Perspectives on SNOMED CT Implementation in Indian Hospital Management Information Systems

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About CDAC

- An autonomous Research and Development organization under the Ministry of Electronics and Information Technology (MeitY), Government of India.
- Key focus areas:
  - High performance computing
  - Health Informatics
  - Cyber Security and Forensics
  - Professional Electronics & VLSI
  - Software Technologies and Services
Health Informatics Products/Solutions by CDAC

- Hospital Management Information System
- Drug Warehouse Management System
- Blood Bank Management System
- Medical Equipment Interfacing
- Healthcare Mobile Applications
- Electronic Health (Medical) Record Solutions

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# CDAC HMIS Modules

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## Modules
- Tele-Consultancy
- Citizen Portal
- Mobile Apps

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HMIS Deployments

1. Hospital-Specific Management Information Systems (*eSushrut*)
2. State-wide Hospital Management Systems
3. Centralized Drug Warehouse Supply Chain Management Systems (*eAushadhi*)
4. Nation-wide Blood Bank Management System (*eRaktKosh*)
5. State-wide Medical Equipment Management System (*eUpkaran*)
Government Initiatives for Healthcare Standards

- Ministry of Health and Family Welfare (MoH&FW), Govt. of India, recently released standards compliance guidelines for creation and maintenance of Electronic Health Records (EHR), 2016.
- Healthcare IT systems and service providers are required to comply with EHR guidelines and standards.
- The objective is to ensure standardization in creation, maintenance and exchange of EHR between systems.
- It is also intended to encourage best practices involving all vendors and stakeholders towards a comprehensive and robust public health infrastructure.
Thrust Areas of EHR Implementation Guidelines

- Identification & Demographics
- Patient Identifiers
- Architecture Requirements
- Functional Requirements
- Reference Model & Comparison
- Terminology
- Coding Systems
- Imaging
- Scanned or captured records
- Data Exchange
- E-Prescription
- Discharge/Treatment Summary
- Medical Device Interface
- Personalized Healthcare
- Data Privacy and Security
- Information Security and Management
- Privilege Management
- Audit Trail
- Data Integrity and Encryption
- Digital Certificates
HMIS: Systems and User Interfaces

Bar Code Interface

Temp. Tag

Biometrics

Medical Equipment Interface

SMS and eMail Server

Interface with Printers, Scanners, Webcam

Smart Cards

Digital Tablet

HMIS
HMIS: Standards Compliance Initiatives

- ICD 10 /ICD O
- LOINC
- SNOMED CT
- MDDS
- HL7 – Messaging and CCD
- ISO/ISO-TS
- CIMS
- DICOM
Leveraging SNOMED CT for HMIS

- Integration of SNOMED CT with CDAC HMIS was important for **compliance with EHR standards guidelines** released by MoH&FW, Govt of India.
- It would also help clinicians and users of the HMIS to perform data entry/view conformant to a **standardized clinical terms vocabulary**.
- Standardized data entry into HMIS repositories and databases would ensure **credibility and robustness of data** being amenable for decision systems and analytics in the future.
- The key objective was hence to provide a **seamless, simple and convenient interface for users** to interact with SNOMED CT via our HMIS.
Challenges in Implementing SNOMED CT

- SNOMED CT is an extensive clinical vocabulary and **selection of subsets** needed to be done which could be integrated with HMIS.
- **Integration points** needed to be identified in HMIS which could be replaced by SNOMED CT vocabulary.
- The **existing terminology in use needed to be mapped with SNOMED CT** terminology to ensure integrity of previous medical records.
- Handling **free-text entry** and interfacing the same with SNOMED CT.
- **Operational challenges** included trained manpower, optimizing data entry time for system user, user friendliness and convenience.
Resolutions Identified to Address Challenges

- **Local Terminology Mapping**
  - The *existing terminology in use needed to be mapped with SNOMED CT* terminology to ensure integrity of previous medical records.
  - Pre-defined Forms or Templates (Parameter and Radio/Combo options mapping)

- **Integration points** needed to be identified in HMIS which could be replaced by SNOMED CT vocabulary. These included summary-based Clinical Entries like Progress Notes, Discharge Notes, Instruction etc.

- Handling **free-text entries** and interfacing the same with SNOMED CT by providing an efficient term search-and-fill mechanism.

- **Operational challenges** were addressed by training manpower/ data entry operators at clinical desks to facilitate compliant data entry.
Resolution Adopted: Local Terminology Mapping
Resolution Adopted : Free-text Entries
Resolution Adopted : Configurable Forms
Architecture for SNOMED CT Implementation

Database Level Abstraction

Lucene Search Indexer

Interface

SNOMED-CT Concept Repository

Central HMIS Database

SNOMED CT Concept Interfaces

Standard Codes

Free text form entries

Configurable Forms

Multiple HMIS Instances

HMIS Instance 1

HMIS Instance 2

HMIS Instance 3

... 

HMIS Instance N
Conclusions and Future Roadmap

- **SNOMED CT has been integrated with CDAC’s Hospital Management Information System (HMIS)** at the following modalities:
  - Local terminology mapping
  - Free-text entry
  - Configurable forms

- This integration would help **enforce standardization of data acquired** by the HMIS, making it useful for analytics and decision support.

- Future work involves periodically **integrating future releases of SNOMED CT vocabularies** to provide better and comprehensive services.

- **Potential integration with language extensions** (when available) would also be of interest for the diverse linguistic landscape of India.
thank you

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