

The WHO Constitution defines health as a state of complete physical, mental and social well-being and not merely the absence or infirmity".

"Life is not mere living but living in health" with this words, the Honorable Mrs. Indira Gandhi the Prime Minister of India, opened her address on 6th May 1981 to the Thirty-fourth World Health Assembly, meeting in Geneva. She further stated that "the health of the individual, as of nations, is of primary concern to us all. Health is not the absence of illness but a glowing vitality, a feeling of wholeness with a capacity for continuous intellectual and spiritual growth". Life means Living in Health:

I. Introduction:

The evolution of Healthcare Management System in India was a mixed one. Medicine and Medical records go parallel to each other, hence to know more about the medicine, one has to witness the progress with medical records. The India has glorious period wherein the history of medical record parallels the history of medicine. Primitive medical records carved in wood and chipped in stone date back to the approximately 25000 B.C. Throughout the millennia, medical records have evolved in conjunction with the advances in the art and science of medicine. The 20th century brought India a mixed experience; such as struggle for independence coupled with First and Second World War that was a dark era for India. However, later half of the century, gave India the freedom that allowed moving forward. During the last decade, India has accomplished tremendous progress in integrating healthcare system supported by ICT and Electronic Health Records.

II. Historical Background of Healthcare Management :

1. Introduction:

The history of medical record parallels the history of medicine. Primitive medical records carved in wood and chipped in stone date back to approximately 25000 B.C. In subsequent centuries, hieroglyphics found on parchments recorded scientific progress. Although, these chronicles preserve medical achievement of those eras for later generations.

2. Flourishing of medical practice in India :

Ample evidence exists to substantiate the flourishing of medical practice in India many centuries before the birth of Christ. Art forms such as the icons, friezes, and frescoes in the caves and temples of Ajanta and Ellore and on the Buddhist Stupas of Amaravathi and Nagarjuna Konda portray medical concepts. There are innumerable references to the science of medicine and surgery in Indian epics like Mahabharata and Ramayana. The earliest documentation of medical practice in India is found in Athervaveda. The first Indian textbook of medicine Atreya Samhita was written by the sage Atreya during the Sutra period following the Vedic ages; this book united previously scattered medical care details into a comprehensive compendium. Agnivesa Samhita also documents the art of healing in a textbook containing about twelve thousand verses.

3. First Indian Textbook of Surgery:

Charaka Samhita represents the view of points of numerous scholars through many centuries, beginning with practices during the period of Agnivesa and ending with those propounded by Dridhabala fifteen centuries later. This Samhita excellently records a glorious period of creative Indian medicine. Susruta Samhita became the first Indian textbook of surgery, describing twenty sharp and one-hundred-and-one blunt surgical instruments, methods of preparation for major surgery, and native methods for anesthesia administration. Ashtanga Hridaya by Vegabhatta described surgical procedures and discussed innovative drugs for medical care. The translation of this work from Sanskrit to Persian by Ali Mohammed Ben Ali Ismail Asavali Asseli as Tibb Shifa Mohammed Sahi is considered an outstanding masterpiece.

4. Unani Tibba System of Medicine:

Unani Tibba System of Medicine with origins tracing to ancient Greek medicine, was introduced into India by Muslim rulers by the Thirteenth Century A.D., this system of medicine was firmly entrenched in places like Delhi, Aligarh, Lucknow and Hyderabad. The Hakims who practiced this system quite willingly also utilized the effective drugs of the Ayurveda system and included them in their Pharmacopoeia.

5. Decline in the indigenous system of medicine:

The successive invasions of India and eventual British Colonial Rule of India evoked a decline in the indigenous system of medicine. Allopathic medical missionaries arrived from other countries to establish hospitals and dispensaries.

Modern medicine was introduced into India by the Portuguese in the Sixteenth Century. In 1510, Albuquerque founded the first Indian hospital, the Royal Hospital in Goa. This hospital highly touted as one of the finest worldwide, was transferred to Jesuit control in 1591. Rudimentary medical teaching began there in 1703 and by 1842 a complete school of medicine and surgery was extant. The Ecole de Pondicherry was a school of medicine established in India by the French government in 1823.

The Medical Department of the East India Company was created in 1740. This unit was comprised of British military surgeons and their local assistants. A committee appointed by Lord William Bentinck drafted the principles of a medical curriculum in 1833. This effort culminated with the establishment of Madras Military Medical School in 1835. A medical college was opened in Calcutta in January 1836, and the Grant Medical College in Bombay was opened in November 1845 under the auspices of Sir Robert Grant, the then Governor of Bombay.

Homeopathy, which Samuel Heinemann (1755-1843) of Germany propounded, gained a foothold in India between 1819 and 1839. This system of pharmacodynamics is based on natural laws of cure. Homeopathy is practiced in numerous countries worldwide, but India claims to have the largest number of practitioners of this system.

III. Prior to Independence:

The struggle for independence went on for decades coupled with the First and Second World War, there was a great vacuum in the development of medical and medical record system; although it is well-known, medicine and medical records go together, due to unknown reasons the status of medical records in India prior to fifties was deplorable. There was only a vague concept of the value of medical records among the professional staff. Establishing or ensuring the proper functioning of the medical records departments in hospitals and health institutions

was absent. Many hospitals had no medical record departments; records were bundled and kept in wards, store rooms only for a short duration. The basic forms required for a complete record and vital laboratory, x-ray and other tests necessary for establishing a correct diagnoses, were absent. The International Classification of Diseases was not known to many medical people. As for statistics, there was no insight as to what type of statistics were important and why, and need for standardized procedures on collecting, compiling and reporting was also absent.

1. Primary Health Care Center:

Earlier during the sixties and seventies the medical record system in PHCs was very poor, majority of the health centers i.e. 90 to 95% of them depended much upon the registers maintained for administrative and other purposes and patient information was disintegrated. Very few teaching hospitals especially mission hospitals had special record forms. Majority of the population in India sought healthcare mainly through primary healthcare centers or sub-centers specially people living in rural areas.

2. Outpatient Record System:

The people in urban and cities used primarily, the outpatient services and the medical record systems utilized in these outpatient services can be broadly classified into two categories namely the:

- (i) Outpatient slip/chit system
- (ii) Departmental record system

(i) **Outpatient Slip/Chit System:** More than 90 -95% both large and small hospitals in India employed Outpatient slip/chit system. Although a simple, economical, and time saving procedure, the slip/chit system is inadequate from the stand point of comprehensive patient care. Clinicians, administrators, and even patients were convinced of the deficiencies of this method. The outpatient chit supplies the patient with an identity card and also served as a treatment chart. Frequently, patients lose or misplace the outpatient slip and then register as a new case on subsequent episode of care.

(ii) **Departmental Record System:** Although superior to the outpatient slip system, this departmental record system used in outpatient of hospitals also lacked effectiveness. The system consists of departmental outpatient cards designed to meet the needs of each clinical specialty (cardiology, neurology, obstetrics, psychiatry and so forth...) The unit record is not achieved with this system because each specialty department registered patients directly and maintained its own record system. Patients do not have custody of their records. If a patient visits four separate clinical departments for treatment, that patient will have four separate health records. Records from a particular department are generally not available to other clinical departments; as a result, a composition health history of an individual patient is not readily available.

3. Inpatient Record System:

The inpatient record system was greatly organized and records were of book type with sheets measuring thirteen inches by eight inches. With each facility standard forms are utilized for the history and physical examination report, the report of diagnostic investigations, operative report, treatment and progress notes, intake and output record, authorization for release and records of linen, room rent collection, messages to police, and so on...

The majority of hospitals in India had an admission office for admitting patients. The inpatient chart originates with the admission office and is sent to the ward along with the patient. The ward nurse was responsible for this record until the patient was discharged from the hospital. Certain hospitals returned discharged patients charts to the admission office on a weekly basis where the admission clerk enters statistical data into admission/accession register.

IV. Post Independence:

India attained independence in the year 1947 and became Sovereign Republic in the year 1950, since then the Government of India has been making all efforts to develop simultaneously many national programs such as agriculture, industry, communication and healthcare service for its large population.

1. Establishment of Central Bureau of Health Intelligence (CBHI):

In 1958, on the recommendation of Douglas Burdick, Health Division of Planning Commission to improve the teaching hospital records. Then the Government of India (GOI) established the Central Bureau of Health Intelligence (CBHI) in the year 1961 to function as the National Nodal Institute of the Director General of Health Services (Dte. GHS), Ministry of Health and Family Welfare (MOHFW), GOI. Its objectives include providing ready information on National Health Profile of India envisaging demography, healthcare, morbidity and mortality indicators, as well as medical/paramedical education and infrastructure in the country.

2. Appointment of A. L. Mudaliar's Committee:

The Government appointed "A. L. Mudaliar's Committee" in the year 1964, which recommended "Provision made in the 4th 5 year plan to establish MRDs in Teaching Hospitals". In accordance with the committee's proposal, the Central Council of Health in its Srinagar Session in October 1964 passed the following resolutions:

"The Central Council of Health Recognizing the important role played by Medical Records in efficient hospital care and Teaching and Research recommend that the available training facilities in medical records may be fully utilized and adequate provision made in the 4th Five year plan for proper medical records department (MRD) in all teaching and major hospitals in the country".

3. Establishing of MRD to improve healthcare in all the Teaching and Major Hospitals:

The Government of India as a follow up action sanctioned 50% of grants for those who establish the medical record department (MRD) in their hospitals. This facility was availed by many and many teaching and major hospitals have established MRDs. The Christian Medical College Hospital (CMCH) and Jawaharlal Postgraduate Medical Education and Research hospitals (JIPMER) were the only two institutes had comprehensive medical records system at par with international standards that were able to meet excellent patient care, medical education and research programs.

V. Hospital Information Systems as an International Perspective:

1. Hospital Information System:

Since the early beginning in the 1960s, hospital information system (HISs) has been developed to cover both administrative and medical functions. However, it must be recognized that the first systems often focused on the billing and are reimbursement aspects of hospital activities. These systems were designed to provide a money-oriented return on investment and streamline patient admissions. The system included managed appointments and provided (stand-alone) ancillary services for hospital laboratories, the pharmacy and radiology departments to support existing manual procedures without adding value, and they functioned as a bonding element among the many disparate systems inside and outside the hospital.

The 1980s saw the implementation of two nearly worldwide changes with a significant impact on the way computer applications were used in hospitals. On one hand, reimbursement systems gradually evolved from a free-for-service basis to a fixed budget system where figures on resource consumption played a central role. On the other hand, medical systems initially developed to simply automate existing processes became systems supporting physicians, nurses, and other healthcare providers in their daily patient care activities. The aim was to attempt to guarantee standards of care and lead to improved levels of decision making.

Health care data are the source of healthcare information, so it stands to reason that a health care organization cannot have high quality healthcare information without first establishing that it has high-quality healthcare data. Data quality must be established at the most granular level. Much healthcare information is gathered through patient care documentation by clinical providers and administrative staff.

In the new millennium, information technology will catalyze dramatic change in many aspects of medicine, including patient records. Good medical care requires accurate records of greater detail than in the past. Malpractice protection mandates more organized and complete records. Third party payers are requiring more justification for the expenses generated by physicians' actions. Today's economics require more efficient and cost-effective methods of keeping the patient's clinical records.

2. Telemedicine:

Telemedicine is distance consultation among health professionals or between health professionals and patients by use of telecommunications technology such as real-time audio or visual systems, most notably video conferencing. The potential advantages are obvious in dispersed communities (rural areas) where expertise is thinly spread, and when traveling is difficult or inconvenient for doctor or patient. Uses are wide and varied and include direct interview and history taking, observation of physical signs, and distance reporting of imaging procedures. The location of consultation varies from hospital inpatient and outpatient settings, to broader residential and home settings, and even outer space.

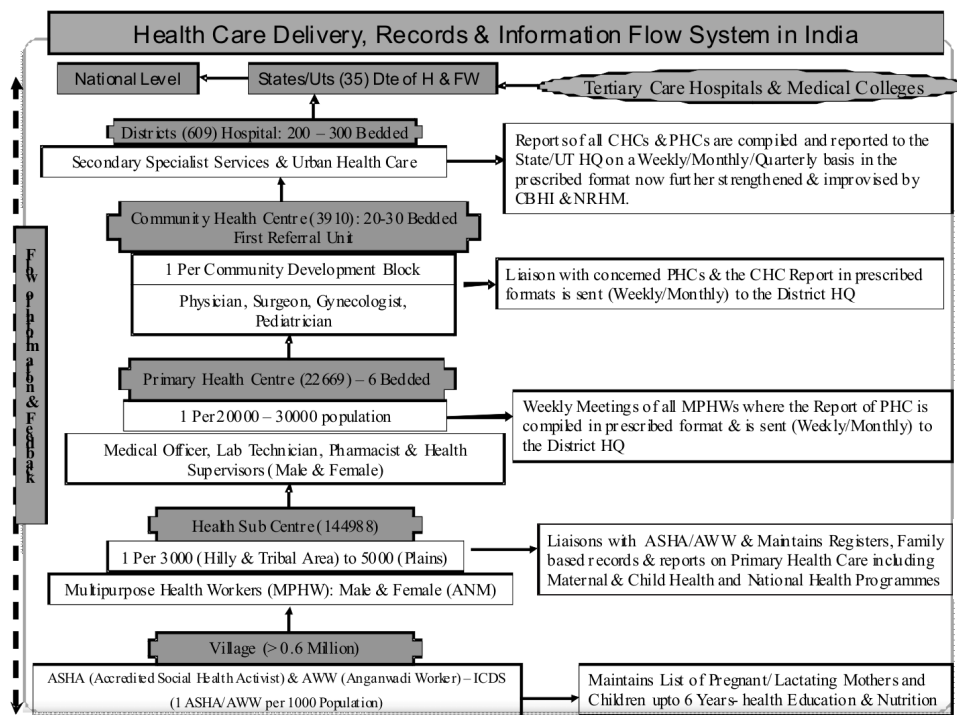
3. Internet and Web-based Medical Communication:

The Internet is a means to improve health and health care delivery, its full utilization is not clear. Nevertheless, an increasing proportion of the public is using the Internet for health information. The advantages of the Internet as a source of health information include convenient access to a massive volume of information, ease of updating information, and the potential for interactive formats that promote understanding and retention of information. Health information on the Internet may make patients better informed, leading to better health outcomes, more appropriate use of health service resources, and a stronger physician-patient relationship.

VI. The Healthcare Delivery System in India:

1. Primary Health Care:

India is one the few countries in the world that have well established primary healthcare delivery and health information system interlinking with all different types of centers. The current health information system by and large was paper based on the MOHFW had already launched the integrated Disease Surveillance Project (IDSP) in the country with weekly health information flow through computerized and satellite-based system from each district up to the national level. The following figures of two distinct periods show the progress made by India.



2. Information and Communication Technology (ICTs):

ICT has a significant role to play in health care delivery to reach nook and corner of the rural India. More than 70% of population is living in most peripheral and difficult terrain with least access to certain basic health facilities. The MOHFW in collaboration with the Ministry of Information, Communication and Technology, the National Rural Health Mission (NRHM) of MOHFW is working out to strengthening the infrastructure, services to utilizing the ICTs for utmost benefit of needy to the optimum.

The CBHI is using ICT for public health and welfare include: (a) electronic health information flow from the periphery upwards under primary healthcare delivery system in India. (b) road safety profile of India as prepared by CBHI/Dte.GHS in collaboration with various stakeholders in the country, (c) road traffic injury surveillance while linking more than 140 Trauma Centers being developed in the Dte.GHS/MOHFW. (d) the disaster management and related surveillance mechanism. The MOHFW/GOI in this course, include computerized and satellite based health information and surveillance systems (viz. IDSP), web based on-line health data inputs and reports generation, video-conference, reviews, training, education and telemedicine linking peripheral, secondary and tertiary hospitals in India..

VII. Hospital Information Systems as an Indian Perspective

1. *Computerized Patient Records:* Health care industry is one of the most information intensive and technologically advanced in our society. Thus, the information should be accessible easily, timely, complete, accurate, reliable and relevant information in making important strategic or patient care decisions. The end objective of medical informatics is the integration of data, knowledge, and tools necessary to apply that data and knowledge in the decision-making process associated with patient care.

2. Though India has transformed its healthcare delivery system dramatically during last one decade. As being large country with huge population and budgetary limitations, majority of

government hospitals have not fully implemented the electronic health record systems. However, some major corporate hospitals have been using the computerized systems, mainly for administrative and financial purposes and with limited clinical aspects. Those who claim to have fully computerized also lack interoperability. Therefore, there is a dire need to establish uniform computerized system in all the health institutions by observing certain norms as recommended by international organizations for implementation of hospital information systems. It is foreseen that by 2015 many countries would have automated all their health institutions by paperless records. India cannot afford to lag behind.

3. Transformation from manual to electronic system:

3.1 To be more precise, the entire hospital system that is being practiced with the manual or hybrid system has to be completely transformed into electronic by using the latest information technology for example; HIS which contains the domain functionality; flowcharts, screens, database that are developed, tested and produced as application software for implementation in order to convert a hospital into a computerized format.

3.2 Application Domain: The application layer to include: Patient management, Medical care, Nursing, Medical support, Administrative, Ancillary services. The information Bus deals with services. The middleware layer should include: Authorization component, Patient component, Activity component, Resource component, and Healthcare record and Knowledge component. The persistent layer related to Images, Bio-signals, alphanumeric data, Web pages.

3.3 While developing the electronic hospital information system, in order to achieve interoperability, portability and data exchange health care information system must apply standards. Some of the standards are as follows:

ISO; HL7;HIPAA; ICD; PACS; DICOM;ASTM;SNOMED;CPT, etc

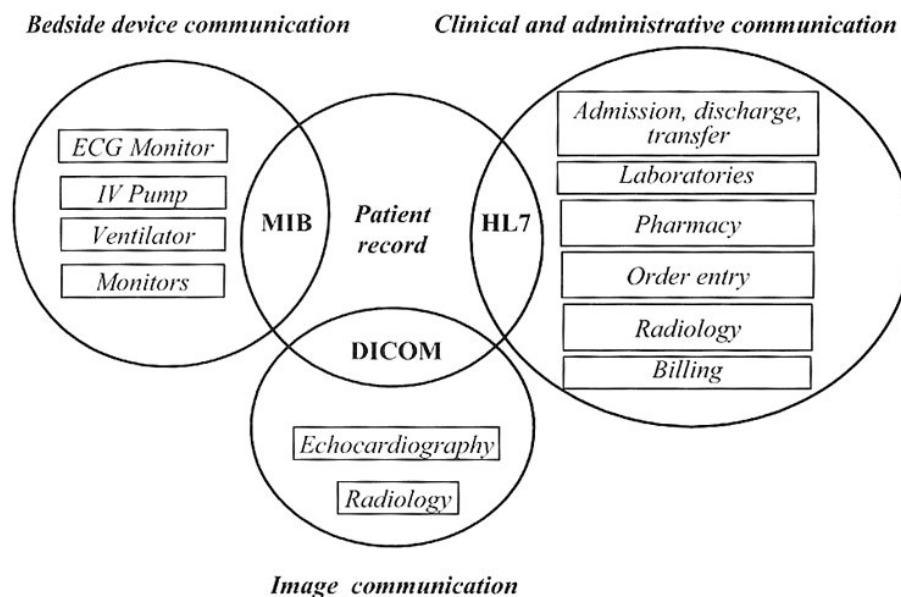


Figure 3.3: Standards dealing with data exchange in a healthcare setting: HL7, MIB, and DICOM.

Clinical alerts reminding system.

- Drug - Drug; Drug -- Laboratory; Drug - Pregnancy;
- Drug - Condition; Drug - pediatric; Drug - Duplication

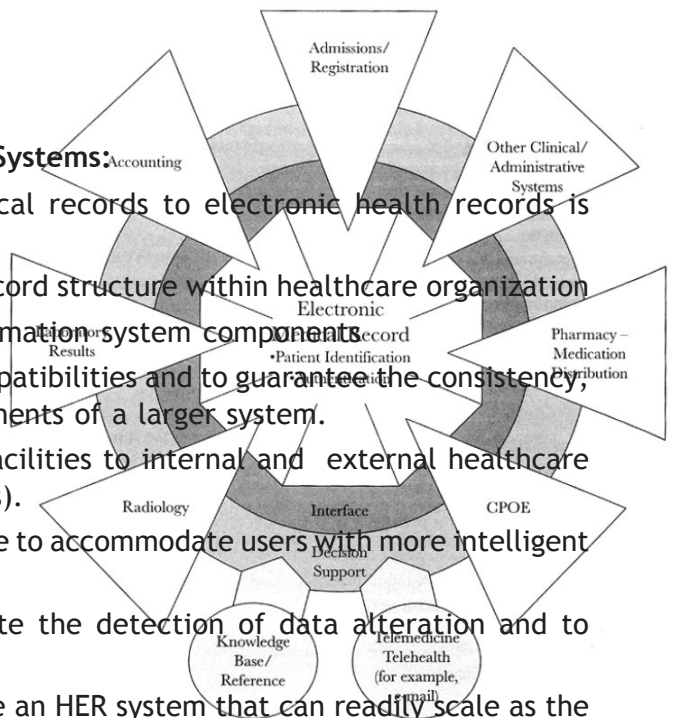
3.4 Signal processing (EEG, EMG, ECG): Computers are useful devices for processing electrical signals from various sources, such as ECG for detection of heart dysrhythmias and EEG for analysis and detection of spike and sharp waves that can sometimes be missed by the neurologist.

3.5 Image Processing: Image processing (radiography, US, CT scanning, MRI/MRA, SPECT/PET scanning, cerebral angiography)

3.6 Decision Support System: Decision support systems are real-time computerized algorithms that help physicians in their clinical practice. -specific information.

3.7 Provider Order Entry Systems: Computer -based provider order entry (CPOE) systems are potential benefits in terms of a improving the quality of patient care and reducing the costs.

FIGURE 5.9. EMR : THE HUB OF CLINICAL INFORMATION SYSTEMS



4. Requirements for the Implementation of EHR Systems:

The transition from handwritten paper medical records to electronic health records is essentially linked to the following challenging issues.

The development of a (standard) healthcare record structure within healthcare organization Merging the EHR component with other health information system components

A common medical terminology; to avoid incompatibilities and to guarantee the consistency, reusability, and sharability of the different components of a larger system.

The increased availability of communication facilities to internal and external healthcare providers (e.g., GPs, other healthcare organizations).

An adequate formalization of medical knowledge to accommodate users with more intelligent features.

The availability of an audit train to facilitate the detection of data alteration and to address potential security violations

Scalability: Multidisciplinary institutions require an HER system that can readily scale as the institution grows while maintaining local ownership of data.

The automatic availability of a central comprehensive information responsibility for healthcare policymakers (providers, hospital managers) to define future policies by analyzing the past on several levels.

VIII. Future of Health Records:

The future of the Health Records is said to be the Personal Health Records (PHR) PHR is an electronic repository in which a person can store his or her health-related information securely and privately and also share that information with multiple health care providers or others at the patient's discretion. PHRs will give patients access to tools for managing this information, some of which patients will enter themselves and some which will come from their clinical care provider, pharmacy, a public health authority, or other sources. Information related to population health and even climate and environment conditions, will be stored and integrated in a way that prompts patients to take appropriate action. The information will be accessible whenever and wherever an authorized user needs it. PHR from Public Health point of view: have an easily accessible and navigable. This would enable public health experts to spot health trends early, which is critical for detecting viral outbreaks like avian flu.

IX. Recommendations:

1 The GOI has to integrate all the health institutions of the country starting from primary, secondary and tertiary care hospitals by electronic health records with interoperability to maintain a single unique record with unique number for each patient; (i.e. the concept of one-patient-one-number-one- and-one -record to maintain continuity from birth to death.

2 The GOI with MCI and other organizations have to develop Accreditation standards for healthcare delivery at par with international standards to maintain certain level of health quality.

X. References:

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Suggested Methods between P.H.Cs, CHC/Area, District and City Hospitals and Interoperable system between PHCs to PHCs or Hospitals to Hospitals, and country to country.

