INTERNATIONAL STANDARD

ISO 18104

First edition
2003-12-15

Health informatics — Integration of a reference terminology model for nursing

Informatique de santé — Intégration d'un modèle de terminologie de référence pour les soins infirmiers

Reference number
ISO 18104:2003(E)

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Published in Switzerland

Contents

Page

Foreword

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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.

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ISO 18104 was prepared by Technical Committee ISO/TC 215, *Health informatics*. Through a work item proposal initiated by the International Council of Nurses and the Nursing Informatics Special Interest Group of the International Medical Informatics Association, the work related to this International Standard takes forward, under the Vienna Agreement, the efforts initiated in ENV 14032, *Health Informatics — System of concepts to support nursing*.

Introduction

Terminology development in nursing has been motivated by multiple factors including

- implementation of computer-based systems in clinical settings,
- quest for reimbursement for nursing services delivered,
- documentation of nursing contributions to patient care outcomes,
- teaching students, and
- enhancing the body of nursing knowledge.

Nursing terminologies, in either paper-based or computer-based form, have been designed as enumerated classifications and implemented both as interface terminologies at the point of care and as administrative terminologies to examine nursing data across settings. At the present time, many standardized terminologies exist and no single standardized terminology is complete for the domain in terms of breadth or granularity. Moreover, there is currently no concept-oriented terminology that integrates the domain concepts of nursing in a manner suitable for computer processing.

In recent years, however, significant advances have been made toward the development of concept-oriented reference terminologies that support the domain concepts of nursing. Among the remaining major challenges are the development of a reference terminology model that supports the representation of nursing concepts and the integration of the reference terminology model with other models for the health-care domain [1]. A number of efforts have focused on addressing these challenges. Prominent among these is the work within the European Standardization Committee (CEN TC 251) that brought together the efforts of the International Classification for Nursing Practice (ICNP®) Programme, Telenurse ID, and other European efforts (e.g., nursing activities within the Galen programme) into a Prestandard — ENV 14032 [2], [3], [4], [5], [6]. Also of relevance to this International Standard are activities related to the International Medical Informatics Association Nursing Informatics Special Interest Group, Nursing Terminology Summits, Systematized Nomenclature of Medicine (SNOMED®) Convergent Terminology Group for Nursing, Health Level 7, and Clinical Logical Observation Identifiers, Names, and Codes (LOINC) [3], [7], [8], [9].

In contrast to the CEN Prestandard that broadly addressed categorial structures for nursing diagnoses and nursing actions, this International Standard focuses specifically on the conceptual structures that are represented in a reference terminology model rather than in other types of information models. Moreover, toward the goal of integration with other health-care models, the reference terminology models for nursing diagnoses and nursing actions in this International Standard reflect attempts at harmonisation with evolving terminology and information model standards outside the domain of nursing.

Health informatics — Integration of a reference terminology model for nursing

1 Scope

1.1 Main purpose

The purpose of this International Standard is to establish a nursing reference terminology model consistent with the goals and objectives of other specific health terminology models in order to provide a more unified reference health model. This International Standard includes the development of reference terminology models for nursing diagnoses and nursing actions and relevant terminology and definitions for its implementation.

The potential uses for this reference terminology model are to

- support the intensional definition of nursing diagnosis and nursing action concepts reflective of a broad range of roles and practice settings,
- facilitate the representation of nursing diagnosis and nursing action concepts and their relationships in a manner suitable for computer processing,
- provide a framework for the generation of compositional expressions from atomic concepts within a reference terminology,
- facilitate the construction of nursing terminologies in a regular form which will make mapping among them easier,
- facilitate the mapping among nursing diagnosis and nursing action concepts from various terminologies including those developed as interface terminologies and statistical classifications,
- enable the systematic evaluation of terminologies and associated terminology models for purposes of harmonization, and
- provide a language to describe the structure of nursing diagnosis and nursing action concepts in order to enable appropriate integration with other reference terminology models and with information models.

1.2 Target groups

The target groups for this International Standard are

- developers of coding systems and terminologies that include nursing diagnosis and nursing action concepts, to assist in the development, refinement, and maintenance of a particular terminology, as well as for comparisons among different systems,
- developers of reference terminology models for other health-care domains, to explicate the relationships and overlap with nursing concepts,
- information modellers, knowledge engineers, and standards developers building models for health-information management systems such as electronic health records and decision support systems, to describe the expected content of terminological value domains for particular attributes and data elements in the information models,
- developers of information systems that require an explicit system of concepts for internal organization, data warehouse management and middleware services,

- developers of software for natural language processing, to facilitate harmonisation of their output with coding systems, and
- developers of mark-up standards for representation of health-care documents.

1.3 Topics considered outside scope

Topics considered outside the scope of this International Standard include

- a comprehensive categorial structure for nursing diagnoses and nursing interventions,
- a detailed classification, nomenclature, or reference terminology of nursing diagnoses or nursing actions,
- descriptors and guidelines to represent contextual information for the recording of information within an electronic health record,
- an exhaustive list of all the potential details that could appear in expressions of nursing diagnoses and nursing actions,
- an exhaustive thesaurus with the complete list of descriptors to be used to describe nursing diagnoses and nursing actions,
- relationships among health professionals, and
- communication of nursing diagnosis and nursing action concepts between electronic health records.

2 Normative references

The following referenced documents are indispensable for the application 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 17117:2002, *Health informatics — Controlled health terminology — Structure and high-level indicators*

ENV 12264:1997, *Medical informatics — Categorial structures of systems of concepts — Model for representation of semantics*

ENV 14032:2001, *Health Informatics — System of concepts to support nursing*

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply. Only key terms and definitions are provided in this section. Additional background terms and definitions from ISO 1087-1:2000 [27] are provided in Annex A. Definitions for the specific reference terminology model components are provided in Clauses 4 and 5.

3.1
domain concept model
set of formal categories, semantic links and sanctions describing potential characteristics for representing concepts in a domain

[ISO 17115]

3.2
reference terminology model
domain concept model (3.1) that is optimised for terminology management

3.3
dissection
systematic representation of a phrase according to a predefined domain concept model

4 Reference terminology model for nursing diagnoses

4.1 General

For the purposes of this International Standard, a nursing diagnosis is considered either as a <<judgement>>[1] on a <<focus>> or as a <<judgement>> on a particular <dimension>[2] (e.g. ability, knowledge) of a <<focus>> (see ENV 14032). A graphical representation of the reference terminology model for nursing diagnoses is shown in Figure 1. A descriptor for <<focus>> and a descriptor for <<judgement>> are mandatory for the intensional definition of a nursing diagnosis. In some special instances, a single descriptor (e.g., anxiety) can serve the role of both <<focus>> and <<judgement>>. In contrast to ENV 14032, no base category is specified; the decision is at the discretion of the terminology developer and/or implementer. Annex C includes examples of three styles of dissection: <<focus>> as the base category, <<judgement>> as the base category, and a single descriptor for <<focus>> and <<judgement>>. Descriptors for other semantic domains, semantic categories, and qualifiers described in 4.4 to 4.6 should be used as necessary to support the intensional definition of a specific nursing diagnosis.

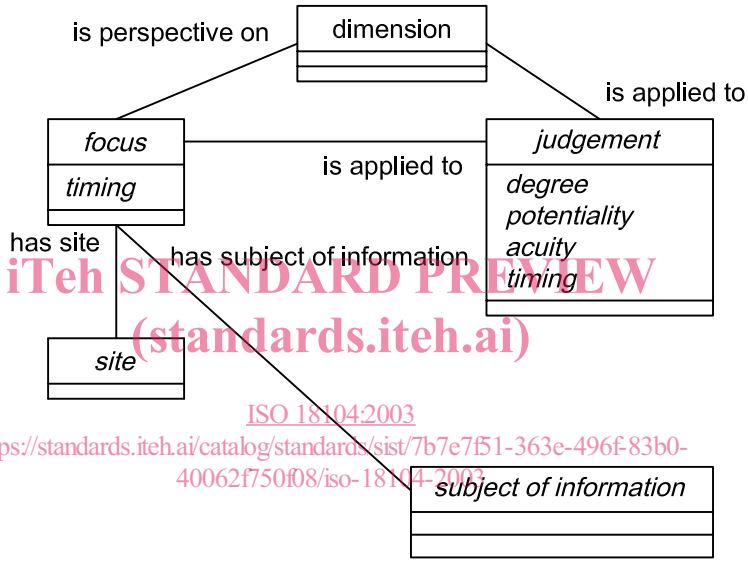

Figure 1 — Reference terminology model for nursing diagnoses

4.2 Focus

4.2.1 Definition

Focus is defined as an area of attention [10]. <<Focus>> may be qualified by timing.

4.2.2 Examples of semantic categories

Semantic categories for the domain of <<focus>> include, but are not limited to: <property>, <process>, <structure>, and <state>. In the case of <altered process>, <altered state> and <altered structure>, the descriptor of <<focus>> is pre-coordinated with the descriptor of <<judgement>>, e.g., anxiety. Categories of <<focus>> may also take the role of <<target>> in the reference terminology model for nursing actions.

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1) Semantic domains are considered as abstract classes of UML that are used as organising categories to simplify the models. Semantic domains are italicised in the diagrams and their labels are enclosed in double angle brackets << >> throughout the document.

2) Semantic categories are considered as instantiable classes in UML and their labels are in plain font in the diagrams. They are enclosed in angle brackets < > throughout the document.

4.3 Judgement

4.3.1 Definition

<<Judgement>> is an opinion or discernment related to a <<focus>> or <dimension> (modified from ENV 14032). A descriptor for <<judgement>> is mandatory for nursing diagnoses. <<Judgement>> may be qualified by degree, potentiality, timing, and acuity. Descriptors of degree (scale of gradations) include, but are not limited to: very, mild, and extreme. Descriptors of timing (a point or period in time) include, but are not limited to: during a procedure, perinatal, and postoperative. Descriptors of acuity (duration) include, but are not limited to: acute and chronic. Descriptors of potentiality (possibility) include, but are not limited to: risk for, actual, possibility of, and potential.

4.3.2 Examples of semantic categories

Semantic categories in the judgement domain include, but are not limited to: <alteration>, <adequacy>, <altered process>, <altered state> and <altered structure>. In the case of <altered process>, <altered state> and <altered structure>, the descriptor of <<judgement>> is pre-coordinated with the descriptor of <<focus>>, e.g. anxiety.

4.4 Dimension

4.4.1 Definition

<Dimension> is a quality possessed by an <individual> or <group> which provides a perspective on, but is not limited to: <process>, <structure>, other semantic categories taking the role of focus, and nursing diagnosis (see ENV 14032). <Dimension> may also take the role of <<target>> in the reference terminology model for nursing actions.

4.4.2 Examples of descriptors for the semantic category

Example descriptors include, but are not limited to: knowledge, motivation, and ability.

4.5 Subject of information

4.5.1 Definition

<<Subject of information>> is an entity to which a diagnosis refers, also known as the “bearer” in ENV 14032. A descriptor for <<subject of information>> should be used as necessary to disambiguate similar rubrics (e.g., ineffective family coping vs. ineffective individual coping) in a terminology.

4.5.2 Examples of semantic categories

Semantic categories in the <<subject of information>> domain include, but are not limited to: <individual>, <group>, and <physical environment>.

4.6 Site

4.6.1 Definition

A physical structure that further specifies the position of a <<focus>> or a <<target>> (see ENV 14032).

4.6.2 Examples of semantic categories

Semantic categories include, but are not limited to: <body component>, <altered structure> (e.g., a wound), and <device>.

4.7 Semantic links

All semantic links, with the exception of the reciprocal of is applied to (IS JUDGED BY), were included in ENV 14032. Examples of use of the semantic links are provided in Annex C.

has acuity
semantic link used to represent associative relations between the qualifier of acuity and <<judgement>>

has degree
semantic link used to represent associative relations between the qualifier of degree and <<judgement>>

has potentiality
semantic link used to represent associative relations between the qualifier of potentiality and <<judgement>>

has subject of information
semantic link used to represent associative relations between <<focus>> and <<subject of information>>

has site
semantic link used to represent associative relations between <<focus>> and <<site>>

has timing
semantic link used to represent associative relations between the qualifier of timing and <<judgement>>, <<focus>>, and <action>.

is applied to (IS JUDGED BY)
semantic links used to represent associative relations between <<judgement>> and <<focus>> and <dimension>

is perspective on
semantic link used to represent associative relations between <<focus>> and <dimension>

5 Reference terminology model for nursing actions

5.1 General

For the purposes of this International Standard, a nursing action is considered an intentional act applied to a <<target>> through an <action>. A graphical representation of the reference terminology model for nursing actions is shown in Figure 2. A descriptor for <action> and a descriptor for <<target>> are mandatory for the intensional definition of a nursing action. Annex D includes examples of dissections. Descriptors for other semantic domains, semantic categories, and qualifiers described in 5.4 to 5.7 should be used as necessary to support the intensional definition of specific nursing actions within a particular terminology.

5.2 Action

5.2.1 Definition

An <action> is the process by which an intentional service is applied to a recipient of care [11], [12]. Actions are frequently represented in compositional expressions as verbs or verb phrases. All nursing actions have an <action>. <action> may be qualified by timing.

5.2.2 Examples of descriptors for the semantic category

Examples of descriptors for <action> include, but are not limted to: observing, teaching, preventing, and feeding. In some terminologies (e.g., ICNP®, Home Health Care Classification) [13], [14] instances of nursing <actions> are classified into broad categories such as assessing, teaching, performing, caring, and managing.

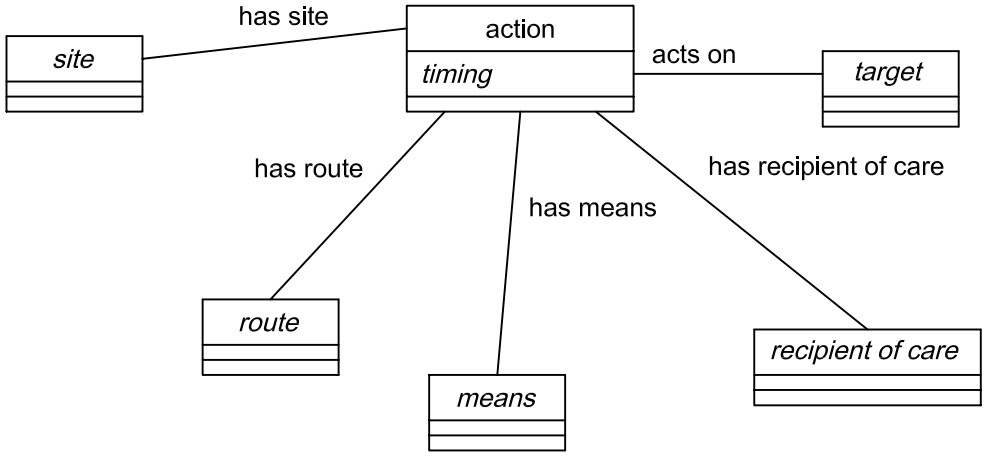

Figure 2 — Reference terminology model for nursing actions

5.3 Target

5.3.1 Definition

<<Target>> is the entity that is affected by the nursing action or that provides the content of the nursing action [11], [13], [15]. All nursing actions have a <<target>>.

5.3.2 Examples of semantic categories

Semantic categories in the <<target>> domain include, but are not limited to: <body component>, <sign>, <device>, <substance>, <physical environment>, <resource>, <process>, <dimension>, <individual>, <group>, and the categories that have the role of <<focus>> in nursing diagnoses (see 4.2). Nursing diagnosis can also be a <<target>>.

5.4 Means

5.4.1 Definition

<<Means>> is the entity used in performing a nursing action [13].

5.4.2 Examples of semantic categories

Semantic categories include, but are not limited to: <resource>, <device> and <substance>.

5.5 Route

5.5.1 Definition

<Route> is a path through which something may pass (see ENV 14032).

5.5.2 Examples of descriptors for the semantic category

Example descriptors for <route> include, but are not limited to: oral route, subcutaneous, and epidural.