

Long-term Preservation Management and Utility of EHR

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Agenda

- Electronic Health Record (EHR)
- Long-term Preservation
- Management of Preserved EHR
- Utility of Preserved EHR
- Conclusion



EHR

- Electronic Health Record is a repository of information regarding the health of a subject of care in computer processable form [1]
- It is longitudinal electronic record of patient health information, generated by one or more encounters [2]



[1] International Organization for Standardization, Health Informatics: Electronic Health Record- Definition, Scope and Context, ISO/TR 20514 (2005)

[2] Healthcare Information and Management Systems Society (HIMSS), Definition of EHR

LONG TERM PRESERVATION

Why Preserve EHR?

- The DOHaD study [3] has established the importance of biomedical records to study the historical context in order to understand various associations of disease and early medical and related history
- Need
 - There are already various studies being undertaken to study the effect of EHR on reducing cost of medical care [4]
 - Reduction in cost of medical care itself is only one of the goals of preserved medical record
 - Biggest contribution is in epidemiology and medical research
 - Speed-up the medical processes and significantly reduce the unwarranted cost associated with lack of such data when needed

[3] Patrícia P. Silveira, et al., Developmental origins of health and disease (DOHaD), *Jornal de Pediatria*, Nov/Dec 2007

[4] Rainu Kaushal, Reducing the Costs of U.S. Health Care: The Role of Electronic Health Records, *Annals of Internal Medicine*, July 2013

National EHR Programs

Country	National EHR Program
Australia	HealthConnect
Austria	ELGA
Canada	EHRs Blueprint
Denmark	MedCom
England	Spine
Hong Kong	eHR Infrastructure
India	*Recommendation Stage*
Netherlands	AORTA
Singapore	NEHR
Sweden	National Patient Summary (NPO)
Taiwan	Health Information Network (HIN)
United States of America	EHR Meaningful Use

[5] Dr. Pradeep Sinha, Gaur Sunder, et al., Electronic Health Record: Standards, Coding Systems, Frameworks, and Infrastructures, ISBN: 978-1-118-28134-5, IEEE-Wiley Press, 2012

Indian Initiative

- Recently notified EHR Standards for India [6] is an important piece in achieving an interoperable medical data system leading to common accessible EHR
- Team in C-DAC worked on building technology for Distributed Scalable & Reliable Healthcare Store funded by DeitY, MCIT, Govt. of India



[6] Ministry of Health & Family Welfare, India, EMR/EHR Standards for India,
<http://mohfw.nic.in/WriteReadData/l892s/EHR%20Standards%20for%20India%20-%20August%202013-32630521.pdf>,
August 2013

Coverage

- Medical data (in other words clinical information) is in two forms; that recorded on paper and that born digital
- Upwardly mobile population causing chances of medical records being spread across geographies
- Ubiquity of computing devices and interconnected networks
- The aggregated EHR from all sources is worth preserving

Entry Barriers

- Why EHR?
 - One of the work groups of HIMSS has suggested several mechanisms that will increase adoption of the EHR itself [7]
- Are we ready for it?
 - Reluctance of the medical professional and lack of familiarity with technical tools are the biggest impediments in implementation of electronic data collection [8]

[7] HIMSS EHR Adoption and Sustainability Work Group, "Key Issues in EHR Adoption and Sustainability Whitepaper," Healthcare Information and Management Systems Society (HIMSS), July 2008

[8] Dr. Pradeep Sinha and Gaur Sunder, "Addressing India's Skewed-Doctor-to-Patient Ratio Issue through ICT", Proceedings of National Conference on Future Trends in Information & Communication Technology & Applications (NCICT -2011), Bhubaneshwar, September 2011

Preservation Challenges

- Existing non-electronic data: Medical practice in the country is largely paper based
- Modes of preservation: Location, Standards, Formats
- Size and duration of preservation: Life expectancy is increasing, so will data and access requirement
- Access, Security and Privacy: Medical data is protected and private, yet access is required for meaningful use, ownership
- Hardware and Software obsolescence: Loss of usability and access
- Other technological aspects: interconnect, fail-safety, performance, scalability

Preservation Strategies

- For inclusion of non-digital data, there are several possible 'compromises'
 - Start from a particular date
 - Convert all non-digital data to digital
 - Need based conversion
- India chose set of standards specific to each purpose in clinical process, but standards change too
 - Convert all preserved data to new standard
 - Ensure preserved data is always usable
 - A mixed strategy
- Data Enormity, its how you store it
 - Local storage, common registry
 - Central storage
 - Scalable distributed system
 - Hierarchical or multi-level storage techniques



Preservation Strategies...

- There is no silver bullet for security concerns, but set of technologies and tools exist
 - Use fine-grained policy based access control
 - Use of PKI and Digital Certificates to identify the user and her/his role reliably
 - All communication should preferably be conducted over secured channel
 - All data in storage could always be kept in encrypted form
 - Audit and log each access and operation

Preservation Strategies...

- Hardware and software ultimately become obsolete
 - Use open technologies and standards
 - Periodic software upgrade and migration
 - For hardware, several best practices are available from datacenters and data-warehouses
 - Distributed system model allows scaling dynamically and hardware can be renewed periodically

MANAGEMENT OF PRESERVED EHR

Management

- Control and Governance of the preserved data is an important aspect of preservation
- Without clear approach to ownership of data, policy or access, modes and mechanisms of its utilization, entire preservation would be meaningless



Retention Rule Tangle!

Authority	Rule/Guideline	Reference
Medical Council of India	Physician should maintain medical records for period of 3 years from the date of commencement of treatment	Regulation 1.3.1 of Medical Council of India (Professional conduct, Etiquette and Ethics) Regulations, 2002
Directorate General of Health Services, India	Records to be maintained for period of 5 years for out-patient, 10 years for in-patient, and medico-legal register to be maintained for 10 years	Letter No. 10-3/68-MH dated 31-Aug-1968 Also, Chapter 12 - Medical Record Services of Hospital Manual by the Directorate General of Health Services, MOHFW, GOI, 2002
State Directorate of Health Services, Punjab	Medico-legal records to be maintained for period of 12 years	Punjab Medical Manual, 1934



Approaches

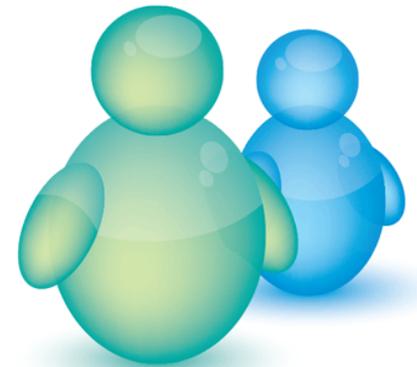
- If not technically impossible or impractically costly, preserve all medical records in perpetuity
- Preserve all records for a specific time period
- Categorize medical records based on their importance or requirement for preservation and assign a specific time period for each category
- In any case, homogenize the time requirement to preserve medical records across entire range of laws and rules

Ownership of Records

- An unresolved question!
- Medical Council of India rules indicate that records must be provided to patient upon request within specific time period
- Widely accepted theory: caregiver or hospital owns it, patient has the right to the information
- EHR Standards Committee of India has recommended a radical shift; Patient is the owner, HSP is custodian on behalf patient [6]

Governance

- Under Indian Constitution, 'Health' is a subject in the State List given in Seventh Schedule
- Each State in Indian Union to be able to create laws and rules governing universal healthcare within its territories
- Possible models:
 - National Rural Health Mission
 - Union Grants tied to some rules



UTILITY OF PRESERVED EHR

Individual's Perspective

- Access to medical records when and where needed
- Reduced time and cost in medical diagnostics
- Evidence-based medical care
- Better Insurance handling

Society and HSP Perspective

- Availability of Medical History
- Patterns and Correlations
- Drug Efficacy
- Management Information



Conclusion

- Preservation of medical records as embodied in EHR is a complex yet required activity
- Benefits far out-weigh the challenges, which themselves are not unsurmountable
- EHR needs to be preserved during the life time of individual and also retained for later use
- India has moved on various fronts from defining common set of standards to developing prototype for aggregation and storage of EHRs
- With Advances in ICT in healthcare, preservation of the medical data will become an imperative

Thank You

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