Preliminary Design of the Interoperable EHR Data Architecture in Korea

Myoung-Ju Jeon[a], Ein-Jeong Hwang[a], Young-Hwan Choi[a], Yoon Kim[ab]

a *Center for Interoperable EHR, Korea, silkjeon@gmail.com*

b *College of Medicine, Seoul National University,Korea*

Center for Interoperable EHR

Content

Abstract and Keywords

Introduction

Methods

Results

Discussion and Conclusion

References and Acknowledgement

Abstract and Keywords

Abstract

Today, interoperable EHR architecture is being developed by key advanced countries but at present time, it remains as a high level conceptual model. In Korea, the center for interoperable EHR is currently developing Interoperable EHR architecture to implement efficient national healthcare information network (NHIN). This study presented preliminary level design to define data architecture of interoperable EHR. To this end, the data model derived from this study should be in accordance with international standards such as HL7 Reference Information Model or openEHR Archetype Model .

Keywords

National Healthcare Information Network, Interoperable Electronic Health Record, Data Architecture

Introduction

- Providing Lifetime EHR for ensuring consumer rights and improving self-care through Korea National Health Information Network
- Ensuring interoperability through International standards related with interoperable EHR
- But,

  according to countries such as US, UK, Australia and Canada, various approaches and information models for EHR have been adopted.
- Also,

  none have been introduced in detail regarding the actual clinical information that needs to be exchanged between medical institutions yet.

Methods

Approach → Survey & Analysis → Classification & Propositon

1 Survey and Analysis

- The shard clinical information elements in domestic studies
- The shard clinical information elements between domestic hospitals
- The shard clinical information elements in foreign studies

2 Classification

- From requirements in EHR business architecture
- From general requirements in EHR infrastructure
- Compared with shared items throughout the previous studies

3 Proposition of the sharable data elements

- The essential data elements regarding discharge summary
- The common data elements to exchange healthcare information

Methods

Approach → Survey & Analysis → Classification & Proposition

Survey and Analysis

Domestic Studies

- "Information Strategic Planning for Sharable Clinical Information" (1999)
- "Study on forming the basis of sharable clinical information" (2003)

Exchange Between Domestic Hospitals

- Surveyed on the scope of clinical data exchange between the main hospital and the branch hospital in Korea :

  Seoul National University Hospital, Inhwa University Hospital, Samsung Seoul Hospital, National Health Corporation Ilsan Hospital

Foreign Studies

- Abstracted form international researches :

  HealthConnect in Australia, Continuity Care of Record in US,

  The Japanese Set of Identifiers for Medical Record Information Exchange in Japan

Methods

Approach → Survey & Analysis → Classification & Proposition

Classification

Key Business Requirements

- Lifetime Health Record
- Sharing of Clinically Relevant Information
- Sharing EHR Information across regions and institutions
- Support of Potential Services
- Privacy and Security
- Consumer Consent

Requirements In EHR Infrastructure

- EHR shared support service
- EHR access support service
- Terminology & medicine supplies service
- Repository management services
- Registry management service
- Internal & External linking services

Comparison Between Surveys

- Considered the requirements mentioned above
- Compared between domains of clinical information derived from previous studies
- Compared between data elements derived from previous studies
- Classified and derived the shared data from the three steps mentioned above

Methods

Approach → Survey & Analysis → Classification & Proposition

Proposition

The essential data elements

- The essential data is related to the discharge summary.
- The essential data is necessary to exchange health information to a minimum.

The common data elements

- The common data is derived from the repetition of the same terminology in the previous surveys.
- It is sure that the common data will need to improve healthcare delivery and the interoperability among different information systems or hospitals to the maximum.

Results

The essential 27 data elements regarding discharge summary

Data Items for Shareable EHR

Information Groups	Detailed Data Items	N
Demographics	Patient Name, National UID, Birth Date, Gender, Address, Phone No., Mobile No.	7
Medical Institution	Hospital Name	1
Medical Record Management	Patient ID	1
Medical Staff	Specialist, Physician, Signature, Medical License	4
Discharge Summary	Admission date, Discharge date, Admission Dept. name, Discharge Dept. name, Chief complaint & Symptom, Diagnostic findings, Name of procedure & operation, Treatment result, Principal diagnosis, Other diagnoses, Codes of diagnoses, Discharge medication, F/U plan	14
Total : 5 Groups		27

Results

29 information scopes and 377 data elements to exchange healthcare information

Data Items for Shareable EHR

Information Groups	N	Information Groups	N
Demographics	15	Puerperal History	18
Occupation	1	Review of System	15
Guardian	1	Physical Examination	15
Death registration	11	Prescription	15
Consent	11	Referral/Consultation	19
Access to Medical Records	6	Diagnostic Lab Test	23
Medical Institution	4	Diagnostic Imaging	12
Medical Record Management	1	Medication	18
Insurance	5	Discharge Summary	13
Medical Staff	9	Emergency	20
Problem List	16	Operation	45
Immunization	13	Transfusion	9
Environmental Risk Factors	8	Diet/Nutrition	11
Past Medical History	17	Other Treatments	6
Prenatal History	20	Total : 29 Groups	377

Detailed Data Items

Examination Name, Examination Date, Reading date, Reading result, Comments, diagnosis, Name of referring Dept, Name of referring physician, Code of diagnosis, name of radiologist, Imaging

Order date, Commercial name, Chemical name, Drug code, Physician name, Problem ID, Prescription rationale, Order status, Dosage, Dosage unit, Administration route, Administration area, Interval & Frequency, Administration precaution, First administration date, Last administration date, Indicated diagnosis for drug

Admission date, Discharge date, Admission Dept. name, Discharge Dept. name, Chief complaint & Symptom, Diagnostic findings, Name of procedure & operation, Treatment result, Principal diagnosis, Other diagnoses, Codes of diagnoses, Discharge medication, F/U plan

Discussion and Conclusion

- The purpose of this study is to propose data elements for providing the NHIN service.
- The proposed data elements are classified and derived from many researches in domestic and foreign countries, such as Korea medical ISP for sharable clinical information, data for exchange between hospitals in Korea, HealthConnect in Australia, and Continuity Care of Record in US.
- These data elements are valuable and important in terms of interoperable EHR. Also, They will be utilized for defining a conceptual data architecture that is an initial step of interoperable EHR architecture at the national level in Korea.
- Future work will be proceeded with verification by surveys and close examinations from experts.

References and Acknowledgement

- References

[1] Center for Interoperable EHR, EHR Architecture Conceptual Modeling V1.0. Korea, 2006.

[2] Linda May, Eric Browne, Lorraine Rayson, Lorraine Anderson, Stephen Chu, Part B – Health Event Summaries, EHR Lists and EHR Views. Clinical Information Project in DoHA(Department of Health and Ageing), 2004

- Acknowledgement

This study was supported by a grant of the Korea Health 21 R&D Project, Ministry of Health & Welfare in Republic of Korea (A050909).