SNOMED CT
Implementation Approaches

National Resource Centre for EHR Standards (NRCeS)
C-DAC, Pune
SNOMED CT with no Health Record

• SNOMED CT is a powerful modern clinical terminology
  - Comprehensive scope and support for detailed information
  - A code system providing standard representation of clinical meanings
  - A global reference terminology with multilingual term support
  - A polyhierarchy with ontological features that enable inference

• SNOMED CT is designed for use in electronic health records
  - On its own SNOMED CT does nothing!

• SNOMED CT is a component that delivers value when implemented as part of an electronic health record
Health Records with no SNOMED CT

• Making health records electronic
  - A significant step forward
  - Improves communication
  - Increases availability of relevant information

... but it is only a partial solution; the real challenge is ...

• Making health records meaningful
  - Identifying significant facts in oceans of data
  - Enabling effective meaning-based retrieval
  - Linking the EHR to authoritative clinical knowledge

• SNOMED CT represents clinical information meaningfully as part of a well-designed EHR
Benefits to Vendors: why implement SNOMED CT

• STRATEGIC BENEFITS
  – Staying Competitive and Relevant to the Market
  – Selling into International Markets
  – Meeting Clinician Expectations
  – Supporting Standards
  – Retaining Existing Customers

• PRACTICAL BENEFITS
  – Common Terminology
  – Ease of Adoption
  – Enhanced User Interfaces
  – Enhanced Analytics
  – Using Clinical Data to Meet External Reporting Requirements
  – Integration of Third Party Products
## Integration Approaches

- SNOMED CT can be integrated as:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Function</th>
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<tbody>
<tr>
<td>A code system</td>
<td>To store clinical information</td>
</tr>
<tr>
<td>An interface terminology</td>
<td>To capture and display clinical information</td>
</tr>
<tr>
<td>An indexing system</td>
<td>To retrieve clinical information</td>
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<tr>
<td>A common terminology</td>
<td>To communicate in a meaningful way</td>
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<tr>
<td></td>
<td>To integrate heterogeneous data</td>
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<tr>
<td>A dictionary</td>
<td>To query, analyze and report</td>
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<tr>
<td></td>
<td>To link health records to knowledge resources</td>
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EHR System Design
• **Benefits**
  
  - Patient data may be integrated from a variety of structured and unstructured sources, including hospital health record systems and mobile devices.
  - Patient data coded in a consistent way can be used for analytics, querying, decision support or displaying to the user.
  - Correlations between data from disparate sources can be made using SNOMED CT’s defining relationships.
An Indexing System for Data Retrieval

• **Benefits**
  - Supports research and analysis in a local system or shared data warehouse
  - Supports use of SNOMED CT for analysis and reporting
  - For identification of cohorts of patients for research studies
  - For exploration of data in support of clinical process review
  - To improve the user experience of longitudinal record review
  - Zero or minimal disruption to run-time processes
A Code System for Clinical Data in the EHR

- **Benefits**
  - No change to terms that clinicians are used to seeing in the user interface
  - Patient data stored using SNOMED CT concepts
  - Communication using shared meaning
  - Can utilize internationally developed mappings such as the mappings to ICD-9 and ICD-10
  - SNOMED CT is available for direct use in electronic communications
  - Standardized integration with decision support rules
An Interface Terminology For EHR Data Entry

• **Benefits**
  • Standardized descriptions in the user interface
  • No mapping required between interface terms and codes stored in patient record
  • Supports enhanced techniques for data entry, search and display e.g. searching over synonyms of the same concept
  • Patient data stored using SNOMED CT concepts
  • Readily available master reference data e.g. allergen list
For Simple Aggregation And Analysis of Data

• **Benefits**
  
  • Supports the use of SNOMED CT for analysis and reporting purposes, such as:
    
    • To improve the user experience
    • For exploration of data in support of clinical process review
    • For identification of patients for research studies
  
  • Can utilize internationally developed mappings such as the mappings to ICD-9 and ICD-10
    
    • Standardized descriptions in the user interface
    • Patient data stored using SNOMED CT concepts
    • Communication using shared meaning
• **Benefits**

  • This system combines all the benefits identified for the preceding approaches.
Enhancing EHR Design with SNOMED CT

• Include SNOMED CT data for storing clinical records
• Mapping from existing data entry templates or message templates to a SNOMED CT equivalent
• Introduction of SNOMED CT into the suite of data entry tools
• Propagating SNOMED CT changes as part of scheduled product maintenance
• Introducing SNOMED CT into the payload of electronic messages
• Migrating clinical records between systems
• Replicating existing reports or other outputs but with SNOMED CT
DATA ENTRY USING SNOMED CT
Constrain searches by Concept and Description status

- Search box: ventral hernia
- Search results:
  - ventral hernia
  - obstructed ventral hernia
  - obstructed ventral hernia
  - recurrent ventral hernia
  - recurrent ventral hernia
  - irreducible ventral hernia
  - irreducible ventral hernia
  - ventral hernia with gangrene
- Filter by
  - Active status
  - Inactive status
Constrain searches by super type ancestors (e.g. Disease)
Constrain search to avoid multiple hits on the same concept
Order shortest matching terms first
Order preferred term matches before synonyms
Distinguish identical terms of different concepts
Using SNOMED CT with other standards

• World Health Organization classifications: ICD-10
  – Develop and assure maps and links between SNOMED CT and WHO Classifications like SNOMED CT to ICD-9-CM and SNOMED CT to ICD-10 maps

• LOINC (Logical Observation Identifiers Names and Codes)
  – One result of this will be alignment of the attributes of laboratory tests. This will enable LOINC and SNOMED CT to be used together in a consistent and interoperable manner.

• Clinical Information Modelling Initiative (CIMI)

• HL7 message standards, CDA and FHIR
  – Enabling effective use of SNOMED CT in HL7 message
Key to Successful Integration of SNOMED CT

• Careful planning and understanding key objectives
• Ease and effectiveness of data entry and display
• Consistent representation of stored clinical information
• Methods and approach to effective communication
• Optimisation of retrieval, analysis and reuse
SNOMED in Action

• Annaswamy Mudaliar General Hospital, Bangalore *(HealthStore HIS developed by CSoft Technologies Pvt. Ltd.)*
• eHealth Kerala Project *(JK Technologies)*
• Death Note Form, AIIMS New Delhi *(AIIMS)*
• Hyderabad, Telangana *(Generation 5 eSushrut)*
  – District Hospital, Kingkoti
  – Area Hospital, Malakpet
  – Gandhi Hospital, Secunderabad
  – NIMS Panjagutta
• HealthQik
• eHospital *(NIC Tripura)* – in-progress
• Manorama Infosolution Pvt. Ltd. – in-progress
References

- Vendor Introduction to SNOMED CT
Thank You

nrc-help@cdac.in