
**Health informatics — Semantic
network framework of traditional
Chinese medicine language system**

*Informatique de santé — Cadre de réseau sémantique du système de
langage de la médecine traditionnelle chinoise*

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Foreword

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The committee responsible for this document is ISO/TC 215, *Health informatics*.

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Introduction

This Technical Specification constitutes preparatory work for the development of a standard for semantic network framework of the Traditional Chinese Medicine Language System.

This Technical Specification is based on the needs of semantic networks of the Traditional Chinese Medicine Language System (TCMLS). This Technical Specification describes the semantic relations of traditional Chinese medicine associated with the semantic concepts, terminology, and the definition of semantic networks.

Historically, the application and development of traditional Chinese medicine (TCM) has continued for a long period of time and the terms used vary in different geographical contexts over time. In the past, it was less problematic for information processing because information exchange and integration were rare. But recently, there has been a greater need for information integration processing and exchange between different organizations, while still maintaining the accurate and unified meaning of messages. Automated machine-aided information processing is now becoming more important, and so the establishment of standardized concepts and relationships of TCM terms becomes important.

TCMLS consists of TCM terms, language translation, natural language processing, and language standardized tools. The core of TCMLS is the semantic network of TCM concepts, which facilitates machine processing.

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Health informatics — Semantic network framework of traditional Chinese medicine language system

1 Scope

This Technical Specification defines the structure of the semantic network by describing the semantic types and semantic relations of TCM language system.

This Technical Specification is intended to:

- a) support establishment of Unified Semantic Modelling TCM Language System;
- b) support develop of standardized TCM concepts and relationships of concepts;
- c) provide a conceptual framework for the concept representation of TCM Language;
- d) support improvement in the processing of natural language by computer systems.

This Technical Specification has been developed for the first time. The initial content described below is intended to be used as a starting point for the application of the content in the information system.

2 Terms and definitions

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

2.1

traditional Chinese medicine

traditional medicine that originated in China, and is characterized by holism and treatment based on pattern identification/syndrome differentiation

Note 1 to entry: Adapted from WHO International Standard Terminologies on Traditional Medicine in the Western Pacific Region.

2.2

Traditional Chinese Medicine Language System

TCMLS

language system that is designed to facilitate the development of computer systems that understand the meaning of the natural language of traditional Chinese medicine, containing two sections in TCMLS, TCM terms dictionary, and the semantic network

2.3

semantic networks

modelling framework that consists of (1) a set of broad subject categories, or semantic types, that provide a consistent categorization of all concepts represented in the TCMLS, and (2) a set of useful and important relationships, or semantic relations, that exist between semantic types

Note 1 to entry: The semantic network contains 96 semantic types and 58 relationships.

2.4

semantic type

node in the semantic network, which helps to organize concepts in hierarchy and assign at least one attribute for every concept

Note 1 to entry: A semantic type is mainly classified into entity and event.

2.5 semantic relationship

relationship that connects between semantic types, divided into two classes: hierarchy and correlation

Note 1 to entry: There are 58 semantic relationships in TCM domain, which forms the skeleton of TCM semantic networks.

3 Semantic networks

3.1 General

The TCMLS semantic network provides a consistent categorization of all concepts represented in TCM terms dictionary and to provide a set of useful relationships between these concepts. The current release of the semantic network contains 96 semantic types and 58 relationships.

3.2 Principles of terminology naming and definition

3.2.1 Marking with the letters TCM in superscript represents the terms which have the same nomenclature with conventional medicine but have the different definition.

3.2.2 Concept is defined by comprehensive description using well known terms.

3.2.3 Definition is given by using standardized terms.

3.2.4 Definition explains the concept, and does not include composition terms.

3.2.5 Each concept is expressed by hierarchical classification and property definition.

3.2.6 Each concept includes both Chinese and English terminology and annotation.

3.3 Semantic types

The semantic types (given in Table 1) are the nodes in the semantic network. The network defines semantic types for all concepts in TCM terms dictionary, both with textual descriptions and by means of the information inherent in its hierarchies. There are two major categories of semantic types: entity and events.

The semantic types structure is shown in [Annex A](#).

Table 1 — Semantic types description and definition

ID	Semantic types	Definition
1	Entity	A broad type for grouping physical and conceptual entities. (UMLS)
1.1	Physical and presentational object	An object perceptible to the sense of vision or touch. (UMLS)
1.1.1	Basic material in the human body in Chinese medicine	In Chinese medicine, the basic elements, constituents, or substances of which the human body is composed or can be made according to TCM theory.
1.1.1.1	Basic substance in the human body	The fundamental substance that maintains body function and keeps the physiological activity of the whole body in balance, such as qi, blood, and body fluid.

Table 1 (continued)

ID	Semantic types	Definition
1.1.1.1.1	Essence ^{TCM}	Essence means two things: (1) the fundamental substance that builds up the physical structure and maintains body function; (2) reproductive essence stored in the kidney. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.1.1.2	Blood ^{TCM}	The red fluid circulating through the blood vessels, and nourishing and moistening the whole body. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.1.1.3	Qi ^{TCM}	The basic element that constitutes the cosmos and, through its movements, changes and transformations, produces everything in the world, including the human body and life activities. In the field of medicine, qi refers both to the refined nutritive substance that flows within the human body as well as to its functional activities. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.1.1.4	Liquid and humor ^{TCM}	A general term for all kinds of normal liquid in the body, except the blood, also known as body liquids. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.1.2	Viscera and Bowels ^{TCM}	A collective term for internal organs, also called zang-organs and fu-organs.
1.1.1.3	Meridian and collateral	A system of conduits through which qi and blood circulate, connecting the bowels, viscera, extremities, superficial organs and tissues, making the body an organic whole, the same as channels and networks; meridians or channels, in short. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.1.4	Acupuncture point	The point where a needle is inserted and manipulated in acupuncture therapy. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.1.5	Body constituent and orifice of sense organ	A collective term for skin, vessels, flesh, sinews, bones and the external opening of sense organs.
1.1.1.6	Constitution	The characteristics of an individual, including structural and functional characteristics, temperament, adaptability to environmental changes and susceptibility to disease. It is relatively stable, being in part, genetically determined and in part, acquired. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.2	Medicinal animal plant and mineral	Generally refers to all animals, plants and minerals that can be used as drugs
1.1.2.1	Medicinal animal	Generally refers to those animals that have therapeutic function or can be used to prevent and treat the disease.
1.1.2.2	Medicinal plant	Generally refers to those plants that have therapeutic function or can be used to prevent and treat the disease.
1.1.2.3	Medicinal mineral	A naturally occurring, homogeneous inorganic solid substance having a definite chemical composition, and have therapeutic function or can be used to prevent and treat the disease.
1.1.3	Medicinal substance	A substance used in the treatment or prevention of pathologic disorders. This includes substances that occur naturally in the body and are administered therapeutically.

Table 1 (continued)

ID	Semantic types	Definition
1.1.3.1	Chinese medicinal	Usually referring to those medicinal substances recorded in Chinese materia medica. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.1.3.2	Formula	A prescription that is formed from Chinese medicinals. TCM pharmacists typically combine various medicinals into in a formula or prescription after carefully considering the dosage, usage, and combination, according to the results of Pattern differentiation as well as therapeutic principles.
1.1.3.3	Chemical constituent of Chinese medicine	Molecular components that are extracted from Chinese medicinal after extraction, separation, identification, structure determination.
1.1.4	Food	Any substance generally containing nutrients, such as carbohydrates, proteins, and fats, that can be ingested by a living organism and metabolized into energy and body tissue. Some foods are naturally occurring, others are either partially or entirely made by humans.(UMLS)
1.1.5	Artificial device	Substances made or synthesized by human.
1.1.5.1	Research device	A manufactured object used primarily in carrying out scientific research or experimentation.
1.1.5.2	Medical device	A manufactured object used primarily in the diagnosis, treatment, or prevention of physiologic or anatomic disorders.
1.1.5.3	Pharmacologic device	A manufactured object used primarily in the medical experiment, Chinese medicinal identification, formulation analysis and pharmaceutical technology, etc.
1.2	Conceptual entity	A broad type for grouping abstract entities or concepts.(UMLS)
1.2.1	Traditional Chinese medicine theory	In Chinese medicine, a system of ideas formed from Chinese medical philosophy in combination with practical experiences on medicine, such as yin-yang theory, visceral manifestation theory, meridian and collateral theory, essential qi theory, and five-phase theory.
1.2.1.1	Yin-yang theory	An ancient Chinese philosophical concept, dealing with two opposite aspects of matters in nature which are interrelated with each other. Its principle is widely applied to traditional Chinese medicine. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.2.1.2	Five phase theory	One of the philosophical theories of medical practice in ancient China, concerning the composition and evolution of the physical universe, epitomized by the nature and the inhibition-generation relationships of the five phases, wood, fire, earth, metal and water, serving as the guiding ideology and methodology of physiology, pathology, clinical diagnosis and treatment, also known as five elements theory. (WHO INTERNATIONAL STANDARD TERMINOLOGIES ON TRADITIONAL MEDICINE IN THE WESTERN PACIFIC REGION)
1.2.1.3	Theories of schools of traditional Chinese medicine	Refers to a TCM theory that is from various factions.
1.2.1.3.1	Traditional Chinese Medicine Schools	The prolonged history of traditional Chinese medicine has witnessed a plurality of famous figures, who not only inherited theories and experiences from their antecessors, but also formed their own opinions and doctrines. The inheritance of academic tradition, achieved through apprenticeship training, in addition to the creativity of famous figures recognized for their outstanding works, gave rise to the different schools of traditional Chinese medicine.

Table 1 (continued)

ID	Semantic types	Definition
1.2.1.3.2	Medical specialist	The people who dedicated their lives to the development of (traditional Chinese) medicine from ancient times, particularly the ancestors who are symbolized as Huangdi and Shennong.
1.2.2	Traditional Chinese medicine subject	A subject that originated in China evolved a unique theoretical system, which is based on the Chinese people's long-term medical practice.
1.2.3	Related subjects of traditional Chinese medicine	Referring to a subject that is connected to Traditional Chinese Medicine.
1.2.3.1	Related nature physics subjects of traditional Chinese medicine	A subject that involves the study of natural phenomena or physical phenomena related TCM.
1.2.3.2	Traditional Chinese philosophy	Philosophical thought that was developed by ancient Chinese, through the generalization and summarization of their natural and social knowledge.
1.2.4	Traditional Chinese medicine organization	A social group organized for some end or tasks related to health care, education, and scientific research in traditional Chinese medicine .
1.2.5	Traditional Chinese medicine literatures	The body of written works (e.g. books, magazines) on the subject of traditional Chinese medicine .
1.2.6	Geographic area	Name that about geographical field.
2	Event	A broad type for grouping activities, processes and states.(UMLS)
2.1	Phenomenon and process	A process or state which occurs naturally or as a result of an activity. (UMLS)
2.1.1	Physiology phenomenon or process	Phenomena or process that organism itself have or due to some activity.
2.1.1.1	Traditional Chinese medicine physiological function	Study of human physiological state according to TCM Theory.
2.1.1.1.1	The function of essence	The function of essence includes construction of the body, generation of offspring, maintaining the vital activities and metabolism of the body.
2.1.1.1.2	The function of qi ^{TCM}	Qi is moving constantly inside the body to proper and stimulate the physiological functions of the body. The functions of qi include: promoting action, warming action, defending action, consolidating action, transforming action.
2.1.1.1.3	The function of blood ^{TCM}	Blood is a intravascular red liquid rich in nutrients. The main physiological function of blood is to nourish and moisten the whole body.
2.1.1.1.4	The function of fluid and humor ^{TCM}	The physiological functions of the body fluid and humor are to moisten and nourish the body.
2.1.1.1.5	The function of viscera	Five viscera have physiological function of producing and storing essence qi. Six bowels possess the functions of reception.
2.1.1.1.6	The function of meridian and collateral	Physiologically the meridian and collateral serve as the pathways for qi and blood to flow and circulate in the body. Pathologically the meridian and collateral transmit pathogenic factors into the body.
2.1.1.1.7	The function of acupuncture point	The functions of acupuncture point are transporting qi and blood, reflecting the condition of disease and syndrome, assisting diagnosis and preventing the disease.
2.1.1.1.8	The function of yin-yang	The general descriptive terms for the two opposite, complementary and inter-related cosmic forces found in all matter in nature. The ceaseless motion of both yin and yang gives rise to all changes seen in the world.