Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore

Effective Management of Long Stay Patients

A team initiative jointly undertaken by the department of Cardiac Sciences, Neuro Sciences and Hospital Management Information Systems at SSSIHMS-Whitefield

Satheesh Kumar S V, Ashwin V, Sai Kiran J, Ravi Kiran R

Background

The Patient Care Committee (PCC) is responsible to review and improve parameters that assess the quality of medical care. This includes mortality, long-stay or morbidity, and out-of-turn admissions. During PCC meeting in April 2012, the need was felt to address the rise in the number of long-stay patients, and evolve a more effective system of regulation and control. A team comprising of clinicians and managers from the respective clinical departments along with a IT manager was constituted to address this issue.
Extended stay of inpatients is a concern as it not only leads to sub-optimal utilization of hospital resources but also increases chances of nosocomial infection and decreases patient satisfaction.

Objective: The objective of this exercise was to study the limitations in the current system and implement a robust method to actively monitor.. In addition it aimed to provide a more effective, visual report to study trends in long-stay across each department. Active monitoring would help control/ reduce long-stay admissions

Pre-Implementation

The previous practice was to review the long stay patients at the end of each month. Queries were run on Enterprise Manager (EM) before the PCC meeting to generate the list of these cases. Managers of each department then obtained comments/ responses from attending doctors and forwarded the list to the Secretary, PCC, who collated these responses into agenda papers for the ensuing meeting, and submitted them to the Director's Office.

The previous system of retrospective analysis of individual cases had the following challenges:
1. Clinicians found it difficult to recollect the details of each case after lapse of days/ weeks, and hence, physical files had to be sought & referred to for substantiating each entry. This time-taking effort resulted in delays.

2. Trends and patterns in movement of parameters were not studied on a day-to-day basis; thus missing on vital information for assessing & improving patient care.

3. Manual creation of reports and collection of data created logistical challenges as well as the possibility of errors.

Implementation

✓Advance scheduling of patients in pre-operative cardiac ward
Earlier, patients in the cardiac ward were scheduled for surgery a day before the actual operation. In an effort to improve surgical planning and scheduling, a provision was created to assign a surgeon, date and time to each patient immediately soon after admission and clearance for surgery (Fig 1.1). In addition, it also provides other details on patients in the ward who have not yet been cleared for surgery (Fig 1.2)

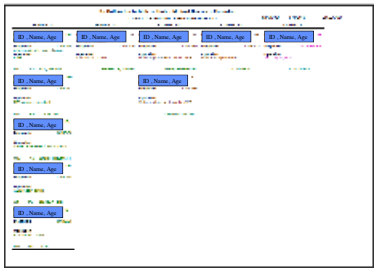


Figure 1.1

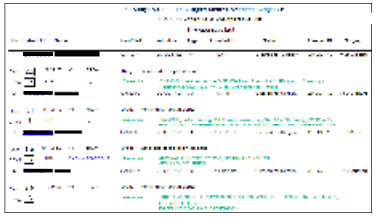


Figure 1.2

✓Daily monitoring of long stay patients in the respective wards
To enable a active monitoring of the reasons for a patient's long-stay and assess trends of these reasons, a standard list of clinical reasons for overstay was introduced into the hospitals' e-HIS. These reasons are currently entered by the nurse in consultation with the attending physician on a day-to-day basis (Fig 1.3) and can be monitored on a dashboard to assess the current situation in the ward (Fig 1.4)

Figure 1.3

Figure 1.4

✓Weekly reports to the director's office
Nurse in-charges from the respective wards provide a weekly report on long stay patients to the director's office. In addition, the director makes periodical physical checks during her daily hospital rounds.

✓Clinical Dashboard for day-to-day monitoring
A clinical dashboard has been created to visually display trends in patient long-stay. This includes reasons recorded in e-HIS. The dashboard also gives an instant visual assessment of trends in long stay. Aberrations in these trends can be instantly identified and the necessary action can be taken (Fig 1.4 to 1.5)

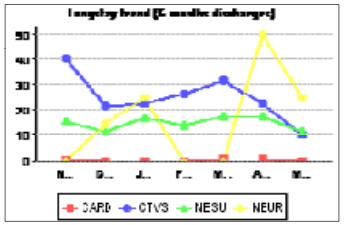


Fig 1.4

Snapshot of Post-op long stay

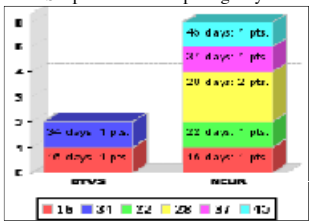


Fig 1.5

Initial Results

There has been a substantial reduction in the number of long stay patients during the month of May (from 1st to 25th May 2012), particularly in CTVS and Neurosurgery. The trend lines over the past 6 months show that these numbers are on the fall.

In CTVS, only 13 patients were long-stay patients in May as compared to 35 patients in April. At 10% of the total admitted patients, this is the lowest percentage reading in the past 6 months.
In Neurosurgery, 20 patients were long-stay patients in May as compared to 33 in April. At 11.5% of total admitted patients, this is also the lowest percentage in the past 6 months.

Cardiology and Neurology have not had a significant rise in long-stay patients admitted to their wards. These numbers are negligible.
The initial results are encouraging, and demonstrate that active monitoring of patient status during admission can reduce the number of long-stay admissions.

Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore

Use of IT in microbiology

Accelerating the Delivery of results to enhance Decision making in Treatment

Sai Kiran J, Satheesh Kumar S V, Dr. Smitalekha

IT in organizing the Microbiology lab work

The LIS as an integrated part of the enterprise-wide hospital information system (EM) defines the process followed in the laboratory – right from computerized test orders till the report reaches the caregiver.

A report (Figure 1) is made available to the microbiology technologists what samples they are likely to receive and what is the expected workload of new samples for them. This is based on the orders placed in eHIS on the Microbiology department

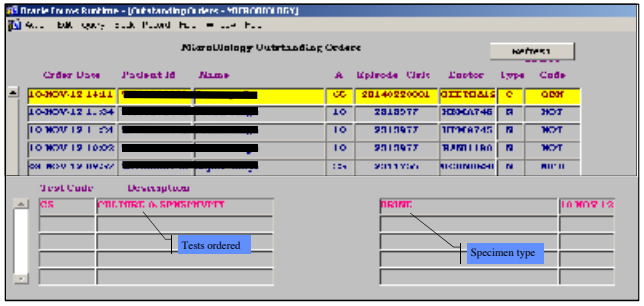


Figure 1

Figure 2 shows a report showing the samples that have been registered on a particular day. The report is used extensively by the technologists to know the samples that are under process/ to be processed. The records are color coded that indicate records which are resulted and which are not

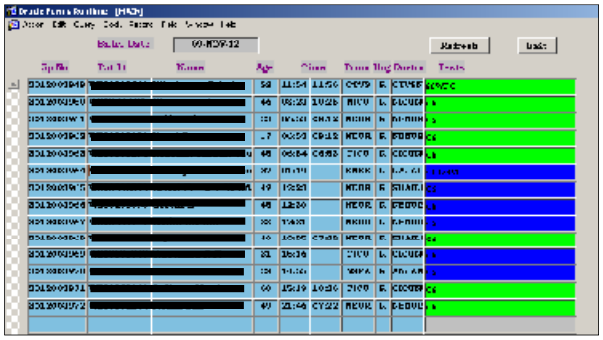


Figure 2

IT helps medical technology deliver what it is meant to

The department has been equipped with automated bacterial culture system (BactAlert) as well as Identification & Antibiotic sensitivity testing equipment (ID & AST - Vitek 2C).

These equipment enable early identification of bacterial infection in the patient samples and an early identification of the organism & provide the antibiotic sensitivity.

Historically, the emphasis has been on interfacing the ID & AST equipment to the LIS to help transfer the detailed reports to HIS: this has its benefits of

- Reducing the time & effort in transcribing the data
- Eliminating transcriptional errors

IT has been used to make it possible to make these benefits result in early treatment of the infection

Advantages of an integrated system in the hospital setting

When the equipment identifies a bacterial growth in the sample, the result is transmitted to LIS.
The *system* sends an auto-generated SMS to the technologist on duty. This is made possible by having the duty roster of the technologists in the *system*. The demands on the Microbiology technologist are such that he has to cater to the works in the media preparation room and in the serology room. Even under such circumstances, the instant, automated communication via SMS ensures that the bacteriology work does not get delayed/ affected.

The technologist then reviews the result in LIS and upon this review, the system sends a SMS to the treating clinician and the nurse in-charge indicating to them the positive bacterial growth found in the patient's sample.

This avoids any delay in the empirical treatment that could be given to the patient upon knowing that he is found to be infected.

Data Analysis/ Mining to aid decision-making

The importance of early treatment of highly dangerous infections cannot be sufficiently emphasized. And many a time, treatment is given empirically even before the complete report (evidence) is known. This is true for treatment of infections too.

Previous data is used to decide upon the empirical treatment of choice. The raw data of antibiotic sensitivity reports of infected patients in the hospital or the particular unit is analyzed by the system and useful information is provided to the care-givers. This information helps the clinician to decide what empirical treatment could be given to the patient before a final antibiotic sensitivity report is available.
This information is provided to the clinicians as reports:

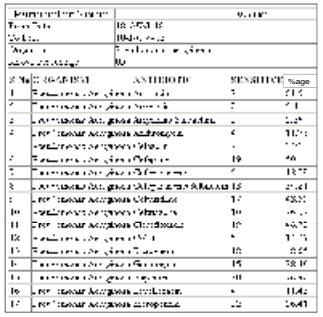


Figure 3:
Sensitivity of various antibiotics for a particular organism

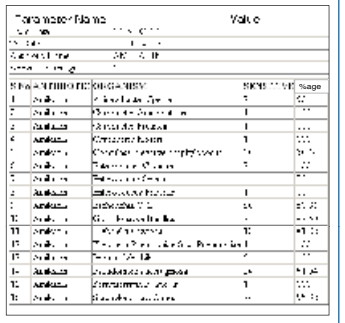


Figure 4:
Sensitivity of a particular antibiotic for various organism

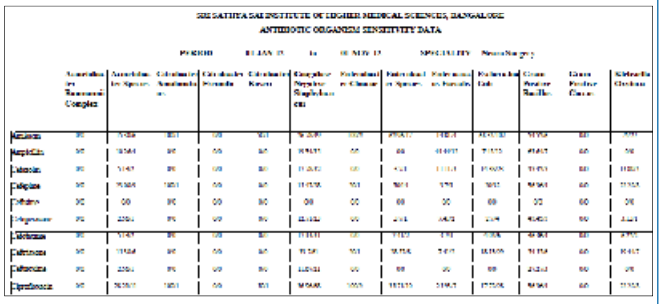


Figure 5:
Report showing Antibiotic Organism Sensitivity Matrix

Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthi Gram

Bed-side Care with Computer on Wheels (COW)

Kannan K S, Ramprasad G

Background

In the year 2007, our hospital formulated a policy of delivering more efficient patient care by being 'paperless' and 'filmless'. This included implementation of an enterprise wide HIS (Hospital Information System) and PACS (Picture Archiving & Communication System). Thus the eHIS 5.x and Synapse 3.0 were deployed at SSSIHMS, Prasanthigram.

The advantages of being 'filmless' were –

(1) Instant, multi-access to all medical images across the organization;
(2) Economy from recurring cost of Imaging films, processor chemicals, physical folders and storage space;
(3) Lesser repeat examinations as images can be fine-tuned;
(4) Saving in personnel requirement.

Need & Solution

All medical images (DICOM) were stored directly in Synapse. These included images from the CR (X-ray images), CT scanner, Ultrasound, Cardiac Cath Lab, OPG (ortho - pantomogram), Nuclear Medicine, C-Arm and Endoscopy. These images were available instantly to clinicians at their desktop computers.

In the wards, ICUs and OTs, images had to be viewed in the Nurses' stations which were not situated close to every patient. This made it difficult for the clinician to view the images and review the patient at the same time and place. When the physical films were available, they could be viewed at patient bed-side. The clinicians needed this 'bed-side viewing' facility to aid in efficient patient-care.

After testing various options such as laptop, thin-client and desktop computer along with regular and RF modems, the following setup was finalized.

1.A desktop computer equipped with a Nanostation2 USB Dongle.
2.Nanostation2 RF Modem from Ubiquiti Networks (2.4 GHz, 802.11 b/g, Antenna Gain 10dBi x 2) with a tested range of 100 Meters.
3.A trolley on wheels with UPS (2 kvA – sufficient for 1.5 Hours power backup).

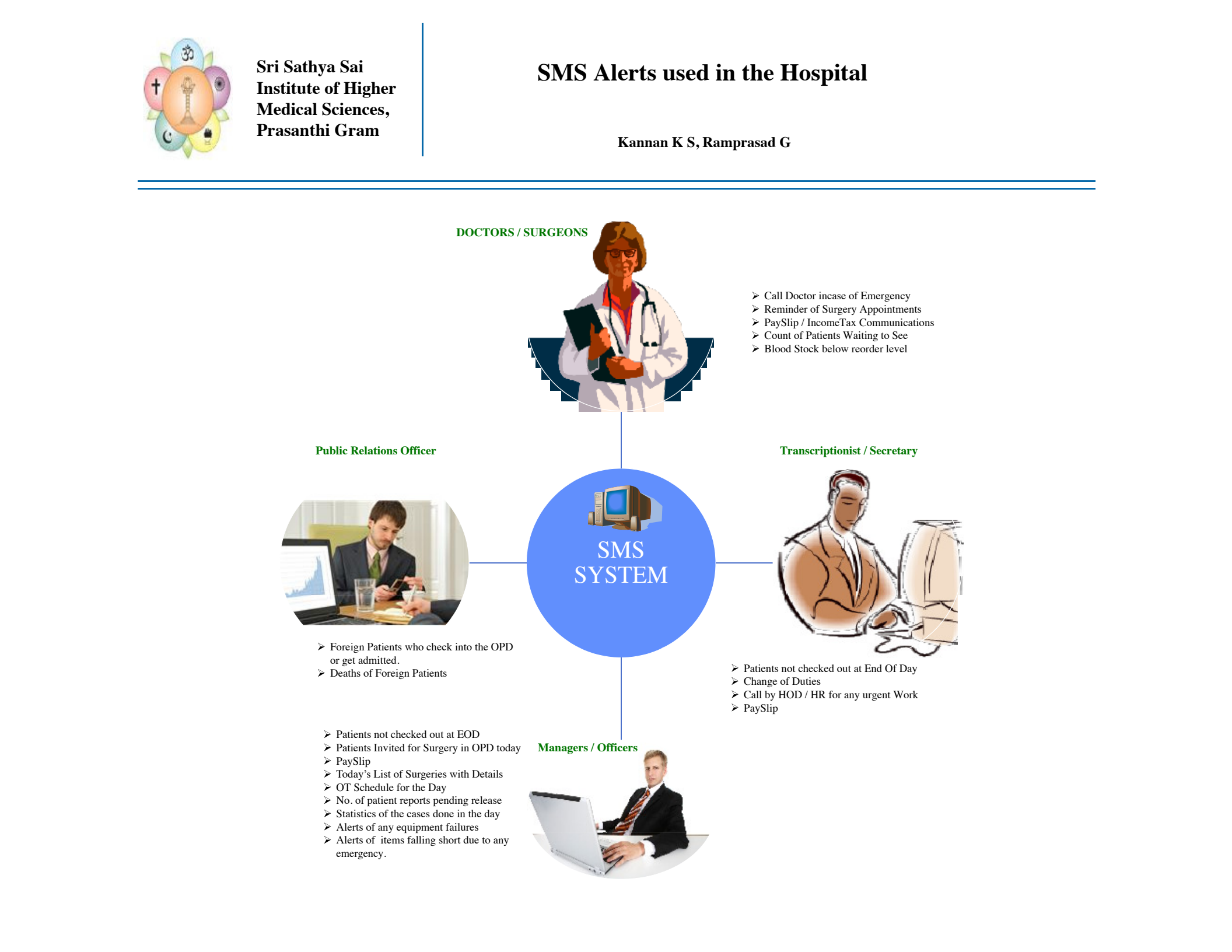
Implementation

Today, clinicians in the wards, OTs and ICUs use the Computer on Wheels (CoW) at patient end-side in the respective clinical areas and get delay-free access to patient images and patient medical records, and can place orders for investigations.

Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthi Gram

SMS Alerts used in the Hospital

Kannan K S, Ramprasad G



Sri Sathya Sai Institute of Higher Medical Sciences, Whitefield

Library Automation at SSSIHMS using NewGenLib

Bharathi Hariharan, Padma Y, Subbarao G V R

Background

SSSIHMS Central library has a large collection of books and journals for the reference of the doctors, students and staff of the hospital. Library houses over 4000 books under Medical, Nursing, General & Spiritual categories.

Primary Functions:

Collection & Cataloging – Ordering, cataloging and de-accessioning of materials

Circulation – Maintaining user accounts, loaning and receiving the books

Maintenance – Shelving books in the correct library classification order

Library used to manage its functions manually for few years.

- Cataloging of books was tedious.
- Circulation and tracking large number of books took time & effort.
- Generating various reports was time consuming and laborious

With the continuously growing number of books, manual management of the books had become tedious. Hence it was decided to automate the processes of the library.

Automation

The four levels of library automation are :

- Library cataloging system
- Housekeeping operation and networking
- Development of CD-ROM library/ products
- Email system and internet

Solution- NewGenLib Software

NwGenLib is a Web-based application. Databases created with NewGenLib reside on web servers and can therefore be accessed by any client machine connected to the Internet (via OPAC).

Modules

Acquisitions

Technical processing and database development

Circulation Control

Serials Management

Online Public Access Catalogue

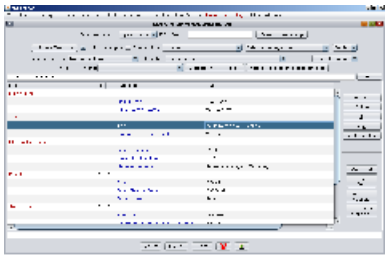
Implementation

Cataloging

A library catalog is a register of all bibliographic items found in a library. A bibliographic item can be any information entity (e.g.. books, computer files, graphics, etc) relevant to the catalog and to the users of the library. Examples of bibliographic items include Title, Author name, Edition, Publisher ISBN, ISSN etc.

Objective of Cataloging

- To enable a person to find a book of which either the author, title or subject (identifying objective) is known.
- To show what the library has by a given author, or on a given subject, or in a given kind of literature (collocating objective)
- To assist in the choice of a book based on the edition or topical terms (evaluating objective).



MARC (Machine-Readable Cataloging) is a standard that defines a data format for cataloging. It provides the mechanism by which computers exchange, use, and interprets bibliographic information, and its data elements make up the foundation of most library catalogs.

The central library chose required fields from the MARC21 bibliographic item list. All the books and journals present in the library were cataloged in the defined format

Bar-coding

Bar-coded accession number labels were affixed to all the books and journals of the library.

The library cards having bar-coded user IDs had been provided to all the users. The objective of bar-coding was to minimize the errors during transaction processing.

Outcomes

Stock keeping and cataloging of books become easy

Through bar-coding, circulation of books was made smooth & error free

Online reports enabled easy tracking of books

Further Enhancements

1.Online book reservation

2.Automating requests for acquisition of new books integrating with purchases

3.Facilitating users to access the information over internet & mobile devices

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SAGE

Electronic Discharge Summary to Speed Patient Discharge

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Prolonged preparation time and delayed completion of patient discharge summaries is a chronic problem in most hospitals. In India, patients take their medical records with them, so a delay in completing discharge summaries can lead to increased length of stay, patient dissatisfaction, and difficulties with scheduled admissions. In our tertiary care facility, it also leads to backups in postoperative units and intensive care units (ICUs) and, therefore, delays in certain surgical cases. In US hospitals, delayed completion of discharge summaries prevents completion of insurance billing. Charts are often tied up in record rooms until the discharge summary is completed.

The Quality Assurance (QA) Department at Sri Sathya Sai Institute for Higher Medical Sciences (SSSIHMS) in Bangalore, India, undertook a project to address this problem with the Cardiothoracic and Vascular Surgery (CTVS) Department.

Historically, discharge summaries at SSSIHMS were handwritten by resident physicians and then typed by clerical staff, returned to operating physicians for corrections, retyped, and then approved and signed by the operating physician. The process was labor intensive and time consuming. Delays were inevitable. Many discharges did not occur until late in the day and delayed the admission of new patients. In addition, the late discharges caused untold difficulties for patients returning home. In some cases, patients face a 3-day train ride to the far reaches of India and do not have the means to wait in a hotel until the next day. Therefore, early discharge is critical for the patient and the hospital.

SSSIHMS has a sophisticated in-house medical information system (MIS) team, a comprehensive electronic medical record (iSOFT, Banbury, Oxfordshire, UK), and the capability to quickly create new electronic medical record modules. The QA and MIS leaders met with the chairman of the CTVS Department to gain approval for a new software program they were piloting. The pilot program would allow the operating surgeon to quickly create a discharge summary on the computer in real time, review it, and digitally sign it. The pilot was approved.

A project team worked with cardiac surgeons to identify in detail the data elements required for the discharge summary. For each field on the discharge summary, a "dictionary" of terms and procedures was developed. Drop-down menus were created for most data elements. Free-text entries also were permitted. Most data contained in the electronic medical record system are retrievable (eg, lab results, echocardiograms); they can be included in the summary with just a mouse click. Physician signatures were digitized and password protected.

Studies by O'Leary et al[1] and Maslove et al[2] have shown that electronic systems can improve the quality and timeliness of discharge summaries. Navas et al[3] showed the value of a terminology server to improve data capture. Our model created templates for electronic discharges combined with drop-down menus and a terminology server.

Within 1 week of completion, all operating surgeons were using the electronic discharge summary. Time of discharge for 1122 consecutive patients from the CTVS postoperative ward was tracked for 3 months before initiation of the project and for 10 months after the project was initiated. Waiting time, from time of physician order for discharge to actual patient discharge, was reduced from an average of 10 hours to 5 hours after the introduction of the electronic discharge summary program. On average, patients were discharged before noon.

Clinical benefits were numerous. The format for discharge summaries was further standardized. Accuracy of details in the summary was enhanced because they were directly transferred from the electronic medical record, thus ensuring accurate information for the primary care physician to whom the patient returned. Productivity of the surgeons increased as time required for the discharge summary process decreased. By using very simple automated programs, the physicians found an easy replacement for what often was an onerous task. Physician satisfaction was shown by the fact that, within 2 weeks, nearly 100% of discharge summaries were done electronically with no complaints. A survey of operating physicians and

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postoperative unit nurses showed unanimous satisfaction with the electronic discharge system.

Administrative savings also were achieved. The clerical staff member previously assigned to type and correct discharge summaries was reassigned to other duties. Admission delays have been reduced. Transfers from the ICU to the postoperative unit flow more smoothly. The hospital benefited by saving staff time and being more efficient in admitting and transferring patients. The QA and MIS Departments learned valuable lessons about implementing changes with physicians and training physicians to use electronic medical records. By implementing customized discharge summary programs throughout the inpatient and outpatient areas, it is estimated that an additional 8 to 10 clerical staff can be reassigned.

Patients also benefited from earlier discharge time by being able to more easily make travel connections to distant places. Reduced waiting time exerts less stress on the patient and family.

Technology Advantages in a Developing Country

The SSSIHMS in Bangalore, India, is a tertiary care charity hospital that provides completely free care to indigent patients from all over India. With state-of-the-art technology and world-class physician leadership, care is offered in CTVS, cardiology, neurosurgery, neurology, and radiology.

The philosophy at SSSIHMS is to put the "patient first." A staff member who observed the hardship faced by patients and their families who were discharged late in the day initiated this project. A typical patient receiving open-heart surgery may be a poor farmer from West Bengal (state) who must travel for 3 days by train to reach home. The hospital allows a longer than expected postoperative stay because of the hardship of the journey and lack of hygiene facilities and nourishment on the train. With a limited budget at the free hospital, efficiencies are continuously sought, but not at the expense of patient care. This model of using state-of-the-art electronic medical records shows the potential of savings and efficiency that benefit all, even in a developing nation.

As a result of this project, we better understand the potential value of our electronic medical records for further research. Comprehensive data are available in every area. We are beginning to mine that data to do further research to improve quality and efficiency.

In the United States, most hospitals have record rooms with many incomplete and unsigned discharge summaries. Delays in completing discharge summaries impede collection of charges from insurers. These delays also often prevent utilization of patient records when they are awaiting a physician signature. US hospitals and their patients can benefit by the introduction of electronic discharge summaries.

Developing countries can use advanced technology and ingenuity to "leapfrog" chronic snafus in hospital efficiency and quality of patient care. This can be done with great benefit to the patient and cost savings. Judicious investment in advanced technology has allowed our "patient first" philosophy to succeed at benefiting everyone.

Authors' Note

This project was staffed and all work provided by salaried staff at Sri Sathya Sai Institute of Higher Medical Sciences.

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