Health Records System in India

Electronic Medical Records (EMR) and Electronic Health Records (EHR) can be an effective application of Information and Communication Technology (ICT) that can be leveraged to improve delivery and extend the reach of health services in India. EMR/EHR systems offer clear advantages over Traditional Paper Based System (TPBS) of medical records and can help provide continuity of care (CoC) for the over 1.2 billion citizens who access the healthcare system through both private and public service providers.

What is EMR/EHR?

Electronic medical record (EMR) is a digital version of the paper charts in the clinician's office. An EMR contains the medical and treatment history of the patients in one practice (single doctor clinics or hospitals). The EMR is typically restricted to the medical domain. Similarly, Electronic Health Record (EHR) is defined by the International Organization for Standardization (ISO) as "*a repository of information regarding the health status of a subject of care, in computer processable form*". EHRs are a summary of the various electronic medical records that are generated during any medical/clinical event during the lifetime of the individual. EHRs are more expansive in the history they cover as compared to EMRs and would typically include broader information on overall wellbeing of the body and mind. A patient EHR will contain some information from individual EMRs but not necessarily all. EHRs are designed to be used beyond the health organization that originally collects and compiles the information and to share information with other health care providers, such as laboratories and specialists, so they contain information from all the clinicians involved in the patient's care.

Why EMR/EHR is important?

The use of EHR/EMR is accelerating rapidly throughout the world. This is because the adoption of an EMR/EHR system offers clear benefits over the TPBS and contributes to smooth functioning of the healthcare system. Some of the important reasons for adopting EHR/EMR are as follows:

1. **Developmental Origins of Health and Diseases**: Research has established that the developmental records of individuals are important for predicting or explaining the diseases that a person suffers from. Handy availability of the entire set of medical history of the individual can help health care providers make better diagnosis and provide proper medical care in context of the past history. EMR/EHR systems would enable availability and easy retrieval of such a set of patient history. EMR/EHR can also provide easy access to data on patient's allergies during treatment when patient is not in a condition to share the details

2. **Continuity of Care and Shared Care:** By ensuring easy accessibility and transmittal of health data, continuity of care can be ensured between separate teams of service providers and between patients and the providers. EHRs can also remind providers when patients need immunizations, enable providers to send reminders to patients for preventive/follow-up care, and give providers access to clinical protocols. The continuity is especially important in case of referrals from first-point-of-care health units to secondary and tertiary units and in case of migratory workers and their families which account for almost 14 Crore in India.

3. **Cost and Time Efficiencies for Patients:** As per NFHS-III, almost a quarter of the respondents reported that they did not use government health facilities due to long waiting times. Long waiting time is generally a result of requirement of fresh registration during every visit to the facility, even for out-patient care. Availability of EHR records will help reduce this

lead time during the registration phase due to requirement of one-time registration. A substantial expense of time and money is involved in accessing diagnostic services (like X-ray, MRI, CT Scan and pathological tests, which constitutes almost 11% of the out of pocket health expenditure) due to lack of records of past diagnostics conducted for the same patient. Availability of diagnostics record through EHR can help reduce these inefficiencies.

4. **Accountability of Healthcare Providers:** EMR provides better accountability for healthcare provider personnel than the TBPS due to increased visibility and accessibility of patient statistics, drug inventories and personnel workload. EMR can also help improve oversight due to increased traceability in medical malpractice and ethics-related incidents.

5. **Population Health Surveillance:** A well-designed EHR system can help in early identification of diseases/incidents which are threat to public health through automated reporting of notifiable diseases and real time situation assessment. It can also be leveraged for quick dissemination of public health alerts to clinical personnel. EHR systems can also help collate data related to chronic diseases through available clinical data which is not covered under conventional TPBS surveys. EHR systems can also help easily collect large scale (anonymized) health data to be used for medical research.

6. **Optimal Functioning of Health Insurance:** With a large potential for health insurance market in India (only 14% of Indian households have health insurance with only 16 insurance providers) and the pursuit of Universal Health coverage, an EHR data regime can help the insurance companies design their products better, optimize premium rates and accurately assess actuarial risks for the insurance pools. A well functioning EMR system can also speed up the billing and processing of insurance claims for the insurance providers and policy holders, while providing easy portability of insurance between providers increasing the competitiveness of the insurance market.

Implementation of EMR/EHR in India

Implementation of ICT-enabled healthcare system has been a part of the developmental discourse for a long time. The National Knowledge Commission, through its Report of Working Group on Health Information Network of March 2010, recommended a comprehensive set of measures to be undertaken for implementation of the EHR/EMR system. The report proposed to identification of technology and network infrastructure for integration, and definition of standards for data sharing, protection of data. The report also proposed the creation of a National Health Information Authority (NHIA) as a standardization and regulatory body for ICT in healthcare. Similarly, the High Level Expert Group Report on Universal Health Coverage for India recommended "the adoption of system-wide Electronic Medical Records; which is critical for the health IT network to track and monitor diseases, expenditures and performance to deliver both favourable health and financial outcomes".

The rules for Clinical Establishments (Registration and Regulation) Act 2010, which were notified on 23rd May 2012, mandated "maintenance and provision of EMR or EHR for every patient" for registration and continuation of every clinical establishment. The Ministry of Health and Family Welfare (MoHFW) notified the "Electronic Health Records Standards for India" in September 2013 based on the recommendations of an expert committee. However, these standards have not been made mandatory. All the State/UT Governments have been advised to adopt the EMR Standards in all the Information & Communication Technology applications in healthcare including in rural areas. India has also become a member of International Health Terminology Standards Development Organisation (IHTSDO) since April, 2014 to support affordable and consistent use of terminologies through Systematized Nomenclature of Medicine Clinical terms (SNOMED-CT) by healthcare providers, a national license for which is available to be used at no cost.

MoHFW has also put in public domain, a concept note on establishment of a National eHealth Authority (NeHA) as a nodal body responsible for development of an Integrated Health Information System for the country through promotion, standardization and enforcement of relevant regulations. In addition, the MoHFW's Central Government Health Scheme (CGHS), which provides insurance cover to government employees and other beneficiaries like MPs and freedom fighters, has included implementation of EMR/EHR as a mandatory condition for empanelment of hospitals under the scheme.

Interoperability and Standards	Hardware and Software Standards	Privacy and Security
•Incremental approach to adopting standards, implementation specifications •Standards should be flexible to adapt to demographic and resource variance •Extensive use of Controlled Medical Vocabularies (CMV) like LOINC, ICD10, SNOMED-CT, CPT4 •Content Exchange Standards like HL7, CCR, DICOM •Interfacing with Personal Healthcare and Medical Devices •Provision for phased inclusion of International Classification for Traditional Medicines for AYUSH practicioners	•Backup or data preservation mechanism should be considered •System redundancy at various levels (disk, power, network, etc.) should be planned •Connectivity medium chosen should be reliable and fast •Secure data exchange for the period expected for transaction of records and data •Software should ensure role based access control at all times •Support privacy, secrecy and audit trail •Rapid data capture-storage-retrieval-display of data	•Contained data is owned by the patient and held in trust by the provider •Patients will have the sufficient privileges to inspect and view their health records without any time limit •Consent of patient required for disclosure •Consent fordisclosure not required in case of national priority likecommunicable/notifiable diseases •Patient identifiable data to be disclosed without prior authorization only thorugh a court order

Indicative Recommendations of Electronic Health Records Standards for India

Challenges in Implementation of EHR/EMR in India

1. **Prevalence of non-institutional private sector:** As per NFHS III, more than **34**.8% of the population relies on private non-institutional points of care like single doctor clinics. As the scale of operation of such clinics/doctors is small and as large upfront investments are required in deployment of EHR systems, it would difficult to bring these service providers under the EHR regime leading to a significant number of patients being deprived of the benefits of EHR. A set of financial and regulatory incentives and disincentives will have to be put in place to encourage these small clinics to become a part of the EHR regime.

2. **Lack of IT infrastructure and connectivity in rural areas:** In spite of IPHS guidelines, mandating the provision of a computer and internet connectivity starting from the PHC level, many PHCs still do not have these facilities. Many PHCs, where computers are provided, the computers are not being used. Coverage of many gram panchayats under the NOFN programme remains incomplete. Regularizing the use of computers and uninterrupted availability of internet and power supply would be prerequisites for the deployment of a universal EHR system.

3. **Learning Curve for EHR practitioner-users:** Initial reluctance in adoption of EHR systems has been observed in countries where such systems have been implemented. Intensive training would be required for the healthcare practitioners who would be using the EHR systems. Familiarity with operating computers, using the EHR software and use of standardized clinical/medical terminologies to be entered into the EHR system will have to be inculcated among the users. Similarly, availability of personnel to enter and manage the EHR systems will have to be ensured at all levels of deployment.

4. **Incomplete coverage of AADHAR:** A unique and multipurpose identifier will be necessary to implement a truly portable EHR system. AADHAR identification issued by UIDAI can be used for the same. However, a universal coverage of population and universal seeding needs to be completed.

International Experience in EHR Implementation

Canada set up Canada Health Infoway in 2002 as a federally funded, independent, not-for-profit organization to lead the development and implementation of electronic health projects across Canada. Government of Canada provides supporting funding and sets national priorities through Canada Health Infoway. In Singapore, the National e-Policy to promote the use of ICT across all sectors and the public funding for ICT support of programs addressing national health priorities has been effective. In United States of America, Office of National Coordinator for Health Information Technology (ONC) leads national health IT efforts, charged as the principal federal entity to coordinate nationwide efforts to implement and use the health IT and the electronic exchange of health information under the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009. Over thirty countries have attempted nationwide e-Health adoption, though none has completed the full scale adoption.

Case Study: Tamil Nadu Health Systems Project

Tamil Nadu Health Systems Project, funded through a reimbursement loan from World Bank, deployed a hospital management information system in over 1771 PHCs and 267 secondary care hospitals. An IT infrastructure was provided for Govt. hospitals with centralized servers and Tamil Nadu State Wide Area Network (TNSWAN) Connectivity for a web based application. It includes all routine healthcare functions like patient registration, out-patient consultation, in-patient admission and diagnostic investigations. The system provides a Unique Patient identification number (PIN), thus freeing patients from the hassle of a registration queue and offering complete portability of records throughout the state. The system maps the final diagnosis to ICD10 standard classifications. The system currently cycles ten thousand users and one lakh patients daily.

Conclusion

Nation-wide adoption of EHR in India is an ambitious but desirable step towards improving the efficiency of the healthcare services in India. In order to pursue the goal of true universal health coverage, it is important that the transition to EHR be taken up on mission mode. An enabling legislative framework for adoption of EHR, combined with financial incentives for practitioners to transition to an EHR regime will help in faster adoption of a nation-wide EHR system.