sit back and witness the marvels that the information technology industry has to unveil for Bangalore.

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