
**Health informatics — Conceptual
framework for patient findings and
problems in terminologies**

*Informatique de santé — Cadre conceptuel pour les constats des
patients et les problèmes de terminologies*

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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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
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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.

ISO/TS 22789 was prepared by Technical Committee ISO/TC 215, *Health informatics*.

Introduction

Enormous investment has occurred over the last two decades in creating health care terminological systems. Further expansion or additions are likely. Many developments overtly or covertly share features of a common model of clinical findings.

The objective of this Technical Specification is to express a core **categorial structure** of clinical findings based upon existing schemes including the World Health Organization *ICD-10*, NHS *Clinical Terms Version 3*, International Health Terminology Standards Development Organisation's *SNOMED Clinical Terms* and the WONCA 2001 *International Classification of Primary Care*. The development of a Technical Specification will help existing users to develop a **mapping** or cross-walks between one scheme and another and provide a robust logical framework for construction of new areas or consistency for updated versions of existing terminological systems. The model describes the underlying principles of clinical findings and important **semantic links** referencing a set or sets of **characterizing concepts** such as anatomy and causative organisms. It utilizes ISO 17115, which has been designed to describe such patterns for **concept** representation in a particular domain.

Within this Technical Specification, the following notation is used:

A **bold** notation has been used where references are made to terms defined in Clause 2.

An item enclosed by single angle brackets < > refers to a category that can be specialized to various **concepts**, as required.

An item enclosed within the text by single accolades { } identifies a **semantic link**.

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Health informatics — Conceptual framework for patient findings and problems in terminologies

1 Scope

1.1 Main purpose

The purpose of this Technical Specification is to specify a **categorial structure**, within the subject field of patient findings and problems, by defining a set of common **domain constraints** for use within terminological systems including a classification, coding scheme, coding system, reference terminology and clinical terminology.

Clinical findings are **concepts** that are recorded in clinical records and can describe any state observed directly or indirectly concerning a patient and their relationship with the environment. This Technical Specification is focused on a sub-population of these findings concerning *in vivo* descriptions of state (structure and function) directly related to the patient. This class of **concepts** includes:

- diseases, which may be defined as a state caused by a known or assumed pathological process impairing the normal physiological function and/or anatomical structure affecting all or part of a patient, where a specific pathological change is caused by a defined mechanism;
- findings of state or function (including normal findings) observed directly relating to a patient.

This Technical Specification describes a concept system detailing a domain constraint of sanctioned characteristics each composed of a semantic link and an applicable characterizing category.

The potential uses for this **conceptual** framework are to:

- support developers of new terminology systems concerning patient findings and problems;
- support developers of new detailed content areas of existing terminology systems concerning patient findings and problems to ensure conformance;
- facilitate the representation of patient findings and problems using a standard core model in a manner suitable for computer processing;
- provide a **conceptual** framework for the generation of **compositional concept representation** of patient findings and problems;
- facilitate the **mapping** and improved **semantic correspondence** between different terminologies by proposing a core specification for patient findings and problems;
- provide a core model to describe the structure of patient findings and problems, and facilitate improved **semantic correspondence** with information models.

1.2 Target groups

The target groups for this Technical Specification are:

- developers of terminology systems concerning patient findings and problems;
- developers of information systems that require a structured framework of **concepts** to facilitate implementation;
- IT specialists, analysts and epidemiologists who require common models of knowledge to facilitate analysis of current and legacy data from one or more information systems;
- clinicians and coders to provide greater consistency in structure and organization when entering and retrieving data using one or more terminology systems;
- managers and administrative personnel in providing a benchmark by which to judge terminology solutions: as to whether the potential options will deliver compatibility with legacy data and future proofing to emerging terminology products.

1.3 Topics considered outside the scope

Topics considered outside the scope of this Technical Specification include:

- a comprehensive **categorial structure** for clinical findings;
- laboratory findings (including biochemical and histological results);
- signal findings (including the output from imaging and electrophysiological tests);
- social findings;
- the absence of findings, e.g. absent bowel sounds, the absence of a knee reflex, are not included within this Technical Specification as it might prejudice subsequent attempts at standardizing the modelling of such instances;
- an exhaustive list of all possible **characterizing concepts** that could be used to describe clinical findings.

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2 Terms and definitions

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

2.1 associative relation
relation between two **concepts** (2.9) having a non-hierarchical thematic connection by virtue of experience

[ISO 1087-1:2000, definition 3.2.23]

EXAMPLE An **associative relation** (2.1) exists between the **concepts** (2.9) “education” and “teaching”, “baking” and “oven”.

NOTE Other relations between **concepts** (2.9) are: hierarchical, generic, partitive, sequential, temporal and causal.

2.2 categorial structure
minimal set of **domain constraints** (2.11) for representing **concept systems** (2.10) in a subject field

[ISO 17115:2007, definition 2.4.5]

2.3**category**

formal category

concept (2.9) represented by a **formal definition** (2.12)

NOTE Adapted from ISO 17115:2007, definition 2.5.3.

2.4**characterizing category**formal **category** (2.3) whose specialization by a **domain constraint** (2.11) is allowed to be used as **characterizing concept** (2.5) in a particular context

[ISO 17115:2007, definition 2.3.3]

EXAMPLE <INFECTIOUS_ORGANISM>={bacterium, virus, parasite}, in the context of "Infection that hasCause INFECTIOUS_ORGANISM".

2.5**characterizing concept****concept** (2.9) that is referenced by a **semantic link** (2.17) in a **composite characteristic** (2.7)

[ISO 17115:2007, definition 2.2.2]

EXAMPLE "Bacterium" in the construct "Disease that hasCause Bacterium" and "Yellow" in the construct "SkinLesion that hasColor Yellow".

2.6**characteristic**

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

[ISO 1087-1:2000, definition 3.2.4]

NOTE **Characteristics** are used for describing **concepts** (2.9)**2.7****composite characteristic**

qualifier

formal representation of a **characteristic** (2.6)

EXAMPLE hasCause Bacteria; Location = LeftUpperLobeOfLung.

NOTE 1 Adapted from ISO 17115:2007, definition 2.2.1.

NOTE 2 Can be compared to an attribute-value pair.

2.8**compositional concept representation**intensional definition of a **concept** (2.9) using as delimiting characteristics one or more **composite characteristics** (2.7)

[ISO 17115:2007, definition 2.4.1]

NOTE Allows inference and subsumption within a compositional system. Usually expressed in a formalism, such as description logic.

2.9**concept**

unit of knowledge created by a unique combination of characteristics

[ISO 1087-1:2000, definition 3.2.1]