

COMP2322: Introduction to Health Informatics

Medical Terminologies/Vocabulary: Introduction

Time: Tues+ Thur: 13:00-13:50

Location: Masri406

Section: 1

HiCure

Excellence in Health Informatics Integrated Curricula

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Terminology: defined

- Terminology is the study of terms and their use.
(wikipedia)
- Terminology or controlled vocabulary:
 - A finite, enumerated set of terms used to convey information unambiguously.
- Clinical terminology:
 - Refers to the meaning, expression, and use of concepts in statements in the medical record or other clinical information system.

Controlled Vocabulary

- “... an established list of **standardized terminology** for use in **indexing** and **retrieval** of information”

(OECD)

- “...an organized **arrangement of words** and **phrases** used to **index** content and/or to **retrieve** content through browsing or searching”

(Getty Institute)

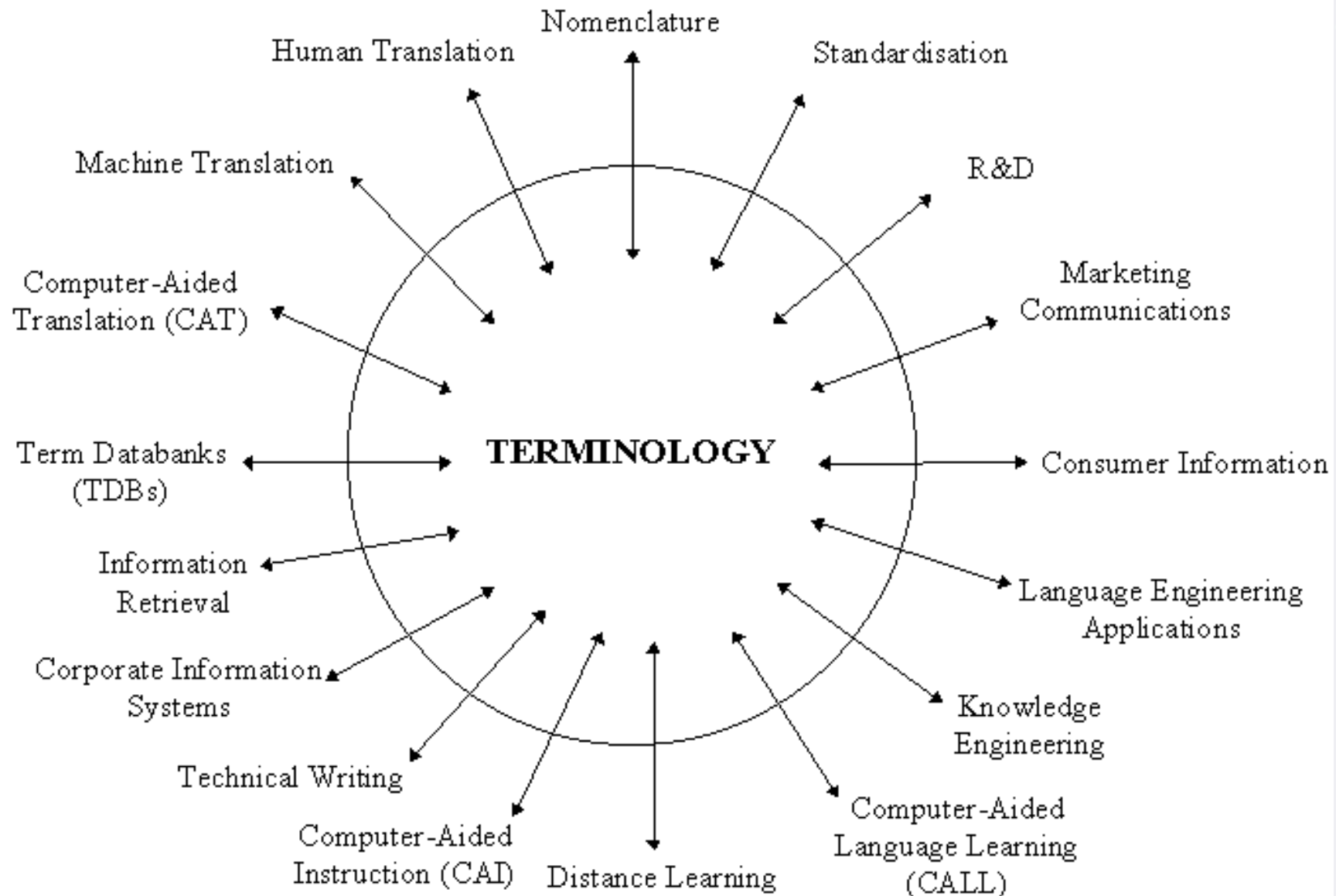
- “... a **standardized** yet **dynamic-set of terms** and **phrases** authorized for use in an **indexing** system to describe a subject area or information domain.”

(SCIP)

Why Medical Terminology?

- **Main use of medical terminologies:**
 - To encode (index/annotate) medical information e.g. in Electronic Health Records (EHR), medical literature etc.
- **Why do we need them?**
 - Machine-readable form: Computers cannot reliably “understand” (respond to/act upon) natural language (free text)
 - Controlled vocabularies help to reduce complexity by
 - restraining content (what can be said) and
 - syntax (how it is said)
 - Electronically-stored information is much more useful if it is encoded

Why Medical Terminology?



What Information to code?

- Information on **individual patients**
 - e.g. Medical records
- Information on **populations of patients**
 - e.g. aggregated data for epidemiology, public health, and quality assurance
- Information on **institutions** and the health care system
 - e.g. information for planning, management etc.
- Information on the current state of knowledge of best **medical practice**
 - e.g. knowledge management and decision support in its widest sense.

Where will coding information be used?

- Entering data about patients
 - fast, easy and intuitive enough to be used routinely during or immediately patient consultations
- Presenting information about individual patients
 - getting information from the medical record
- Querying and retrieving information about populations of patients
- Sharing and integrating patient information
 - from different applications, medical records, and decision support systems
- Also, for
 - Authoring knowledge – either static knowledge or dynamic decision support
 - Indexing knowledge – both general medical knowledge and information about individual patients
 - Analysing and generating natural language – for international use in multiple languages

Terminology of Terminologies

- **Terminology**
 - is a set of terms representing a system of concepts.
- **Classification**
 - is a system that classifies or organizes entities or concepts into distinct classes or categories - groups similar or related concepts within connected classes
- **Taxonomy**
 - A scheme of classification.
- **Nomenclature**
 - A system of naming, i.e. the system for devising or choosing of names for things

Terminology of Terminologies

- **Vocabulary**
 - is a collection of words or phrases with clearly defined meanings- i.e. a dictionary of those terms.
- **Dictionary**
 - is a defined listing of vocabulary
- **Lexicon**
 - Vocabulary of a language or branch of knowledge
- **Thesaurus**
 - lists vocabulary in groups of synonyms and related concepts.
- **Code Set**
 - is a set of unique codes assigned to vocabulary
- **Ontology**
 - is a common vocabulary, organised by meaning, that allows for an understanding of structure of descriptive information, which helps to facilitate interoperability

Standardisation: A Crucial Need In Healthcare

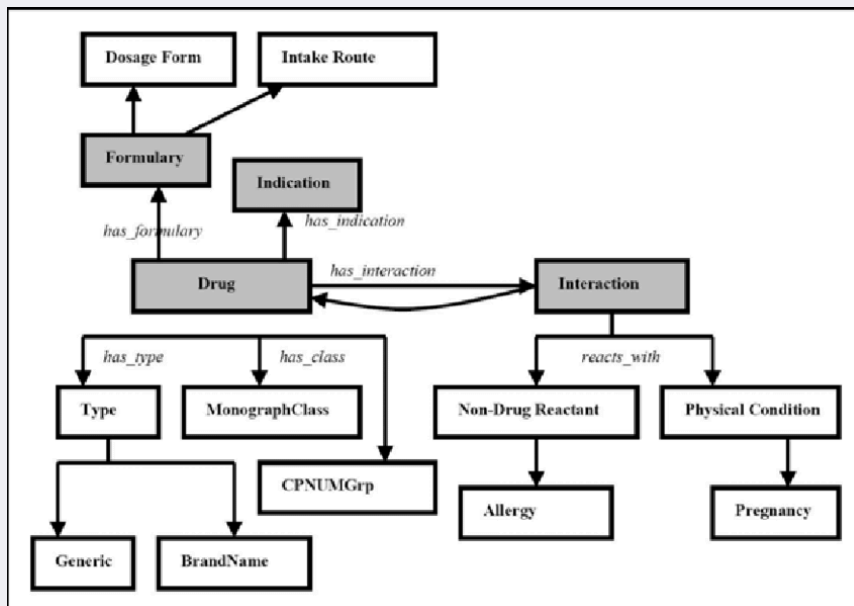
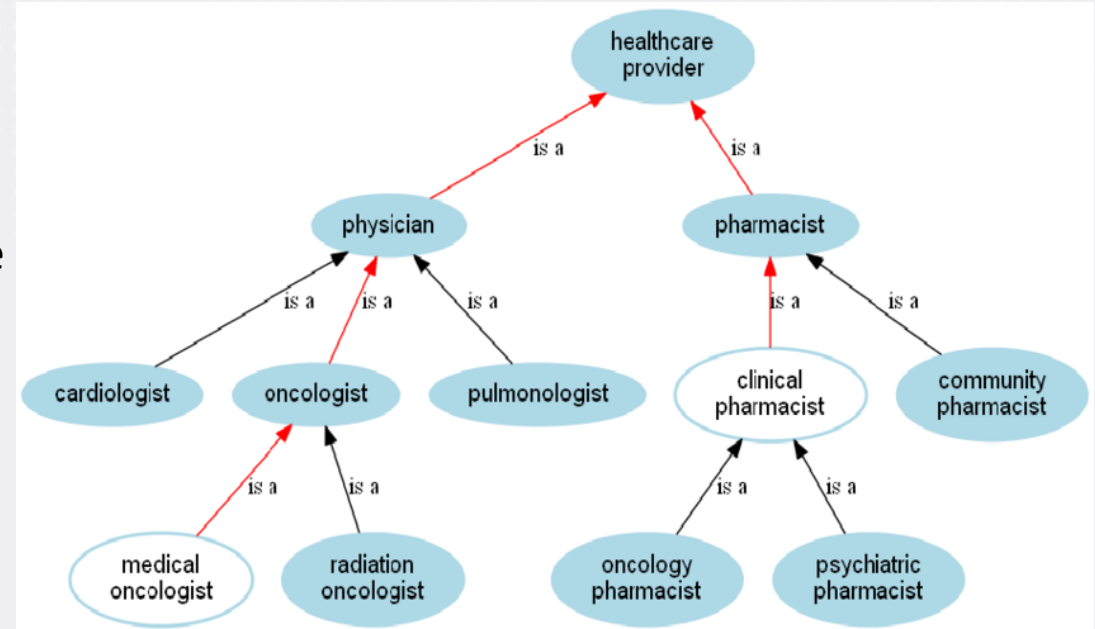
- using different terms for the same concept, In the healthcare settings, might lead to “for example”:
 - clinical misinterpretation
 - wrong management of the registered knowledge
 - misdiagnosis of the patient’s problem
 - etc.
- *Using **coding systems and clinical terminologies**, solve such problems if used properly, for coding patients’ clinical data in EHRs, as part of daily practice, by*
 - *clinicians and*
 - *other health professionals.*

Terminologies & Semantic interoperability

- Terminologies or coding standards are crucial to achieve semantic interoperability
 - **recall-Semantic interoperability:**
 - the ability of two or more systems to exchange information and
 - the receiving system have the ability to interpret the meaning of that information automatically and accurately enough to produce useful results, as defined by the end users of both systems.
- Thus terminologies or coding standards should be capable of creating interoperability across
 - different domains of medicine
 - different health systems
 - different health organisations and
 - across national boundaries.

Terminologies and Ontology

- Recall- **Ontology** is a formal explicit specification of a shared conceptualisation
- A medical ontology is a collection of terminologies that are organised into relationships that are meant to simulate the nature of those concepts in the real world.
- Example: a healthcare provider terminology represent different types of providers. The relationship between these types can be represented as an ontology



- Example: a drug product terminology typically has component parts that represent routes, dose forms, ingredients and units of measure. The relationship between the drug product and these component terminologies is an ontology.

Mapping between Medical Terminologies

- **Mapping between medical terminologies or coding systems is** to provide a link between one terminology and another, and/or between terminologies and data models
- Mapping between medical terminologies important to:
 - reuse data collected for other purposes
 - maintain value of data in cases of migration to newer database formats and schemas;
 - avoid repeated editing of the same data and consequently the risk of errors;
 - facilitate the semantic interoperability between systems:
 - maintaining meaning between sources of data and systems that are targets for data reuse.
 - Translating or mapping, automatically, coding between systems that use different coding systems.

Medical terminologies/Vocabulary: Types and Purpose

- **Diagnosis/signs and symptoms:**
 - ICD9/10: ICD9CM, ICD10, ICD10CM, ICD10AM, ICD-O,
 - SNOMED: SNOMED-RT, SNOMED-CT
 - Read Codes
 - ICPC, ICF, CTCAE, WHOART, MEDCIN, DSM
- **Procedures:**
 - ICD9CM, ICD10-PCS
 - SNOMED CT
 - CPT, CDT, HCPCS, OCPS
- **Drugs –**
 - RXNORM
 - NDDF, VANDF, NDC, MedDRA
- **Lab/Diagnostic tests –**
 - LOINC,
 - UltraSTAR
- **Nursing –**
 - NANDA, NIC, NOC, OMS, HHC
- **Medical devices –**
 - UMDNS, GMDN, SPN
- **Genomics –**
 - GO, HUGO, NCBI Taxonom

Thanks!

Any questions?

You can find me at:

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