SNOMED CT Basics for Clinical Staff
Awareness Training and Assessment
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Introducing SNOMED to Clinical Staff

Learning Objectives:

• Foundational knowledge of the structure and use of SNOMED for clinicians
• Ability to search, find and retrieve SNOMED CT terms using an internet browser
• Discernment of the difference between terminologies and classifications used in healthcare settings
• Understanding of the role of SNOMED CT integration into electronic health records systems
• Basic development principles and best practices in administering knowledge assessments involving SNOMED CT
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• Interest in the clinical use of SNOMED CT is increasing around the world
• The need for education and training in the clinical uses of SNOMED CT is growing
• As more countries adopt its use, the need for knowledge transfer and clinician training is urgent
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• Depending on the clinician’s role the use of classifications have been used for many years for encoding information

• SNOMED CT is a clinical terminology

• It is important to recognize that classification systems and terminologies are designed for different purposes
Does patient have a respiratory disorder?

Yes: is a subtype descendant of “respiratory disorder”

Does patient have an infection?

Yes: is a subtype descendant of “infectious disease”

Does the disorder affect the lung?

Yes: has finding site relationship to “lung structure”

Is the disorder caused by a virus?

Yes: has causative agent “orthomyxoviridae” which is a subtype descendant of “virus”
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• A classification systematically arranges things in groups or categories according to established criteria

• A terminology provides terms for use in a particular business of field of study

• SNOMED CT and classifications such as the *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) support different aspects of medicine and health care documentation requirements
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• **A common medical language** provides significant benefits by enabling semantic interoperability

• Terminologies and classifications are designed for different purposes and both are used to satisfy important and diverse user data requirements

• Getting the most out of electronic health records requires both!
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• It is possible for SNOMED CT to enable data capture at the point of care
• The terminology plays a pivotal role in electronic health records due to its broad coverage of clinical representation
• Using SNOMED CT to represent clinical information enables retrieval and reporting from EHRs
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• When the terminology is implemented in software applications it can be used to represent clinically relevant information in the process of producing electronic health records

• Browser tools are increasingly available and easy to use
Basic SNOMED CT Knowledge

• Like many other forms of technology use there are tools for access and specific functions
• One browser is a mobile application which runs on a Smart Phone and/or I-Pad
• A listing of SNOMED CT browsers is available from the US Library of Medicine
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• Browser examples
  – **CliniClue Xplore** is easy to use
  – **Snomobile** is designed for I-Pad and Smart phones
  – **National Library of Medicine SNOMED CT Browser**
  – **Snoflake**

• There are many browsers available these are only a sampling of products
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• The current IHTDSO project developing a **one-way authoritative map** from SNOMED CT to ICD-10 (and eventually other WHO-FIC classifications) enables data capture at the point of service.

• Efficiency is improved by leveraging technology to **link the clinical terminology representation** to the **classification** for secondary use.
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- Care must be taken to assure data integrity when linking systems
- Opportunities for capturing data once and reusing it for a different purpose leveraging maps from SNOMED CT are increasing
- Example: Development of the I-Magic Mapper by the National Library of Medicine for Problem Lists
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• SNOMED CT can help in the ICD transition to new versions
• Clinician’s frequently note that ICD terms are not user friendly while the language of SNOMED CT is more clinician friendly
• Direct use by healthcare providers during the process of care is possible through technology support
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• The **structure** of SNOMED CT standardizes detailed **clinical information** for documentation in health records

• This structure also **ensures interoperability** across software applications involving disease reporting

• Information **retrieval** is improved
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• The best approach for introduction and awareness is to communicate the **benefits** of implementing SNOMED CT in clinical systems

• IHTSDO provides [benefit lists](#) and [information sheets](#) in web friendly documentation and in [monthly newsletters](#)

• Check the resource list for links for IHTSDO authoritative resources
Basic SNOMED CT Knowledge

• Basic Components include:

- Descriptions
- Relationships
- Attributes
- Hierarchies

Concepts
Basic SNOMED CT Knowledge

• Building blocks
  – **Concepts** provide the anchors for meaning
  – **Descriptions** are strings of readable characters used to express meaning of the concepts
  – **Relationships** provide concept to concept links to express information in computer processable language
Basic SNOMED CT Knowledge

• Building blocks
  – **Attributes** are properties or characteristics of concepts
  – **Hierarchies** are comprised of parent-child relationships which means there are broad concepts at the top (called the parent) followed by child concepts which are more specialized or specific than the parent concept
  – This structure is **almost** like a genealogy diagram for relatives
Basic SNOMED CT Knowledge

• Root Concepts
  – Clinical finding
    • Inflammatory disorder
      – Arthritis
        » Rheumatoid Arthritis

• Selection of Concepts
  – SNOMED CT Browsers
  – Drop down lists
  – Automated mapping
  – Use of value sets
Basic SNOMED CT Knowledge

• SNOMED CT Logical Model
  – Component Design uses
    • Concepts
    • Descriptions
    • Relationships
  – Derivatives use
    • Navigation hierarchies
    • Reference sets
    • Cross Maps
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• Description logic from a knowledge representation viewpoint:
  – A set of constructs for representing terminological knowledge
  – Algorithms and their implementations for performing
    • Subsumption (Testing pairs of expressions to see whether one is a subtype of the other & vice versa)
    • Classification (Structuring in a set of expressions according to their subsumption relationships)
The core components included in the model specify a structured representation of:

- Clinical ideas
- Terms to represent these ideas
- Relationships between these ideas when it exists

Every concept represents a unique clinical idea.
Basic SNOMED CT Knowledge

- **Technical information** is available for clinicians seeking how the terminology works.
- Clinicians do not need to **master how the terminology is developed and maintained** to reap the benefits of its use.
- Follow the links in the resource pages to learn more about SNOMED CT use in electronic health records and more.
Assessment of Knowledge

• Implementation and use of SNOMED CT requires **orientation and training** for best success

• **Fact:** Clinical professionals have limited time to spend in a classroom

• Training programs are most successful when **assessment of knowledge** is included in the program
Assessment of Knowledge

• Adult learning principles suggest that adult learners have these characteristics:
  – Internally motivated and self-directed
  – Bring life experiences and knowledge to learning experience
  – Goal oriented
  – Relevancy oriented
  – Practical
  – Seek respect
Assessment of Knowledge

• Typical assessment of knowledge for healthcare settings:
  – **Overview** sessions in person, by webinar or through distance education sessions
  – Administration of a **pre-training assessment** is given to measure current knowledge of the topic
  – After training sessions have been completed a **post-training assessment** is administered to measure results of the learning experience
Assessment of Knowledge

• Busy clinicians generally prefer online and self-scoring assessments

• Provision of “real life” case studies are most effective in learning about new technology affecting clinical practice

• Since adult learners are relevancy oriented it is critical to feature assessments and materials which are relevant to roles or specialty of practice
Assessment of Knowledge

• Practical assessments are important for clinical staff— it is best to start with simple easy to understand features of SNOMED CT based on a use case already familiar to clinicians

• Include opportunities within the assessments to include clinician experiences when developing or selecting assessment tools
Developing Educational Resources

• When creating knowledge assessments first determine the skill and/or competencies you want to test. This assures the effort spent on taking the assessment is useful and applicable to the person being tested.

• IHTSDO is currently developing an inventory of publically available and accessible SNOMED CT training resources.
Common barriers for adult learners include:

- Lack of time, scheduling problems
- Lack of confidence in test taking
- Unable to see the importance of adopting or using SNOMED CT
- Respond only to visual learning and “hands on” learning with a guide
Developing Educational Resources

• Common solutions for breaking down barriers
  – Create **short but challenging** assessments and provide incentives to participate in the learning exercise
  – Offer **online “any time” assessments** with the ability for the test taker to review questions not answered correctly and supplemented with authoritative references for additional learning value
Developing Educational Resources

• Writing questions for SNOMED CT assessments can be challenging
• Items should be focused on a specific knowledge point, skill or ability
• Test specifications are used to inform a testing blueprint to guide the question development
• Item writers for assessments must have substantial knowledge of SNOMED CT
Developing Educational Resources

• For **measurable success** it is important to be able to differentiate between assessment takers with **high to low levels of knowledge about the terminology** after training sessions or educational services have been administered.

• Each question asked in assessments **must relate** to the intended piece of knowledge.

• Avoid superfluous information.
Developing Educational Resources

• **Terminology for test development**
  – Item
  – Stem
  – Prompt/Stimulus
  – Options
  – Key
  – Distractors/Confounders
  – Response
  – Rubric
How To Create a Test Blueprint

• For professional employment related assessments it is essential to distinguish the level of aptitude, abilities and knowledge requirements

• Start with fundamental knowledge clusters provided within IHTSDO documentation and resources

• Select the skills and abilities important to evaluate
How To Create a Test Blueprint

• Record the objectives of developing the test
  – **Identify** the type or class/audience of users of SNOMED CT to be assessed
  – Determine the **number and types of questions** to include
  – Decide on the **delivery** method
  – Determine if a Pre-test assessment will be offered **before** training is provided
How To Create a Test Blueprint

• Record the **objectives** of the project and plan before developing the test
  – State your goal of providing SNOMED CT related assessments for clinical staff
  – Determine the **time and availability** for assessments to be administered
  – Decide on the **delivery** methods
    • Online
    • In classroom
    • Paper
How To Create a Test Blueprint

• Develop an outline of SNOMED CT topics and knowledge important to achieve training goals
• Plan and arrange for qualified personnel for item writing
• Develop a plan for scoring test items
• Determine the method of sharing assessment results
Tips for Assessment Delivery

- Explore use of online assessment vendors – some are free or low cost
- Leverage educational support services from your institution
- Consider engaging education and training companies and who are familiar with SNOMED CT
- Engage interested clinicians to assist with training
Tips for Assessment Delivery

• Get familiar with the resources and documentation available through the IHTSDO

• Leverage the monthly newsletters from IHTSDO for information and as a source for testing items (questions)

• Make learning fun by using gaming, online surveys and creative challenges related to SNOMED CT
Resource List

• IHTSDO General Information including
  – Benefits of SNOMED CT
  – SNOMED CT Value Proposition
  – http://www.ihtsdo.org/snomed-ct/

• SNOMED CT Concept Identifier Lookup Service
Resource List

• SNOMED CT Documentation July 2013
• Includes
  – Frequently Asked Questions – SNOMED CT User Guide
  – SNOMED CT Editorial Guide - SNOMED CT Technical Implementation Guide
  – Draft IHTSDO Glossary - SNOMED CT Release Format 1
  – SNOMED CT Release Notes – SNOMED CT Scope Memo
  – SNOMED Medical Devices – SNOMED CT Developer Tool Kit Guide
  – SNOMED CT Release Format 2 Value Proposition – SNOMED
  – CT Canonical Table (RF1)
Resource List

- Presentations from the 2012 IHTSDO Implementation Showcase
- History of SNOMED CT
  - http://www.ihtsdo.org/snomed-ct/history0/
- Licensing
  - http://www.ihtsdo.org/licensing/
Resource List

• An Overview of Adult Learning Processes
  (Sally S. Russell, MN, CMSRN, CPP)

• Adult Learning Theory and Principles: The Clinical Educator’s Resource Kit (Queensland AU Occupational Therapy Fieldwork Collaborative)
Resource List

• Example of development of a test blueprint from the Schreyer Institute for Teaching Excellence (Penn State University)

• Sample test blueprint from the Pediatric Hematology & Oncology Certification Review

• Item Writing and Review Guide from the Assessment Systems Corporation
Resource List

• Clinical Classification and Terminology: Some History and Current Observations (Christopher G. Chute, MD, DrPH)
  – [http://jamia.bmj.com/content/7/3/298.full](http://jamia.bmj.com/content/7/3/298.full)

• SNOMED CT: Who Needs to Know What? (Ed Conley, Tim Benson)

• Sharing Ontology between ICD-11 and SNOMED CT will enable Seamless Re-use and Semantic Interoperability (Nine authors)
Questions?

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IHTSDO Activities
Quality Assurance Standing Committee
SNOMED CT Implementation Advisory Scheme
Education Special Interest Group