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Health informatics — Terminological resources —

Part 2: Implementation Capability (TIC)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 215, *Health informatics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 Objective

The aim of the ISO 17117 series is to enable health care organizations, vendors (including cloud services and conventional software products), governments and other decision makers to

— understand requirements for implementation of terminology in healthcare systems, and

— describe organization capability needed when using terminological resources.

This document defines the capability of implemented terminological resources based on the information lifecycle. Terminology implementation is assessed by review of each of the following 5 terminological implementation component parts:

— Data design;

— Data capture;

— Data storage;

— Data retrieval;

— Data exchange (interoperability) and re-use.

And reviewed according to the implementation processes and capabilities as defined across 5 areas:

— Terminological resource functionality;

— Tool functionality;

— Workforce capability;

— Governance;

— Conformity to standards.

0.2 Stakeholders and audience

The users of this document include

— health care organizations – to assess product capabilities and plan future directions and purchases;

— vendors (including cloud services and conventional software products) to

  — support implementation of terminological resources in their products,

  — enable semantic interoperability across different systems, and

  — assess product requirements influencing future directions for software development.

— government and other decision makers to identify areas of terminology practice that require improvement or should be included in purchasing or tender arrangements,

— educators and educational organizations to educate the health informatics and healthcare communities on the requirements for terminology implementation, and

— terminological resource developers to assist in defining the services needed to best support their resources.

Health informatics — Terminological resources —

Part 2: Implementation Capability (TIC)

1 Scope

This document defines the components (benchmarks) of capability of terminological resources implementation in healthcare software products, including electronic health record systems. It is intended that these benchmarks form the basis of a maturity model. The document will support analysis of requirements to meet use cases in the implementation of terminological resources in healthcare.

This document does not specify requirements for any specific terminological resource. It is intended to provide a basis from which requirements for terminological resources capabilities can be specified in the future. The tooling being used can impact the level of maturity reached but is not covered in detail in this document. Terminological resources include code systems of all types, terminologies, classifications, value sets, and value domains.

The impact of tooling (computer–assisted coding, speech recognition, template development) on the capability of the terminological resources is not covered in detail in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 22287, *Health informatics — Workforce roles and capabilities for terminology and terminology services in healthcare (term workforce)*

ISO/TS 21564, *Health Informatics — Terminology resource map quality measures (MapQual)*

3 Terms and definitions

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

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

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

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

3.1
term
word or words corresponding to one or more concepts

Note 1 to entry: Value domains can be enumerated (e.g. Total centimetres NNN) or non-enumerated (e.g. Sex code N).

3.2
code system
organized, managed collection of codes, each of which has associated designations, meanings and in some cases relationships, properties or rules

3.3
classification
exhaustive set of mutually exclusive categories to aggregate data at a pre-prescribed level of specialization for a specific purpose

3.4
terminology implementation
process of taking a terminological system and applying it for concept representation to achieve efficient and accurate concept representation

3.5
map
device that provides an index from one term to another, sometimes using rules that allow translation from one representation top another indicating the degree of equivalence

3.6
terminology
structure, human and machine-readable representation of concepts

3.7
workforce capability
ability of those working on terminology implementation in an organization to perform their job properly

Note 1 to entry: Properly implies that the job is done in a manner which supports safe representation of concepts in the health record and health data supply chain, as well as efficient practice.

3.8
terminological resource
controlled set of terms in healthcare

4 The terminology implementation capability pillars

Terminology implementation capabilities are viewed across different functional areas to support identification of measures associated with terminology implementation maturity. These functional areas include

— data requirements for terminology implementation in healthcare software including the use of terminology in health records and health data,

— functional requirements of terminology implementation including its use in health records, clinical information systems, clinical guidelines or decision support systems, and

— tooling as a delivery mechanism for terminology representation or collection or the management of such implementations.

The capabilities of terminological resources implemented in healthcare information systems are defined considering the information lifecycle (data specification (design), capture, management, storage, and use). Specific components of the capability assessment will include

— choice of terminology resource to represent semantic concepts appropriately,

— user interface issues,

— meaning maintenance in health record content, and

— terminology resources implementation functionality (often provided by tooling).

This document will provide the following benefits to the health community:

— Define the capability of terminological resource implementation which deliver required safe outcomes for use in healthcare;

— Support healthcare software vendors and organizations to

  — compare terminological resource capabilities and organizational requirements for those resources, and

  — plan improvements, i.e., align requirements and capabilities, as needed.

— Improve the safety and utility of healthcare information systems and the data in them, such as implementation of clinical decision support systems;

— Enable information sharing (semantic interoperability) between organizations;

— Support of short- and long-term analytics within the organization and more broadly to enable knowledge acquisition.

5 Design of the data (data specifications)

5.1 General

The choice of a terminological resource is the first key to quality implementation. The resource chosen shall be suited to the task and robust if it is to be used in health records and systems which share data and persist over time. The key requirements for initial design of the data from a terminology implementation perspective are provided in this clause.

5.2 Choice of terminological resource

No matter which type of terminological resource, Terminology, Classification, Code System, Value set or Value domain, is being discussed, the concept representation influences the ability of the resource to meet implementation needs and to represent the data elements accurately and appropriately.

For further information on the attributes of a terminological resources see ISO 17117-1.

The following apply to the choice of a terminological resource for any specific use case:

a) Terminological resources for clinical use

   i. shall have the ability to represent a concept at different levels of granularity,

   ii. shall have the ability to represent the precise meaning of that concept,

   iii. shall have the ability to persist meaning over time, and

   iv. shall support retrieval of concepts by multiple attributes (multi-hierarchical).

b) Terminological resources for statistical use

   i. shall have the ability to represent not otherwise specified or unspecified concepts, and

   ii. shall support data aggregation at a specified level of granularity so that concepts can be counted.

c) Scope of the terminological resource content shall be able to represent all content required for the use case

   i. when a terminological resource is chosen, it shall include all concepts that are needed for representation in the use case. In many cases, the terminological resource will have more

concepts than are needed for the use case, in which case the value domain for the specific data element shall be restricted to only those concepts required for the use case.

For example: if a data element is to record types of fractures (not the body location but the fracture type such as: spiral, comminuted, greenstick. The terminological resource chosen shall be able to represent all of these concepts.

d) Scope of the terminological resource shall be reduced to only the concepts required for the specific data element and use case.

e) The terminological resource shall clearly differentiate between different concepts to ensure clarity and accuracy of data capture.

For example

A code system representing types of fractures which includes spiral, comminuted, greenstick, open and closed as the values does not meet this need. As a fracture can be comminuted and open.

To effectively use this code system two data elements would be required, in which case the terminology would be fit for purpose.

Data Element – Fracture exposure: with values Open or Closed

Data Element – Fracture type: with values spiral, comminuted, greenstick, etc.

f) Existing, preferably international, robustly governed and maintained terminological resources should used wherever possible. Governed code systems have the following:

i. An Organization responsible for the creation and maintenance of the code system content;

ii. Regular release cycles to ensure currency and ability to represent clinical practice;

iii. A maintenance regime undertaken by those skilled in working with terminological resources (See TermWorker);

iv. A mechanism for submission of code system queries and change requests;

v. A standard published rationale for changes applied consistently throughout the code system.

g) Reflect data source code systems. Where a data element is abstracted or extracted from an existing data collection the code systems should be the same in each system. This is intended to reduce the use of expensive and often poor-quality data maps.

5.3 Relationship to the information model

This capability identifies the need for terminological resources used in systems to be able to be associated with the data element or information model within which they are used as these can influence the meaning intended when the concept is recorded.

This includes the requirements for post-coordination of concepts. Terminology cannot represent every concept effectively without an appropriate information model for the data being collected will give a more maintainable and robust data.

EXAMPLE 1

ICD-10 Activity Codes

These codes include concepts of the following:

— What a person was doing such as playing soccer;

— What industry a person was working in – Education;

— Whether they were employed in paid work or not.