INTERNATIONAL STANDARD

ISO 17115

Second edition
2020-05

Health informatics — Representation of categorial structures of terminology (CatStructure)

Reference number
ISO 17115:2020(E)

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Published in Switzerland

Contents

Page

Foreword

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 17115:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

— change in title and expansion of scope;

— reference to the ISO 17117 series which has further developed terms, definitions and characteristics of healthcare terminologies;

— inclusion of requirements for categorial structures to support the key purpose of standardization and clarification of terminologies in healthcare.

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

Health terminology is complex and multifaceted, more so than most language domains. It has been estimated that between 500 000 and 45 million different concepts are needed to adequately describe conditions of patients and populations, actions in healthcare and related concepts, such as biomedical molecules, genes, organisms, technical methods and social concepts.

To adequately represent and especially to process this complexity, simple coding schemes are inadequate and formal multidimensional concept representation systems are better suited. The differences in terminology are understandable as this kind of work is highly interdisciplinary and integrates knowledge from linguistics, philosophy, informatics and health sciences, and there is room for misunderstanding between disciplines.

Several such formal systems exist but systems and underlying philosophy are described in different ways. The system itself can, for example, be called an ontology, medical entity dictionary, coding and reference model or reference terminology.

Computer-based processing and interchange of medical or clinical information uses various kinds of terminological systems of concepts to represent that information, such as controlled vocabularies, classifications, nomenclatures, terminologies and thesauri, with or without coding schemes.

The specific terminological issues in the field of health informatics are the following:

a) a large number of different terminological systems are available in different clinical specialties;

b) a large overlap among the subject fields involved;

c) a large number of codes and rubrics, typically in the order of magnitude of 10 000 to 100 000 entries, in commonly used terminological systems;

d) an increasing need for re-use of coded data in different health-care contexts;

e) polysemy across and sometimes within clinical specialties.

The integration of computer-based medical records and administrative information systems design is supported by a uniform way to represent the meaning of medical concepts using terminologies. Such uniformity ensures that the EHR receiving a message will catch the meaning intended by the sender EHR and not just the string of characters used to represent that meaning. It is not possible to impose a rigidly uniform standardized natural language clinical terminology on healthcare providers due to the need for different levels of specificity based upon the clinical use case.

This document is intended to be read in conjunction with ISO 17117 and contains references to Reference [16].

A domain specific semantic model has been envisioned and applied in a series of specific European standards (EN) and International Standards (ISO) on various subject fields to describe a set of categorial structures. This is partially important where subject fields overlap. There are more than 10 different International Standards on categorial structures and this number is increasing every year.

Potential uses for this document are to

a) describe formal definitions, parts of definitions and how they are related, and

b) describe patterns for concept representation in a particular domain.

This document also

a) facilitates the construction of new terminological systems in a regular form which will increase their coherence and expressiveness,

b) facilitates maintenance of terminological systems,

c) increases consistency and coherence of existing terminological systems,

d) allows systematic cross-references between items of different types of terminological systems,

e) facilitates convergence among terminological systems and makes explicit the overlap between different health care domains terminological systems,

f) provide elements for negotiation about integration of different terminological systems into information systems between the respective developers, and

g) enable the systematic evaluation of terminological systems.

The target groups for this document are

a) developers of concept representation systems for different health care domains,

b) developers of standards for concept representation, especially those describing domain concept models,

c) information modellers, knowledge engineers, and standards developers building information models for health information systems such as electronic health records and decision support systems,

d) developers of information systems that require an explicit system of concepts for internal organization, data warehouse management and middleware services,

e) designers of specialized standard healthcare terminological categorial structures,

f) developers of healthcare terminological systems including classifications and coding systems,

g) producers of services for terminological systems and designers of software including applications for natural language processing,

h) information modelers, knowledge engineers, and standards developers building models for health information management systems,

i) developers of information systems that require an explicit system of concepts, and

j) developers of mark-up standards for representation of healthcare documents.

This document is informed by other standards, with clarifications and examples appropriate to healthcare.

This document has been developed for use as an integrated part of computer-based applications and for the electronic healthcare record. It would be of limited value for manual use.

