

# MODERN TRENDS AND TECHNIQUES ON MEDICAL RECORDS

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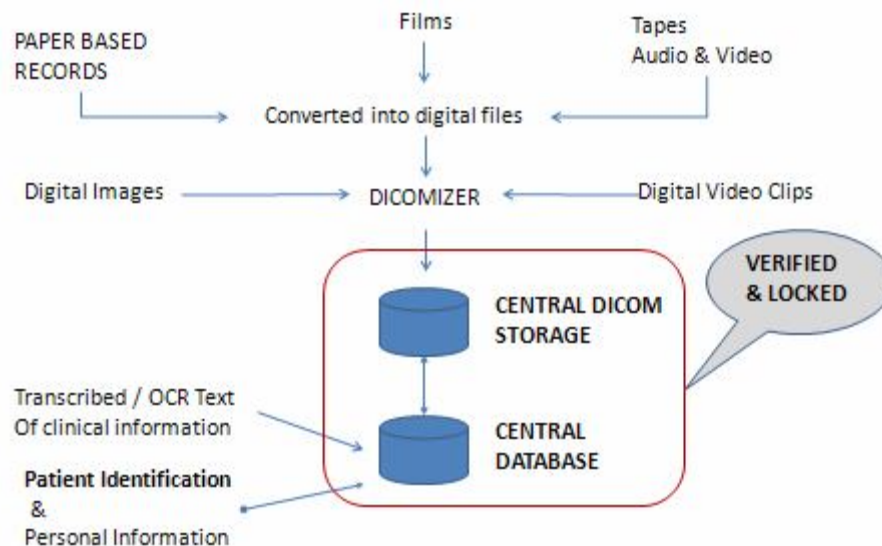
Good Medical care requires maintaining comprehensive and accurate medical records. The importance of maintaining such Medical Records cannot be over-emphasized. It is the backbone of any medical institution. With the advancements in technology, medical records maintenance has become easier and more efficient. A lot of duplication which exists in any manual records maintenance can be totally avoided. In this computer age, where computer literacy is on the increase, we must make every effort to capture maximum information directly into the computer. All the physical forms must be replaced with computer screens and data captured directly. Where it is impossible to capture data directly, the physical forms can be scanned and digitized. All these lead to effective methods of keeping the patient's medical records.

With the introduction of Electronic Medical Records (EMR) in a hospital, many advantages can be obtained. A few important techniques and its application are listed below:

- **Remove duplication of work using Barcode:** Once patient information (personal & clinical) is captured in the computer it can be reused in every other place avoiding re-typing. For example once a patient is registered at the Outpatient department, by using barcode printers in various important locations, barcode labels can be generated and stuck on all MR forms used. The patient details need not be re-written on them again. The barcode labels can also be stuck on the patient file for easy issue and receipt of files using a barcode scanner.
- **Simplifies Work by using Templates:** Templates and 'canned text' (pre-defined text) can facilitate reuse of most often used text in any computer data entry program.
- **Internet Enabled EMR for sharing patient data across the globe securely:** Computers have made sharing data easy and fast. With the emergence of the World Wide Web / Internet, users all over the globe can communicate with each other very effectively. A database of information can be used to provide innumerable services to the world at large. A Web based EMR is all the more desirable as it can be accessed over the internet from any part of the world for purpose of obtaining expert consultation and knowledge sharing. The hospitals in different parts of the world can share their medical knowledge through the internet facilities like email, file sharing

and Telemedicine. These facilities have contributed to better research work by the medical community. It does not require any other software installed on the machines to access the EMR except a standard browser.

- **Quickly retrieve all the information of a patient:** All the patient information is stored centrally under one patient ID in the database and also in a single patient physical file. All medical images / videos of the patient are also centrally stored in DICOM storage based on patient id. Once a patient ID is typed into the EMR both personal and clinical information containing text, images and videos of a patient can be retrieved based on the unique id of the patient by authorized users.
- **Validation Checks and Security Procedures:** These ensure that the data captured in the EMR is valid and correct. Once the data is entered in the EMR it must be verified by the medical records department user and locked from further modification or deletion.
- **Digitization of paper and films:** All the physical records older than 10 years can be scanned and converted into Digital images and saved on central digital repository under the patient id for easier access and sharing. All x-rays and films can be digitized using a camera. All videos and audio tapes can be also digitized using a video/audio capture card.



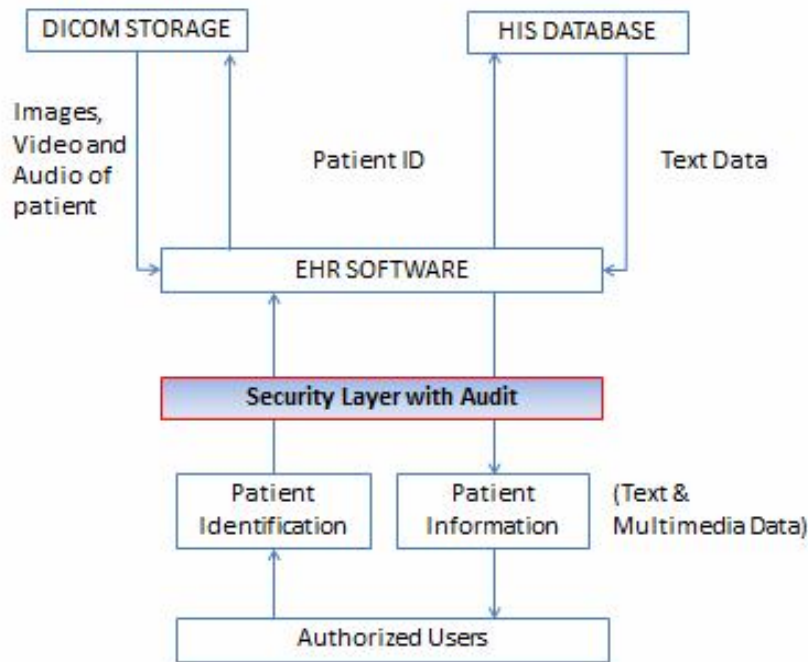
- **Standardization of Diagnosis:** EMR simplifies implementation of ICD 10 (WHO) codes. All the codes can be imported into the EMR directly and saved for future reference. We can then select the ICD codes relevant for each patient during his discharge and attach it to the patient id. Once this linking is done retrieving the list of patients for a given ICD code can be easily done.

- **Cpt / International Coding of procedures:** With the standard coding of these procedures it becomes easy to share and compare the disease and treatment statistics or research findings. These Codes can be classified under different categories in an EMR for easier access based on what categories the users are familiar with.
- **Better Storage facility:** Magnetic or optical discs storage has enormous capacity and can store thousands of pages. They are available at a very meager cost. By using this technology the storage space required for the manual storage of medical records is reduced to a bare minimum. For example a DVD of 4.5 GB can hold around 500 electronic patient files. These usually take up a rack's space of 7" X 4" in the records room. Data retrieval equally is very fast. Once the patient id is typed in, the computer retrieves all the data from the online database or DVD/CD and displays it. These media can be easily stored for a much longer time than physical records which will degrade with time and become faded.
- **High degree of Security & Audit:** With the raising trend of malpractices by hackers, safeguarding the EMR on the internet is vital. This challenge can be addressed if technology is coupled with the age old, time proven MR policies. The records must be accessible only to authorized users and must be well protected from prying eyes. The access to EMR must be well monitored by recording all the access given to a log file and then later auditing this file to prevent data thefts and prevent hackers from gaining access to the EMR system. VPN technology helps us share the EMR data securely even across the Internet.
- **Online availability of records for Doctors (24 x7):** All the data of patients both old and new will be available online, whether data was entered using EMR or scanned and digitized. These files can be read anytime by the doctors, for reference, research or study purposes, at their own desktop computers, after proper authentication. They need not borrow files anymore from Medical records department.

### **Case Study of Medical Records functionality at Sri Sathya Sai Super Speciality Hospitals:**

We had started our effort in computerization with a simple EMR way back in 1991. It has evolved over years into a web based EMR which works on Internet Explorer. We maintain all the patient text data (personal and clinical) in a HIS Database. We store all our clinical images and videos in a central DICOM storage. All the equipment in the hospital which gives us digital output is linked to the DICOM repository or HIS database, depending on whether, the output is an image or text data. The existing old paper records are digitized using scanners and camera and stored in the central storage classified by patient id, date and document type. A photograph is also captured at the OPD to help in identification of the patient at any later stage in the EMR. The overall design of our EMR (data retrieval point of view) is

shown below:



### The features of our EMR system:

- ✓ Quick retrieval of information by Patient ID and other important ids like PAN etc.
- ✓ All the patient information, be it text data or images or videos can be viewed in the EMR.
- ✓ If the patient comes to the hospital losing the ID card we had given him, we search with a combination of Name, State and District, locate his patient id and verify finally with his photograph.
- ✓ Diagnosis & Surgeries are codified using ICD and CPT. They are search enabled so that we can quickly retrieve the list patients for a given diagnosis or procedure.

**Current Encounter**  
**Problem Assessment**

Stage: Discharge \* Discharge Type: Improved Diagnosis Type: Final \*

Code: I052 \* Supporting Diag ICD10 Search

Description: Mitral stenosis with insufficiency ⓘ

Remarks: [Text Area]

Recorded By: Dr Dilip Petil Reviewed By: [Text Field] ⓘ Authorize: [ ] [Text Field] ⓘ

Primary: [ ] Significant: [ ] Onset Date: 16/01/2011 ⓘ \* From Last ( [ ] D [ ] M [ ] Y )

- ✓ Store and quickly retrieve all the information of a patient ordered by date and by clinical parameters.



- ✓ Extract all types of statistical information based on diagnosis, procedures, age, sex, income, other demographic and visit details at outpatient and inpatient levels.
- ✓ Good security measures are very essential to safely store data, and prevent unauthorized access and modifications. We need to login to access the patient records. We maintain good audit procedures in place to prevent unauthorized access which is possible in the digital world especially when the system is exposed to the internet. All access to the system is audited by the IT Department.
- ✓ The EHR data, both text and images, are shared with all our sister institutions which are geographically located far away, using VPN and leased lines.

We are now in the computer age much ahead of the stone and paper age. We need to update ourselves constantly to make best use of the technology in our workplace and improvise. Using technology we can certainly save time and existing staff can do more work. Maintenance of statistics in Medical records department was a big job until introduction of computers. Now, not only generation of statistics but also showing them in a more useful way like graphs is also possible with minimum effort.

Lastly, training of the medical records staff in the latest trends in Information technology, and its application to their field, can create an interest in them to use computers at their work, simplify their work and provide better and faster service to the hospital and society at large.