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Indian Standard

स्वास्थ्य सूचना विज्ञान — पारिभाषिक संसाधन

भाग 1 विशेषताएँ

Health Informatics — Terminological Resources

Part 1 Characteristics

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NATIONAL FOREWORD

This Indian Standard (Part 1) which is identical to ISO 17117-1 : 2018 ‘Health informatics — Terminological resources — Part 1: Characteristics’ issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Health Informatics Sectional Committee and after approval of the Medical Equipment and Hospital Planning Division Council.

The text of the ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in the draft Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words ‘International Standard’ appears referring to this standard, they should be read as ‘Indian Standard’; and
b) Comma (,) has been used as a decimal marker while in Indian Standard, the current practice is to use a point (.) as the decimal marker.

Contents

Page

Introduction

Health terminology is complex and multifaceted. It has been estimated that up to 45 million different terms are needed to adequately describe health-related concepts like conditions of patients and populations, actions in healthcare and related concepts, such as medicines, biomedical molecules, genes, organisms, technical methods and social concepts[3]. Many formal and less formal terminological resources exist to represent this complexity. These may be called terminological systems, coding systems, formal concept representation systems, classification systems, and others. Specific features of different terminological resources make them more or less useful for particular purposes and technological environments.

The need for formal terminological resources to support health information management has been widely recognized[6][7][8]. Such resources are required for precise data collection, accurate interpretation of data and interoperability among information systems that exchange such data[7]. National governments, healthcare organizations and others are currently concerned with the question of which of the available terminological resources will meet their requirements, i.e. they wish to 'assign value' to specific terminological resources to decide which are suitable for their purposes and healthcare contexts.

A set of criteria to support such evaluations was originally published by ISO in 2002 (ISO/TS 17117). The main purpose was to enable users to assess whether a terminological resource has the characteristics that will support their specified requirements, since the characteristics of a terminological resource influence its utility and appropriateness in applications. There has been much progress in the study and use of terminological resources since that time and some experience of formal evaluations[9][10]. This revision updates the original Technical Specification with a revised scope and purpose commensurate with present and future healthcare and technology contexts, incorporating new definitional standards where relevant.

As the first part of the entire revision work, this document (ISO 17117-1) identifies the characteristics of terminological resources in healthcare (Clause 4) and functions or roles invoked by those characteristics (Clause 5). This document also provides a framework to identify different types of terminological resources using a combination of those characteristics and functions, which is essential for the development of criteria for the categorization of terminological resources in healthcare. Requirements for, and evaluation criteria of, terminological resources in healthcare, which will be addressed in the future parts of ISO 17117, are tightly related to the characteristics of terminological resources and functions that they can provide.

Indian Standard

HEALTH INFORMATICS — TERMINOLOGICAL RESOURCES

PART 1 CHARACTERISTICS

1 Scope

This document defines universal and specialized characteristics of health terminological resources that make them fit for the purposes required of various applications. It refers only to terminological resources that are primarily designed to be used for clinical concept representation or to those parts of other terminological resources designed to be used for clinical concept representation.

This document helps users to assess whether a terminology has the characteristics or provides the functions that will support their specified requirements. The focus of this document is to define characteristics and functions of terminological resources in healthcare that can be used to identify different types of them for categorization purposes. Clauses 4 and 5 support categorization according to the characteristics and functions of the terminological resources rather than the name.

NOTE Categorization of healthcare terminological systems according to the name of the system might not be helpful and has caused confusion in the past.

The target groups for this document are:

a) organizations wishing to select terminological systems for use in healthcare information systems;

b) developers of terminological systems;

c) developers of terminology standards;

d) those undertaking independent evaluations/academic reviews of terminological resources;

e) terminology Registration Authorities.

This document contains general characteristics and criteria with which systems can be evaluated.

The following considerations are outside the scope of this document.

— Evaluations of terminological resources.

— Health service requirements for terminological resources and evaluation criteria based on the characteristics and functions.

— The nature and quality of mappings between different terminologies. It is unlikely that a single terminology will meet all the terminology requirements of a healthcare organization: some terminology providers produce mappings to administrative or statistical classifications such as the International Classification of Diseases (ICD). The presence of such maps would be a consideration in the evaluation of the terminology.

— The nature and quality of mappings between different versions of the same terminology. To support data migration and historical retrieval, terminology providers can provide maps between versions of their terminology. The presence of such maps would be a consideration in the evaluation of the terminology.

— Terminology server requirements and techniques and tools for terminology developers.

— Characteristics for computational biology terminology. Progress in medical science and in terminology science will necessitate updating of this document in due course.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

NOTE Selected terms from ISO 1087-1 are given in Annex A as background to the terms and definitions in Clause 3.

3.1 General terms

3.1.1
concept
unit of knowledge created by a unique combination of characteristics

Note 1 to entry: Informally, the term 'concept' is often used when what is meant is 'concept representation'. However, this leads to confusion when precise meanings are required. Concepts arise out of human individual and social conceptualizations of the world around them. Concept representations are artefacts constructed of symbols.

Note 2 to entry: Concept representations are not necessarily bound to particular languages. However, they are influenced by the social or cultural context of use often leading to different categorizations.

[SOURCE: ISO 1087-1:2000, 3.2.1, modified]

3.1.2
term
linguistic representation of a concept in a specific subject field

[SOURCE: ISO 1087-1:2000, 3.4.3, modified]

3.1.3
characteristic
abstraction of a property of an object or of a set of objects

[SOURCE: ISO 1087-1:2000, 3.2.4]

3.1.4
term identifier
sequence of letters, numbers or symbols, capable of uniquely identifying a term within the terminological resource

Note 1 to entry: Term identifier shall be unique within the terminological resource.

3.1.5
concept identifier
canonical expression (3.3.5), or sequence of letters, numbers or symbols, capable of uniquely identifying a concept within the terminological resource

Note 1 to entry: Concept identifier shall be unique within the terminological resource, so terms shall not be used for the purpose here in case polysemy exists.

3.1.6
code
identifier expressed by a series of letters, numbers, or symbols

Note 1 to entry: A code is a *concept identifier* (3.1.5) when used in a *coding system* (3.4.4).

3.1.7
terminological resource identifier
unique permanent identifier of a *terminological resource* (3.4.1) for use in information interchange

Note 1 to entry: This is equivalent to Health Coding Scheme Designator in EN 1068:2005 for registration of coding systems.

Note 2 to entry: Globally unique schemes such as OIDs, UUIDs, and URIs may be used for this purpose.

3.1.8
terminological resource version identifier
version identifier
identifier assigned to a version under which a *terminological resource* (3.4.1) is published or updated

3.1.9
coding scheme
collection of rules that maps the elements in one set, the "coded set", onto the elements in a second set, "the code set"

Note 1 to entry: The two sets are not part of the coding scheme.

[SOURCE: ISO 17115:2007, 2.7.2, modified]

3.1.10
composite characteristic
representation of a *characteristic* (3.1.3)

EXAMPLE has Cause Bacteria; Location = LeftUpperLobeOfLung.

Note 1 to entry: Typically expressed by a *semantic link* (3.2.5) and a *characterizing concept* (3.1.11).

[SOURCE: ISO 17115:2007, 2.2.1]

3.1.11
characterizing concept
concept that is referenced by a *semantic link* (3.2.5) in a *composite characteristic* (3.1.10)

EXAMPLE "Bacterium" in the construct "Disease that has Cause Bacterium"; "Yellow" in the construct "Skin Lesion that has Colour Yellow".

[SOURCE: ISO 17115:2007, 2.2.2]

3.1.12
characterizing generic concept
characterizing category
value domain
formal category whose specialization by a *domain constraint* (3.1.14) is allowed to be used as *characterizing concept* (3.1.11) in a particular context

EXAMPLE 1 <INFECTIOUS_ORGANISM> = {bacterium, virus, parasite}, in the context of "infection that has Cause INFECTIOUS_ORGANISM".

EXAMPLE 2 has Cause Bacteria; Location = LeftUpperLobeOfLung.

Note 1 to entry: The context includes a superordinate concept and a semantic link.

[SOURCE: ISO 17115:2007, 2.3.3]

3.1.13
sanctioned characteristic
formal representation of a type of *characteristics* (3.1.3)

EXAMPLE 1 performed Using <INSTRUMENT>; hasLocation <BodyPartOfImplantedDevice>.

EXAMPLE 2 "Cause Of Inflammation can Be set {bacteria, virus, parasite, autoimmune, chemical, physical}", where "can Be" is the semantic link, and "set{bacteria, virus, parasite, autoimmune, chemical, physical}" is the characterizing generic concept.

Note 1 to entry: A sanctioned characteristic is typically made up of a combination of a *semantic link* (3.2.5) and a *characterizing generic concept* (3.1.12), and can be used in *domain constraints* (3.1.14).

[SOURCE: ISO 17115:2007, 2.3.1]

3.1.14
domain constraint
sanction rule prescribing the set of *sanctioned characteristics* (3.1.13) that are valid to specialize a concept in a certain subject field

EXAMPLE "Infection possibly has Location Skeletal Structure" describes that an infection in a certain context can be located in a structure that is a kind of skeletal structure.

Note 1 to entry: The rule describes the set of potential characteristics by combining the *semantic link* (3.2.5) and the *characterizing generic concept* (3.1.12) it links to, possibly by enumeration of the concepts in the characterizing generic concept.

Note 2 to entry: Different levels of sanctioning are possible (e.g. conceivable, sensible, normal, usually In The Context Of, necessary).

[SOURCE: ISO 17115:2007, 2.3.2]

3.2 Relations between concepts

3.2.1
generic relation
generalization-specialization relation
relation between two concepts where the intension of one of the concepts includes that of the other concept and at least one additional delimiting characteristic

Note 1 to entry: A generic relation exists between the concepts 'word' and 'pronoun', 'vehicle' and 'car', 'person' and 'child'.

Note 2 to entry: This relation is equivalent to 'parent-child' or 'is-a' relation. The child concept has the same intension as the parent concept and at least one additional delimiting characteristic. Also the same in X 'is-a' Y.

Note 3 to entry: The use of the term 'relation' from an English perspective means that this is describing the concept (i.e. this concept is a generic relation of another concept) not the relationship. However, the 'generic relation' here means the relationship itself, not a concept.

[SOURCE: ISO 1087-1:2000, 3.2.21, modified]

3.2.2
partitive relation
whole-part relation
relation between two concepts where one of the concepts constitutes the whole and the other concept a part of that whole

Note 1 to entry: A partitive relation exists between the concepts 'week' and 'day', 'molecule' and 'atom'.

Note 2 to entry: This relation is different from *generic relation* (3.2.1). For example, a day is part of a week, but is not a specialization of a week, i.e. it is not a type of week.

[SOURCE: ISO 1087-1:2000, 3.2.22, modified]

3.2.3
hierarchical relation
relation between two concepts which may be either a *generic relation* (3.2.1) or a *partitive relation* (3.2.2)

EXAMPLE Relations such as 'stomach' ↔ 'organ' and 'stomach' ↔ 'body' are hierarchical relations, but the former is a generic relation and the latter is a partitive relation.

Note 1 to entry: *Partitive relations* (3.2.2) have several sub-types, such as "constitutional part of", "regional part of", "grouped by", and so on, which are also hierarchical types of relations.

Note 2 to entry: A characteristic which is explicitly identified in the terminological resource may be used to determine a hierarchy, and includes declaration of directionality. There may be more than one such characteristic in which case the terminological resource can be said to have "poly-hierarchy". The characteristic must have a value in the two concepts at either end of the relation which can be compared to determine the hierarchy.

[SOURCE: ISO 1087-1:2000, 3.2.20, modified]

3.2.4
associative relation
pragmatic relation
relation between two concepts having a non-hierarchical thematic connection by virtue of experience

EXAMPLE The relation between disease "X" and virus "Y" is not a hierarchical but an associative relation. The relation exists under a certain theme of interest (e.g. "a disease and its causative agent") and explicitly recognized by virtue of experience.

[SOURCE: ISO 1087-1:2000, 3.2.23, modified]

3.2.5
semantic link
formal representation of a directed *associative relation* (3.2.4) or *partitive relation* (3.2.2) between two concepts

EXAMPLE hasCause (with inverse isCauseOf).

Note 1 to entry: This includes all relations except the *generic relation* (3.2.1)

Note 2 to entry: A semantic link always has an inverse, i.e. another semantic link with the opposite direction.

[SOURCE: ISO 17115:2007, 2.2.3]

3.3 Formal concept representation

3.3.1
axiomatic concept representation
atomic concept representation
concept representation that is not composed of other simpler concept representations within a *formal (concept representation) system* (3.4.7)

EXAMPLE 'Liver', 'Incision act', 'Pain'

Note 1 to entry: In many cases, axiomatic concept representations will correspond to what philosophers call "natural kinds". Such an entity cannot be meaningfully decomposed. These should form the basis of all concept representations.

Note 2 to entry: A coding system may include axiomatic concept representations as well as compositional concept representations required for different use cases.

[SOURCE: ISO 17115:2007, 2.4.2, modified]

3.3.2
compositional concept representation
composite concept representation
intensional definition of a concept using as delimiting characteristics one or more *composite characteristics* (3.1.10)

Note 1 to entry: Each *characterizing concept* (3.1.11) in a *composite characteristic* (3.1.10) may be *axiomatic concept representation* (3.3.1) or another compositional concept representation.

Note 2 to entry: This allows inference of subsumption within a *formal (concept representation) system* (3.4.7). It is often expressed in a formalism, such as description logic.

Note 3 to entry: Compositional concept representation can be further divided into *pre-coordinated concept representation* (3.3.3) and *post-coordinated concept representation* (3.3.4).

[SOURCE: ISO 17115:2007, 2.4.1, modified]

3.3.3
pre-coordinated concept representation
compositional concept representation (3.3.2) predefined within a *formal (concept representation) system* (3.4.7), with an equivalent single unique concept identifier

EXAMPLE In SNOMED CT, “cancer of colon” is predefined and has a single unique identifier, which means to the SNOMED CT that it represents a “single” concept. However, “colon” is a synonym for “colon structure” and “cancer” is a synonym for “malignant neoplastic disease” in SNOMED CT. Therefore, “colon cancer” is non-atomic as it can be broken down into compositional concept representation (e.g. “cancer of colon” = “malignant neoplastic disease” < Finding_Site: “colon structure”>.).

[SOURCE: ISO 17115:2007, 2.4.6, modified]

3.3.4
post-coordinated concept representation
compositional concept representation (3.3.2), which is not pre-coordinated and therefore shall be represented using more than one concept from one or many *compositional systems* (3.4.5), combined using mechanisms within or outside the compositional systems

EXAMPLE 1 Problem.Main = Fracture, Problem.Location = Femur (within a template for a problem description).

EXAMPLE 2 Some common terminological resources, such as IETF BCP-47 for language tags, explicitly construct post-coordinated concept representations from disparate coding systems for language, script, region, and so on.

Note 1 to entry: Combining concepts from disparate terminologies can cause problems with overlapping and/or conflicting concepts, because there might be various ways to form compositional concept representations for the same concept. Typically, the mechanisms for making compositional concept representations across disparate terminological resources are specified in an information model (e.g. as templates for a certain type of concept).

[SOURCE: ISO 17115:2007, 2.4.7, modified]

3.3.5
canonical expression
concept name
term (3.1.2) which uniquely designates a concept within a *terminological system* (3.4.2)

EXAMPLE 1 Machine readable: <Inflammation that <hasCause Bacteria hasLocation Lung>>(with compositional characteristics sorted alphabetically after semantic link) instead of <pulmonaryInfection that hasCause Bacteria>

EXAMPLE 2 General language: Inflammation that has cause bacteria and has location lung (with compositional characteristics sorted alphabetically after semantic link) instead of pulmonary infection that has cause bacteria.

Note 1 to entry: It is unique within the system and unambiguous.

[SOURCE: ISO 17115:2007, 2.4.4, modified]

3.3.6
categorial structure
minimal set of *domain constraints* (3.1.14) for representing *terminological systems* (3.4.2) in a subject field

[SOURCE: ISO 17115:2007, 2.4.5, modified]

3.4 Terminological resources (in health domain)

3.4.1
terminological resource
controlled set of *terms* (3.1.2) in health domain

Note 1 to entry: Usually designed and controlled for use with computers for a specific purpose in the health domain, such as data entry, aggregation, retrieval and analysis. Accordingly, it has usability characteristics in health domain as described in Clause 4.

Note 2 to entry: It has a generic relation to the following types (3.4.2 to 3.4.7).

3.4.2
terminological system
terminology
concept representation system
<health> structured human and machine-readable representation of health concepts and relationships

Note 1 to entry: Every terminological system shall be organized by *hierarchical relations* (3.2.3) and/or *associative relations* (3.2.4). Typically, most terminological systems are organized by hierarchical relations.

Note 2 to entry: Every terminological system shall have term representations of health concepts for human-readability.

Note 3 to entry: It is used directly or indirectly to describe health concepts such as health conditions and healthcare activities, and allow their subsequent retrieval for analysis.

3.4.3
classification system
statistical classification
classification
terminological resource which has characteristics of mutual exclusiveness and exhaustiveness to aggregate data to a pre-prescribed level of specialization for a specific purpose

Note 1 to entry: Both of the two additional characteristics are indispensable to provide data aggregation function (5.4), and accordingly, to suit the use case for statistical analysis and data aggregation.

Note 2 to entry: It usually includes *hierarchical relations* (3.2.3) as well as definitions and rules for use but might not, as in the example simple classification of gender: Male, Female.

Note 3 to entry: It does not necessarily consist of a pre-defined exhaustive set of mutually exclusive categories. Some classification systems may have explicit rules to enable mutual exclusiveness.

3.4.4
coding system
combination of a set of *concepts* (coded concepts) (3.1.1), a set of *code* (3.1.6) values, and at least one *coding scheme* (3.1.9) mapping code values to coded concepts

Note 1 to entry: Coded concepts are typically represented by terms, but can have other representation. Code values are typically numeric or alphanumeric.

Note 2 to entry: Coding systems without organization by hierarchical relations and/or associative relations, such as ISO 3166-1 for country codes, are not terminological systems.

[SOURCE: ISO 17115:2007, 2.7.3, modified]

3.4.5
compositional system
compositional terminology
terminological system (3.4.2) that supports the creation of *compositional concept representation* (3.3.2)

Note 1 to entry: The definition is equivalent to "a terminological system that has an ability of post-coordination." It does not preclude that a compositional system also includes axiomatic and pre-coordinated concepts.

Note 2 to entry: Pre-defined concepts in a compositional system are not necessarily represented as *compositional concept representation* (3.3.2), since pre-defined concepts may include axiomatic concepts.

[SOURCE: ISO 17115:2007, 2.5.2, modified]

3.4.6
nomenclature
compositional system (3.4.5) structured systematically according to pre-established naming rules

EXAMPLE 1 Naming rules for a family of molecules such as '—ane', '—ene', 'halo—', 'hydroxyl—' in prefix or suffix is an example of pre-established naming rules in the compositional concept creation.

EXAMPLE 2 In SNOMED CT, "fully specified names" use a number of pre-established naming rules.

[SOURCE: ISO 1087-1:2000, 3.5.3, modified]

3.4.7
formal (concept representation) system
compositional system (3.4.5) with a set of machine processable definitions in a subject field

Note 1 to entry: Each definition of a pre-defined concept shall be an *axiomatic concept representation* (3.3.1), a *compositional concept representation* (3.3.2) or a formal extensional definition.

[SOURCE: ISO 17115:2007, 2.5.1, modified]

4 Characteristics of terminological resources in the health domain

4.1 Basics

The characteristics of a terminological resource influence its utility and appropriateness in clinical applications. Terminological resources should be evaluated within the context of their stated scope and purpose and are intended to complement and utilize those notions already identified by other national and international standards bodies.

This document explicitly refers only to terminological resources that are primarily designed to be used for health concept representation or to the aspect of a terminological resource designed to be used for health concept representation. This document will also provide terminological resource developers and users with the basic characteristics and functions invoked by those characteristics that should be taken into account on the occasion of assessing whether a terminological resource meets their requirements. These tenets do not attempt to specify all the richness that can be incorporated into a healthcare terminological resource. However, this document does specify the minimal characteristics, which will ensure that the terminological resource can provide the functions that are indispensable for the requirements on it. Figure 1 illustrates how those components are related to each other.

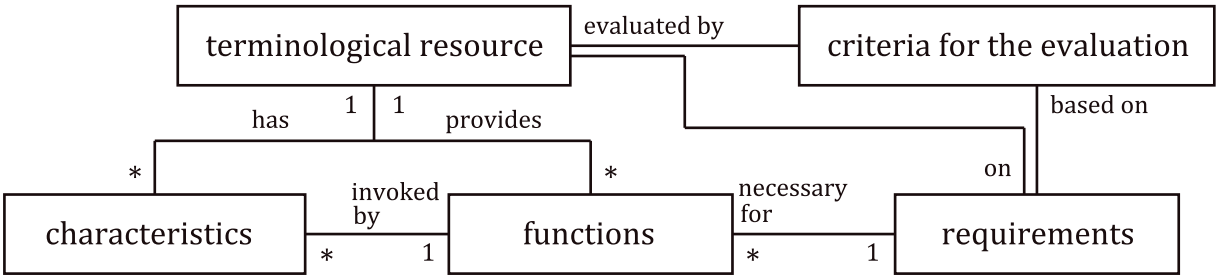

Figure 1 — Relations among the components in ISO 17117

This document will also provide terminology developers with a sturdy starting point for the development of healthcare terminological resources. This foundation serves as the basis from which terminology developers will build robust, large-scale, reliable and maintainable terminological resources.

Some classes of terminological resources defined in Clause 3 may have overlaps. For example, classification systems (3.4.3) are typically coding systems (3.4.4). Each class of terminological resource defined in Clause 3 may have several characteristics defined in this clause. To assess whether a terminological resource meets the applicable requirements, it is necessary for users and developers to pay considerable attention to the characteristics the terminological resource has and functions invoked by those characteristics, rather than its class name.

Annex B gives relations between characteristics, functions, requirements and evaluation criteria of terminological resources. Relations among terminological resources are given in Annex C.

4.2 Pre-coordinated characteristics aiming at identification of a specific concept/term

4.2.1 Term identifier

Every term in a terminological resource should have a term identifier (3.1.4).

EXAMPLE 1 In UMLS, the term 'headache' has the lexical unique identifier (LUI) 'L0018681', which is an example of a term identifier at the 'lexical' level according to the definition in UMLS. Each LUI is also related to one or more lexical variants, such as upper-lower case or punctuation difference, each of which is assigned a string unique identifier called SUI. For example, 'Headache' has SUI 'S0046854' and 'headaches' has 'S1459113', which are also examples of term identifiers at the 'string' level. Since UMLS is a meta-thesaurus which provides a mapping structure among vocabularies, every occurrence of a string in each source vocabulary is assigned a unique identifier called atom unique identifier (AUI). In this example, the term 'Headache' coming from SNOMED CT is given the UMLS AUI 'A2882187', and 'Headache' coming from MeSH is given the UMLS AUI 'A0066000', both of which are related to the same SUI 'S0046854'. The AUIs are also term identifiers at the 'source vocabulary' level of granularity.

NOTE Some terminological resources have no term identifiers. For example, MeSH has no identifiers for entry terms.

Term identifier shall be different from concept identifier, because different terms may point to the same concept.

4.2.2 Concept identifier

Every concept in a terminological resource shall have a concept identifier (3.1.5).

EXAMPLE 1 In UMLS, the concept 'Headache' has the concept unique identifier (CUI) 'C0018681'.

EXAMPLE 2 In UMLS, there are three terms related to the same concept 'Headache' (C0018681) with a different term identifier (3.1.4): 'headache' (L0018681), 'cranial pain' (L1406212) and 'cephalgia head pain' (L0290366). This is an example of different terms pointing to the same concept, and the relation between a concept identifier and term identifiers.

Concept identifiers should also have the following characteristics (4.2.3.2, 4.2.3.3).

A terminological resource may have more than one concept identifier. For example, ISO 3166-1 has three concept identifiers for each concept (numeric, alpha-3, alpha-2).

4.2.3 Concept orientation

4.2.3.1 General

The basic unit of a terminological system (3.4.2) shall be a concept. Concept identifiers shall correspond to one and only one meaning, and only one concept may have the same meaning. Different terms may have the same meaning if they are explicit representations of the same concept. This implies the following characteristics: non-redundancy, non-ambiguity and non-vagueness.

4.2.3.2 Non-redundancy

Terminological resources shall be internally normalized. There shall not be more than one concept identifier in the terminological resource with the same meaning (see ISO 704). This does not exclude synonymy; however, terms synonymous with the canonical expression (3.3.5) shall not be used for concept identifiers.

4.2.3.3 Non-ambiguity

No concept identifier should have more than one meaning. However, a term can apply to more than one concept.

Concept identifier should not be reused to indicate another meaning after its retirement, to keep non-ambiguity (see 4.6.2 and 4.6.5).

NOTE Sufficient intensional definition or extensional definition of concepts can also help users to keep non-ambiguity.

4.2.3.4 Non-vagueness

Terms shall correspond to at least one concept.

EXAMPLE 1 “Diabetes mellitus” does not have the child concept “Type I”, instead the child concept’s name is “Type I diabetes mellitus” or “Diabetes mellitus, Type I”.

EXAMPLE 2 ICD10 is an example of terminological resource. However, the set of the category names of ICD10 does not satisfy non-vagueness, because some terms such as “Other infectious diseases (B99)” is not context-free.

4.3 Characteristics related to extensibility for concept representations

4.3.1 Characteristics to specify more detailed concepts

4.3.1.1 General

The following characteristics are used to specify more detailed concepts than are supplied by the terminological resource, i.e. when atomic or pre-coordinated terms or concepts are not sufficient to cover them.

4.3.1.2 Post coordination

Post-coordinated concept representation (3.3.4) can be used to specify a certain concept using compositional concept representation (3.3.2) if the concept is not included in the atomic or pre-coordinated concept set. This is the attempt of a system to construct a set of concepts from within a

terminological system to more completely represent a user's query. This characteristic also requires compositionality (4.5.1) as a prerequisite.

EXAMPLE 1 The concept "bacterial effusion, left knee" might not be expressed by a unique identifier in a particular terminology. It represents a clinical concept that some patient has an infected left knee joint. As it cannot be represented by a single concept identifier, to fully capture the intended meaning a system would need to build a representation from multiple concept identifiers or lose information to free text.

EXAMPLE 2 Under the information model that any detailed "Fracture" concepts should be represented as a combination of "Fracture code", "Fracture type", "Location" and "Laterality", the concept "open fracture of left femur" can be post-coordinated as:

{"Fracture code": "Fracture of Bone", "Fracture type": "open", "Location": "Femur", "Laterality": "left"}

with their concept identifiers. Typically, such mechanisms for making compositional concept representations are specified in an information model within or outside the terminological resource.

4.3.1.3 Canonical expression

Canonical expression (3.3.5) could be applied to the post-coordinated concept representation (3.3.4) in order to identify the same compositional concept representation.

EXAMPLE 1 Machine readable: <Inflammation that <hasCause Bacteria hasLocation Lung>> (with compositional characteristics sorted alphabetically after semantic link) instead of <pulmonaryInfection that hasCause Bacteria>.

EXAMPLE 2 General language: Inflammation that has cause bacteria and has location lung (with compositional characteristics sorted alphabetically after semantic link) instead of pulmonary infection that has cause bacteria.

4.3.1.4 Explicit uncertainty

Notions of "probable", "suspected" or differential possibilities such as a differential diagnosis list, could be supported. The impact of "certain" versus "very uncertain" information has an obvious impact on decision support and other secondary data uses. Similarly, in the case of incomplete syndromes, clinicians should be able to record the partial criteria consistent with the patient's presentation. These criteria are listed separately, as many current terminological systems fail to address this area adequately.

4.3.2 Characteristics to broaden coverage of concepts

4.3.2.1 General

The following characteristics should be used to broaden coverage of concepts, if coverage of the atomic or pre-coordinated concepts is not sufficient.

4.3.2.2 Absorption to the nearest concept

Explicit rules for absorption to the nearest concept can help users to assign a concept identifier (3.1.5) to non-predefined concepts (atomic/pre-coordinated concepts). It expands the coverage of a pre-defined set of concepts and cannot be replaced by post-coordination (4.3.1) because adding composite characteristics in post-coordination will only create a more detailed concept.

EXAMPLE "A certain point in the small area between the cheek and the ear" might not be expressed by a unique identifier in a particular terminology. In such cases, explicit rules absorbing it to the pre-defined closest concept (such as 'cheek' or 'ear') can help users to assign a concept identifier.

4.3.2.3 Rules to define boundaries

Explicit rules to define boundaries can also be used for the same purpose as above (4.3.2.2). The rules will be typically provided as decision criteria based on measured values and so on, within or outside the terminological resource.

EXAMPLE For the clinical condition that a patient's BP level is not in the range of pre-defined concept "optimal (ideal) blood pressure" or "hypertension", explicit rules to define boundary (e.g. decision criteria based on the BP level) can help users to assign a concept identifier.

4.4 Characteristics related to data aggregation or classification

4.4.1 General

The following characteristics are used to aggregate or classify data for statistical analysis in healthcare.

4.4.2 Mutual exclusiveness

4.4.2.1 General

For many statistical analysis purposes, each input data item should be classified into one (and only one) category. This can be achieved if the terminological resource has either one of the following characteristics.

4.4.2.2 Pre-defined set of mutually exclusive categories

Pre-defined set of mutually exclusive categories naturally ensures mutually exclusiveness that is an indispensable characteristic for data aggregation.

NOTE It usually requires supporting information for defining the boundary of each category, such as inclusion criteria and exclusion criteria.

4.4.2.3 Explicit rules to enable mutual exclusiveness

If the pre-defined set of categories is not mutually exclusive, additional rules are required to enable mutual exclusiveness. These rules shall be explicitly described within or outside the terminological resource.

EXAMPLE In ICD10, 'double-coding' is allowed in some cases. However, ICD10 also includes the rules to determine primary code.

4.4.3 Exhaustiveness

For statistical analysis purposes, all data in a subject field shall be classified into a certain category. To do that, exhaustive sets of categories in a subject field or some residual categories to achieve exhaustiveness are required.

EXAMPLE In ICD10, several residual categories such as "Other and unspecified infectious diseases (B99)" are used.

4.5 Characteristics related to formal concept representation and semantic interoperability

4.5.1 Compositionality

Compositionality is a characteristic that the compositional concept representation (3.3.2) is supported by a terminological resource, regardless of whether it is pre-coordinated or post-coordinated. This characteristic serves as a prerequisite for a terminological resource to be a compositional system

(3.4.5) which supports the creation of post-coordinated concept representation. In formal (concept representation) system (3.4.7), every definition for non-axiomatic concept shall be pre-coordinated concept representation (post-coordination is also supported). The characteristics described below (4.5.2, 4.5.4, 4.5.5) are also tightly related to compositionality since they will be used to represent composite characteristics (3.1.10).

EXAMPLE "Laparoscopic Cholecystectomy" might be represented as "Excision" {<hasSite> "Gallbladder" AND <hasMethod> "Endoscopic">}. In this example, "Excision" is upper concept linked by generic relation, and the semantic links such as <hasSite>, <hasMethod> and so on is either partitive relation or associative relation.

NOTE Different compositional systems (3.4.5) might have different compositional approaches for representing concepts. The compositionality does not avoid such potential variations of composition. In the above example, <hasMethod> "Endoscopic" might also be represented as < access device>"Laparoscope" in another compositional system.

4.5.2 Hierarchical relation

4.5.2.1 General

Hierarchical relation (3.2.3) is a fundamental relation for organizing terminological resources and a popular characteristic for them to form terminological systems (3.4.2).

NOTE Partitive relation is used not only for organizing terminological resources but also used to represent composite characteristics (3.1.10).

4.5.2.2 Clear distinction between generic relation and partitive relation

Hierarchical relation may be either a generic relation or a partitive relation. Both of them can be used to organize the structure of terminological systems, but a clear distinction of those two relations is critical for the ability to provide reasoning functions (5.5). If a looser meaning such as "broader than/ narrower than" is used, it should be explicitly stated.

EXAMPLE 1 Strictly defined generic relation or partitive relation is transitive within each, but not true in mixed usage. For example, a 'wheel' is a part of a 'car' and a 'car' is a 'vehicle'; however, a 'wheel' is not a 'vehicle'. It means an instance of the lower concept is not always an instance of the upper concept, if generic and partitive relations are not clearly distinguished.

EXAMPLE 2 MeSH has hierarchical structure, but the hierarchical relation is not always a generic relation. For example, 'Remuneration' [N01.824.417.605] is located under 'Health care' [N].

4.5.2.3 Clear distinction between generic relation and role

A concept such as "teacher" or "patients with a fever" is a role concept temporarily played by a role-holder[11]. Thus, the relation "X =(is-a)=> patient with a fever" does not always hold. However, a 'role' relation is sometimes incorrectly used as an essential 'generic relation'. Clear distinction between generic relation and role is an important characteristic to avoid unintended error under a certain machine reasoning scenario.

EXAMPLE The relation "bacteria =(is-a)=> infectious agent" does not always hold, because "infectious agent" is a role concept.

4.5.2.4 Multiple hierarchy

Terminological resources with multiple hierarchies offer more functionality than those with a single hierarchy. This characteristic assumes obvious advantages for natural navigation of terms (for retrieval and analysis), as a concept of interest can be found by following intuitive paths (i.e. users should not have to guess where a particular concept was located).

EXAMPLE One example of multiple semantic parentage is "stomach cancer" which can be viewed as a "neoplasm" or as a "gastrointestinal disease".

4.5.3 Associative relation

4.5.3.1 General

Associative relations (3.2.4) are used to represent composite characteristics (3.1.10) as well as partitive relations, in both cases of pre-coordination and post-coordination. Thus it is indispensable for all compositional systems. Associative relations are also used to organize terminological resource to form terminological system, as well as hierarchical relations (3.2.3).

4.5.3.2 Explicitness of associative relations

As well as hierarchical relations (4.5.2.2, 4.5.2.3), the formal behaviour of all kinds of associative relations should be explicitly defined.

EXAMPLE 1 Transitivity in associative relations (e.g. causal relations) might be an example of the formal behaviour.

EXAMPLE 2 Clear definitions to distinguish similar associative relations are also important, such as {“part_of” and “contained_in”}, {“associated_with”, “after”, “due_to” and “causative_agent”} or {“adjacent_to”, “continuous_with” and “attached_to”}.

4.5.4 Categorial structure

Categorial structure (3.3.6) could be used in formal (concept representation) systems (3.4.7) to ensure internal consistency of compositional concept representations (3.3.2), i.e. it ensures that relationships between composite concepts should be uniform across parallel domains within the formal system. It is not a characteristic a formal system should have, but will support not only to ensure internal consistency but also to map with appropriate semantic correspondence between the concepts in various terminological resources.

EXAMPLE In the compositional concept representation of surgical procedures, a categorial structure would support user to make an uniform representation such as “removing (SURGICAL DEED)” <hasObject> “polyp (PATHOLOGY)” which <hasSite> “colon (HUMAN ANATOMY)” and <hasMeans> “endoscope (INTERVENTIONAL EQUIPMENT)”, which can also support to calculate the semantic consistency as described in 4.5.5.1 (Normalization of content) and 4.5.5.2 (Normalization of semantics).

4.5.5 Semantic consistency

4.5.5.1 Normalization of content

Normalization is the process of supporting and mapping alternative words and shorthand terms for compositional concept representations. All pre-coordinated concepts shall be mapped to or logically recognizable by all possible equivalent post-coordinated concept representations. There should be mechanisms for identifying the equivalence between user created (new) post-coordinated concepts as well (i.e. when there is no pre-coordinated concept for this notion in the terminological resource). This functionality is critical to define explicitly equivalent meaning, and to accommodate personal, regional and discipline specific preferences.

4.5.5.2 Normalization of semantics

In compositional systems (3.4.5), there exists the possibility of representing the same concept with multiple potential sets of axiomatic concept or compositional concepts, which may be linked by different semantic links. In this case, the compositional system needs to be able to recognize isosemantic expressions. The extent to which normalization can be performed formally by the system should be clearly indicated.

EXAMPLE The concept represented by the term “Laparoscopic Cholecystectomy” might be represented in the following two post-coordinated expressions:

“Excision”: {<hasSite> “Gallbladder” AND <hasMethod> “Endoscopic”>}

and

"Excision": {<hasSite> "Gallbladder" AND <usingDevice> "Endoscope">}

These representations might be recognized as isosemantic, if there is a rule/definition that <hasMethod> "Endoscopic" is equivalent to <usingDevice> "Endoscope", within the compositional system.

4.6 Characteristics related to maintenance of terminological resources

4.6.1 Context-free identifiers

Unique codes attached to concepts shall not be tied to hierarchical positions or other contexts; their format shall not carry meaning. Because health knowledge is being constantly updated, the generic, partitive, associative relations, and other categorizations of health concepts often change over time. For this reason, the concept identifier (4.2.2) assigned to a concept shall not be inextricably bound to a hierarchy position in the terminological resource, so that the code need not change when concepts are hierarchically reorganized.

EXAMPLE 1 "Peptic ulcer disease" is now understood as an infectious disease, but this was not always so.

EXAMPLE 2 The ICD10 code "K27.1" of the category "Peptic ulcer, site unspecified: acute with perforation" is an example of the concept identifier bound to a hierarchy position.

4.6.2 Persistence of identifiers

Term identifiers (3.1.4), concept identifiers (3.1.5) and terminological resource identifier (3.1.7) shall not be reused when a term, a concept or a terminological resource is added or modified, regardless of the length of time that the original term, concept, or terminological resource identified has been obsolete or superseded. Consistency of patient description over time is not possible when terms or concepts change their identifiers; the problem is worse when identifiers can change meaning. This practice not only disrupts historical analysis of aggregate data, but can be dangerous to the management of individual patients whose data might be subsequently misinterpreted.

4.6.3 Version identifier

Updates and modifications shall be referable to consistent terminological resource version identifier (3.1.8).

NOTE 1 Typically, a new version is required when the meaning or scope of any concept in the terminological resources changes.

NOTE 2 Typically, a new version is required when new concepts are added to the terminological resource.

NOTE 3 Some terminological resources can optionally associate version identifiers to individual concept or term records within them.

4.6.4 Editorial information

New and revised terms, concepts and synonyms shall have their date of entry or effect in the system, along with pointers to their source and/or authority. Previous ways of representing a new entry should be recorded for historical retrieval purposes.

4.6.5 Obsolete marking

Superseded entries should be so marked, together with their preferred successor. Because data may still exist in historical patient records using obsolete terms, their future interpretation and aggregation are dependent upon that term being carried and cross-referenced to subsequent terms. This should

be applied to term identifiers (3.1.4), concept identifiers (3.1.5) and terminological resource version identifier (3.1.8).

EXAMPLE Human T-cell leukaemia virus – Type III (HTLV III) to human immunodeficiency virus (HIV).

4.6.6 Responsiveness

The frequency of updates, or sub-versions, should be sufficiently short to accommodate new codes and repairs quickly, in a time agreed to be satisfactory by all parties.

NOTE This is not only a matter of updates of the contents, but also of implementability of new releases and of releasing deltas.

5 Functions invoked by a certain set of characteristics

5.1 Basics

Functions that a terminological resource will provide are tightly related to the requirements on it and also the implementation capability, thus are very important for users or developers for terminological resource assessment. In this clause, the document specifies required sets of characteristics for a terminological resource to provide certain functions. Some optional characteristics are not necessarily required, but will affect the quality of the functions. In each category of functions, “general criteria” shall be applied to all sub-type functions.

NOTE Mapping is also an important function but it will be defined outside the terminological resources. Thus it is out of scope of this document. ISO/TR 12300 will provide guidance for organizations charged with creating or applying maps to meet their business needs.

5.2 Data capture

5.2.1 General

Data capture is a fundamental function in most use cases. A terminological resource can provide the data capture function, if the terminological resource is a terminological system and has the following characteristics.

— [required] concept identifier (4.2.2)

— [required] non-redundancy (4.2.3.2)

— [required] non-ambiguity (4.2.3.3)

— [required] non-vagueness (4.2.3.4)

— [required] persistence of identifiers (4.6.2)

— [required] version identifier (4.6.3)

— [required] editorial information (4.6.4)

— [required] obsolete marking (4.6.5)

— [optional] term identifier (4.2.1)

— [optional] responsiveness (4.6.6)

5.2.2 Extensibility for concept representation

A terminological resource can provide a function of offering advanced features to represent 'non pre-defined concept' if the terminological resource has the following characteristics according to the purpose.

5.2.2.1 Specifying detailed concepts

— [required] compositionality (4.5.1)

— [required] hierarchical relation (4.5.2)

— [required] associative relation (4.5.3)

— [required] post-coordination (4.3.1.2)

— [optional] canonical expression (4.3.1.3)

— [optional] explicit uncertainty (4.3.1.4)

NOTE For specifying detailed concepts, canonical expression (4.3.1.3) is necessary to ensure the uniqueness of the compositional concept representation.

5.2.2.2 Broadening coverage of concepts

— [required] Absorption to the nearest concept (4.3.2.2)

— [required] Rules to define boundaries (4.3.2.3)

5.2.3 Providing semantically consistent formal concept representation

The following characteristics are required to provide semantically consistent formal concept representations in addition to the general criteria (5.2.1).

— [required] compositionality (4.5.1)

— [required] hierarchical relation (4.5.2)

— [requited] clear distinction between generic relation and partitive relation (4.5.2.2)

— [required] associative relation (4.5.3)

— [required] explicitness of associative relations (4.5.3.2)

— [required] normalization of content (4.5.5.1)

— [required] normalization of semantics (4.5.5.2)

— [optional] categorial structure (4.5.4)

— [optional] clear distinction between generic relation and role (4.5.2.3)

5.3 Display/presentation/identification

5.3.1 General

In order to provide every detailed display/presentation/identification function, the following characteristics are required in common for all sub-types in 5.3.

— [required] concept identifier (4.2.2)

— [required] non-redundancy (4.2.3.2)

— [required] non-ambiguity (4.2.3.3)

— [required] non-vagueness (4.2.3.4)

— [optional] term identifier (4.2.1)

5.3.2 Accessing concepts using terminology structure

A terminological resource can provide a function of accessing concepts using terminology structure in certain conditions. The following characteristics are commonly required among detailed case.

— [required] hierarchical relation (4.5.2) or associative relation (4.5.3)

NOTE Searching concepts using a natural language processing technique is not a function that a certain terminological resource provides by itself, thus is not included here.

5.3.2.1 Accessing concepts by hierarchical relations

Concepts can be accessible through hierarchical paths, if the terminological resource has the following characteristics in addition to the characteristics in 5.3.2.

— [required] hierarchical relation (4.5.2)

— [optional] clear distinction between generic relation and partitive relation (4.5.2.2)

— [optional] multiple hierarchy (4.5.2.4)

5.3.2.2 Accessing concepts by hierarchical and associative relations

Concepts can be accessible through hierarchical paths and associative links, if the terminological resource has the following characteristics in addition to the characteristics in 5.3.2.

— [required] hierarchical relation (4.5.2)

— [required] associative relation (4.5.3)

— [optional] normalization of content (4.5.5.1)

— [optional] normalization of semantics (4.5.5.2)

— [optional] multiple hierarchy (4.5.2.4)

— [optional] categorial structure (4.5.4)

5.4 Data aggregation for statistical analysis

A terminological resource can provide the data aggregation (classification) function, if the terminological resource has the following characteristics.

— [required] concept identifier (4.2.2)

— [required] non-redundancy (4.2.3.2)

— [required] non-ambiguity (4.2.3.3)

— [required] mutual exclusiveness (4.4.2)

— [required] exhaustiveness (4.4.3)

— [required] persistence of identifiers (4.6.2)

— [required] version identifier (4.6.3)

— [optional] explicit uncertainty (4.3.1.4)

— [optional] absorption to the nearest concept (4.3.2.2)

— [optional] rules to define boundaries (4.3.2.3)

NOTE 1 Mutual exclusiveness can be achieved if the terminological resource has either pre-defined set of mutually exclusive categories (4.4.2.2) or explicit rules to enable mutual exclusiveness (4.4.2.3).

NOTE 2 classification system (3.4.3) shall be able to provide this function. However it is not necessarily a terminological system (3.4.2).

5.5 Reasoning

There will be various kinds of reasoning related functions. Only fundamental and general reasoning functions are listed below. A terminological resource does not provide each function by itself. It will be necessary to utilize a certain external computational mechanism together with the terminological resource.

5.5.1 Reasoning of internal consistency

To check internal consistency of a given terminological resource by subsumption inference, the terminological resource should be formal system and has at least the following characteristics.

— [required] concept identifier (4.2.2)

— [required] non-redundancy (4.2.3.2)

— [required] non-ambiguity (4.2.3.3)

— [required] non-vagueness (4.2.3.4)

— [required] compositionality (4.5.1)

— [required] clear distinction between generic relation and partitive relation (4.5.2.2)

— [required] explicitness of associative relations (4.5.3.2)

— [optional] canonical expression (4.3.1.3)

— [optional] categorial structure (4.5.4)

— [optional] clear distinction between generic relation and role (4.5.2.3)

— [optional] normalization of content (4.5.5.1)

— [optional] normalization of semantics (4.5.5.2)

NOTE For automatic machine-reasoning of internal consistency, external computational logic such as Description Logic will be necessary. The characteristics listed above are for terminological resources.

5.6 Maintenance-related functions

5.6.1 Concept permanence

To provide permanent concepts is an essential function not only for historical analyses of aggregate data, but also to avoid historical patient data confusion or errors. The terminological resources shall have the following characteristics to provide this function.

— [required] concept identifier (4.2.2)

— [required] non-redundancy (4.2.3.2)

— [required] non-ambiguity (4.2.3.3)

— [required] non-vagueness (4.2.3.4)

— [required] context-free identifiers (4.6.1)

— [required] persistence of identifiers (4.6.2)

— [required] editorial information (4.6.4)

— [required] obsolete marking (4.6.5)

— [optional] term identifier (4.2.1)

— [optional] explicit uncertainty (4.3.1.4)

— [optional] responsiveness (4.6.6)

5.6.2 Version control

Usage of any terminological resource in patient records should carry the version information. To provide version control function, the terminological resource shall have the following characteristics.

— [required] version identifier (4.6.3)

— [required] responsiveness (4.6.6)

EXAMPLE AIDS patients were coded inconsistently before the introduction of the term AIDS.

Terminology representations should specify the state of the terminological resource at the time a term is used; version information most easily accomplishes this, and may be hidden from ordinary review, as specified in ISO 12620, ISO/IEC 11179-3 and ISO/IEC 2382.

Annex A
(informative)

Selected definitions from ISO 1087-1

The following terms and definitions are selected from ISO 1087-1:2000. They are included here as background to the key terms and definitions in Clause 3 of this document. The numbering in this Annex reflects the numbering in ISO 1087-1:2000, for consistency.

A.1 Language and reality

A.3.1.1

object

anything perceivable or conceivable

NOTE Objects may be material (e.g. an engine, a sheet of paper, a diamond), immaterial (e.g. conversion ratio, a project plan) or imagined (e.g. a unicorn).

A.3.1.2

subject field

domain

field of special knowledge

NOTE The borderlines of a subject field are defined from a purpose-related point of view.

A.2 Concept

A.3.2.1

concept

unit of knowledge created by a unique combination of characteristics (A.3.2.4)

NOTE Concepts are not necessarily bound to particular languages. They are, however, influenced by the social or cultural background which often leads to different categorizations.

A.3.2.2

individual concept

concept (A.3.2.1) which corresponds to only one object (A.3.1.1)

NOTE 1 Examples of individual concepts are 'Saturn', 'the Eiffel Tower'.

NOTE 2 Individual concepts are usually represented by appellations (A.3.4.2).

A.3.2.3

general concept

concept (A.3.2.1) which corresponds to two or more objects (A.3.1.1) which form a group by reason of common properties

NOTE Examples of general concepts are 'planet', 'tower'.

A.3.2.4

characteristic

abstraction of a property of an object (A.3.1.1) or of a set of objects

NOTE Characteristics are used for describing concepts (A.3.2.1).

A.3.2.5

type of characteristics

category of characteristics (A.3.2.4) which serves as the criterion of subdivision when establishing concept systems (A.3.2.11)

NOTE The type of characteristics colour embraces characteristics (A.3.2.4) being red, blue, green, etc. The type of characteristics material embraces characteristics made of wood, metal, etc.

A.3.2.6

essential characteristic

characteristic (A.3.2.4) which is indispensable to understanding a concept (A.3.2.1)

A.3.2.7

delimiting characteristic

essential characteristic (A.3.2.6) used for distinguishing a concept (A.3.2.1) from related concepts

NOTE The delimiting characteristic support for the back may be used for distinguishing the concepts (A.3.2.1) 'stool' and 'chair'.

A.3.2.8

extension

totality of objects (A.3.1.1) to which a concept (A.3.2.1) corresponds

A.3.2.9

intension

set of characteristics (A.3.2.4) which makes up the concept (A.3.2.1)

A.3.2.10

concept field

unstructured set of thematically related concepts (A.3.2.1)

NOTE Concept fields may be used as a starting point for establishing concept systems (A.3.2.11).

A.3.2.11

concept system

system of concepts

set of concepts (A.3.2.1) structured according to the relations among them

A.3.2.12

concept diagram

graphic representation of a concept system (A.3.2.11)

A.3.2.13

superordinate concept

broader concept

concept (A.3.2.1) which is either a generic concept (A.3.2.15) or a comprehensive concept (A.3.2.17)

A.3.2.14

subordinate concept

narrower concept

concept (A.3.2.1) which is either a specific concept (A.3.2.16) or a partitive concept (A.3.2.18)

A.3.2.15

generic concept

concept (A.3.2.1) in a generic relation (A.3.2.21) having the narrower intension (A.3.2.9)

A.3.2.16

specific concept

concept (A.3.2.1) in a generic relation (A.3.2.21) having the broader intension (A.3.2.9)

A.3.2.17

comprehensive concept

concept (A.3.2.1) in a partitive relation (A.3.2.22) viewed as the whole

A.3.2.18

partitive concept

concept (A.3.2.1) in a partitive relation (A.3.2.22) viewed as one of the parts making up the whole

A.3.2.19

coordinate concept

subordinate concept (A.3.2.14) having the same nearest superordinate concept (A.3.2.13) and same criterion of subdivision as some other concept (A.3.2.1) in a given concept system (A.3.2.11)

A.3.2.20

hierarchical relation

relation between two concepts (A.3.2.1) which may be either a generic relation (A.3.2.21) or a partitive relation (A.3.2.22)

A.3.2.21

generic relation

genus-species relation

relation between two concepts (A.3.2.1) where the intension (A.3.2.9) of one of the concepts includes that of the other concept and at least one additional delimiting characteristic (A.3.2.7)

NOTE A generic relation exists between the concepts (A.3.2.1) 'word' and 'pronoun', 'vehicle' and 'car', 'person' and 'child'.

A.3.2.22

partitive relation

part-whole relation

relation between two concepts (A.3.2.1) where one of the concepts constitutes the whole and the other concept a part of that whole

NOTE A partitive relation exists between the concepts (A.3.2.1) 'week' and 'day', 'molecule' and 'atom'.

A.3.2.23

associative relation

pragmatic relation

relation between two concepts (A.3.2.1) having a nonhierarchical thematic connection by virtue of experience

NOTE An associative relation exists between the concepts (A.3.2.1) 'education' and 'teaching', 'baking' and 'oven'.

A.3.2.24

sequential relation

associative relation (A.3.2.23) based on spatial or temporal proximity

NOTE A sequential relation exists between the concepts (A.3.2.1) 'production' and 'consumption', etc.

A.3.2.25

temporal relation

sequential relation (A.3.2.24) involving events in time

NOTE A temporal relation exists between the concepts (A.3.2.1) 'spring' and 'summer', 'autumn' and 'winter'.

A.3.2.26

causal relation

associative relation (A.3.2.23) involving cause and its effect

NOTE A causal relation exists between the concepts (A.3.2.1) 'action' and 'reaction', 'nuclear explosion' and 'fall-out'.

A.3 Definitions

A.3.3.1

definition

representation of a concept (A.3.2.1) by a descriptive statement which serves to differentiate it from related concepts

A.3.3.2

intensional definition

definition (A.3.3.1) which describes the intension (A.3.2.9) of a concept (A.3.2.1) by stating the superordinate concept (A.3.2.13) and the delimiting characteristics (A.3.2.7)

NOTE The following is an example of an intensional definition for the concept (A.3.2.1) 'incandescent lamp':

— incandescent lamp;

— electric lamp in which a filament is heated by an electric current in such a way that it emits light.

A.3.3.3

extensional definition

description of a concept (A.3.2.1) by enumerating all of its subordinate concepts (A.3.2.14) under one criterion of subdivision

EXAMPLES

— Family 18 in the Periodic Table

— helium, neon, argon, crypton, xenon and radon

— noble gas

— helium, neon, argon, crypton, xenon, or radon.

statement which provides further information on any part of a terminological entry

A.4 Designations

A.3.4.1

designation

designator

representation of a concept (A.3.2.1) by a sign which denotes it

NOTE In terminology work three types of designations are distinguished: symbols, appellations (A.3.4.2) and terms (A.3.4.3).

A.3.4.2

appellation

name

verbal designation (A.3.4.1) of an individual concept (A.3.2.2)

A.3.4.3

term

verbal designation (A.3.4.1) of a general concept (A.3.2.3) in a specific subject field (A.3.1.2)

NOTE A term may contain symbols and can have variants, e.g. different forms of spelling.

A.3.4.14

term acceptability rating

rating established from a predetermined scale and used to evaluate a term (A.3.4.3)

NOTE The following ratings are common: preferred, admitted, deprecated.

A.3.4.15

preferred term

term (A.3.4.3) rated according to the scale of the term acceptability rating (A.3.4.14) as the primary term for a given concept (A.3.2.1)

A.3.4.19

synonymy

relation between or among terms (A.3.4.3) in a given language representing the same concept (A.3.2.1)

NOTE 1 The relation of synonymy exists, for example, between deuterium and heavy hydrogen.

NOTE 2 Terms (A.3.4.3) which are interchangeable in all contexts are called synonyms; if they are interchangeable only in some contexts, they are called *quasisynonyms*.

A.3.4.20

antonymy

relation between two terms (A.3.4.3) in a given language representing opposite concepts (A.3.2.1)

NOTE 1 The relation of antonymy exists, for example, between encoding and decoding, positive and negative.

NOTE 2 The terms (A.3.4.3) in the relation of antonymy are called *antonyms*.

A.3.4.21

equivalence

relation between designations (A.3.4.1) in different languages representing the same concept (A.3.2.1)

A.3.4.22

mononymy

relation between designations (A.3.4.1) and concepts (A.3.2.1) in a given language in which one concept has only one designation

NOTE The designations (A.3.4.1) in the relation of mononymy are called mononyms.

A.3.4.23

monosemy

relation between designations (A.3.4.1) and concepts (A.3.2.1) in a given language in which one designation only relates to one concept

NOTE The designations (A.3.4.1) in the relation of monosemy are called *monosemes*.

A.3.4.24

polysemy

relation between designations (A.3.4.1) and concepts (A.3.2.1) in a given language in which one designation represents two or more concepts sharing certain characteristics (A.3.2.4)

NOTE 1 An example of polysemy is:

bridge

a) 'structure to carry traffic over a gap';

b) 'part of a string instrument';

c) 'dental plate'.

NOTE 2 The designations (A.3.4.1) in the relation of polysemy are called *polysemes*.

A.3.4.25

homonymy

relation between designations (A.3.4.1) and concepts (A.3.2.1) in a given language in which one designation represents two or more unrelated concepts

NOTE 1 An example of homonymy is:

bark

a) 'sound made by a dog';

b) 'outside covering of the stem of woody plants';

c) 'sailing vessel'.

NOTE 2 The designations (A.3.4.1) in the relation of homonymy are called *homonyms*.

A.5 Terminology

A.3.5.1

terminology 1

set of designations (A.3.4.1) belonging to one special language (A.3.1.3)

A.3.5.2

terminology 2

terminology science

science studying the structure, formation, development, usage and management of terminologies (A.3.5.1) in various subject fields (A.3.1.2)

A.3.5.3

nomenclature

terminology (A.3.5.1) structured systematically according to pre-established naming rules

NOTE Nomenclatures have been elaborated in various fields, such as biology, medicine, physics and chemistry.

Annex B
(informative)

Relations between characteristics, functions, requirements and evaluation criteria of terminological resources

Figure B.1 illustrates relationships among characteristics and functions of healthcare terminological resources, and how this document is related to future parts of ISO 17117.

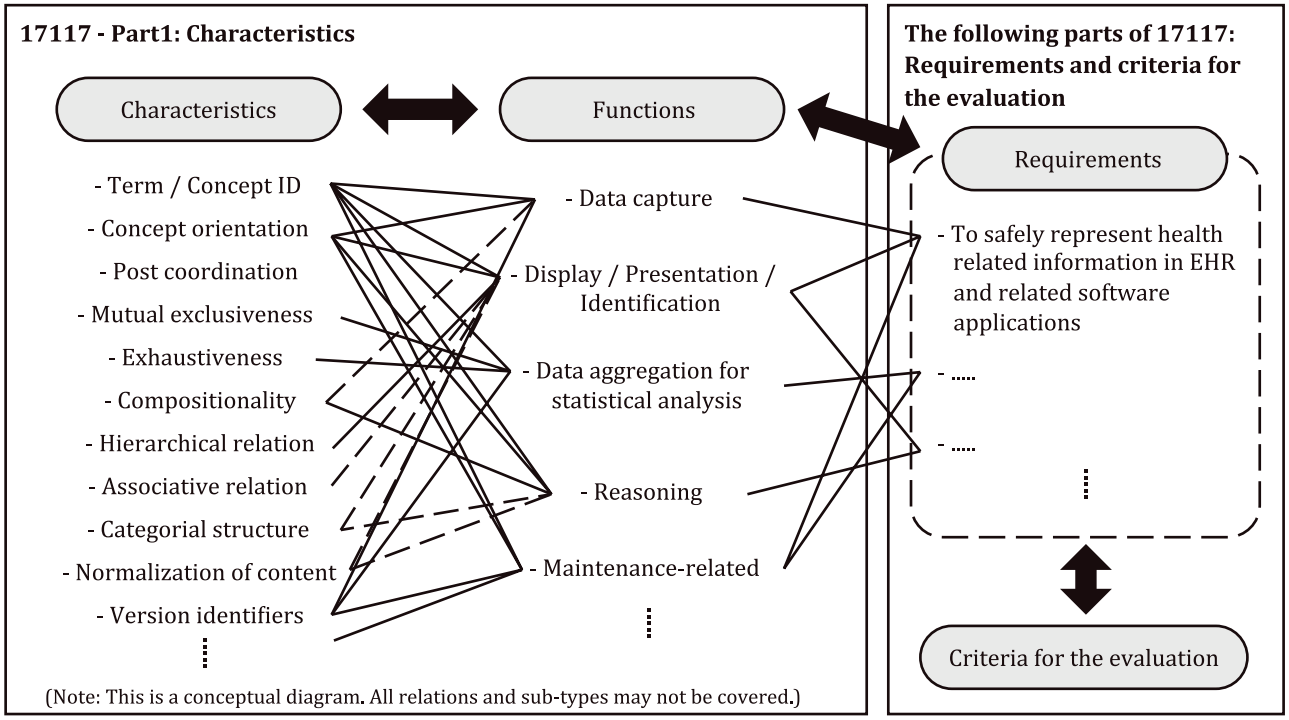

Figure B.1 — Relations between characteristics, functions, requirements and evaluation criteria of terminological resources

Annex C
(informative)

Relations among terminological resources

Figure C.1 illustrates relationships among various kinds of terminological resources. The targeting artefacts of both this documents and future parts of ISO 17117 are “Terminological resources” that is included in broader class “Vocabulary”.

An instance of a terminological resource may belong to several classes. For example, ICD10 can be recognized as an instance of “Coding system” and “Classification system”, but not as an instance of “Terminological system” because the set of category names of ICD10 does not satisfy non-vagueness (4.2.3.4). In the same way, SNOMED CT can be recognized as an instance of “Nomenclature”, “Coding system”, “Formal concept representation system”, but not as an instance of “Classification system” because it does not satisfy exhaustiveness (4.4.3).

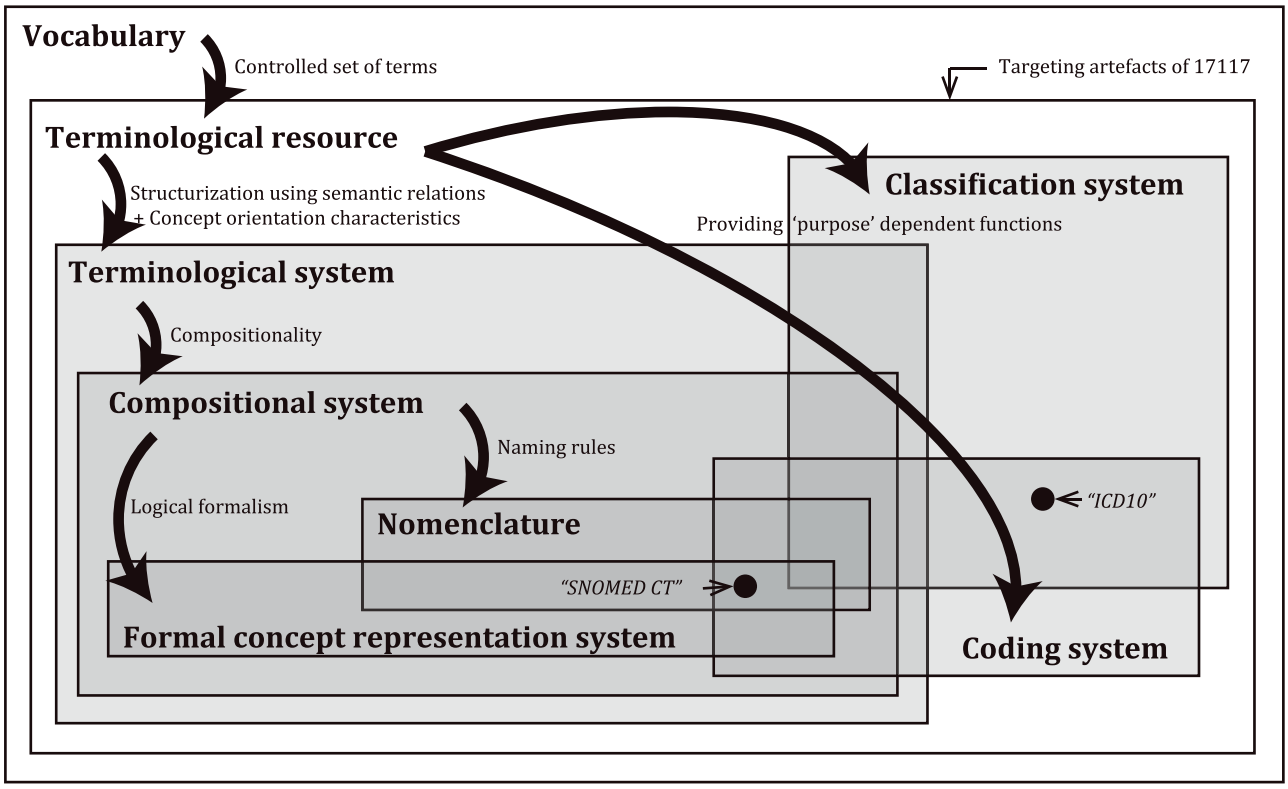

Figure C.1 — Relations among terminological resources

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