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Health informatics — Conceptual data model for Chinese medicinal herbs

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Contents Page

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Foreword

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For an explanation ~~on~~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 ~~the following URL:~~ www.iso.org/iso/foreword.html.

~~The committee responsible for this~~This document ~~is~~was prepared by Technical Committee ISO/TC 215, *Health informatics*, in collaboration with Technical Committee ISO/TC 249, *Traditional Chinese medicine*.

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.

Field Code Changed

Introduction

Chinese medicinal herbs have been used systematically for over 4,000 years because of ~~its~~their efficacy and cost-effectiveness in preventing and curing illness. According to the WHO, around 21~~,~~000 plant species have the potential for being used as medicinal plants. therefore many health authorities and administrators took traditional forms of medicine more seriously and have explored the possibility of utilizing them in primary health care.

However, the species of commonly used medicinal plants are decreasing and many plants face extinction. In China, for example, ~~the current stock volume of licorice has drastically dropped by over 40 percent compared with that in 1950.~~liquorice stocks fell sharply by more than 40% from the 1950s to the 2010s. The main reasons include an emerging growth in demand, deforestation, environmental deterioration, ecological imbalance~~,~~ and lack of awareness of environmental protection.

~~One of tasks we should start is~~It would be beneficial to establish unified information systems including databases. There are a range of regional and other databases on the uses of medicinal plants. The development of a common design for databases on the conservation and sustainable use of Chinese medicinal herbs should also be done~~ as soon as possible~~ at the international level. It is beneficial to exchange information both within and between countries permitting a constant process of refining and updating.

By collecting information of individual Chinese medicinal herb, such as plant attributes, growth geographic attributes, medicinal attributes and identification methods, etc., ~~we can~~it is possible to set up ~~centralised~~centralized databases to explore further on scarce species, alternative varieties and authentic Chinese medicinal herbs. This would also facilitate artificial cultivation, sustainable development and application of Chinese herbal medicine resources.

This document aims at protecting scarce species of Chinese medicinal herbs, promoting ~~its~~their cultivation, seeking proper substitutes~~,~~ and breeding new varieties in high quality. Moreover, it can assist the standardization and information process of the general surveys on Chinese medicinal herbs.

Health ~~Informatics~~<u>informatics</u> — Conceptual data model for Chinese medicinal herbs

1 ~~1~~ Scope

This document specifies ~~the~~<u>a</u> conceptual data model for Chinese medicinal herbs (CMH). The organization of<u> the</u> data model for each CMH consists of its medicinal attributes, plant attributes, geographic attributes and identifications.

This document is applicable to the establishment and maintenance of ~~the~~ CMH databases.

2 ~~2~~ Normative references

The following ~~referenced~~ documents are ~~indispensable for~~<u>referred to in</u> the ~~application~~<u>text in such a way that some or all of their content constitutes requirements</u> 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 ~~8601-1, Date and time — Representations for information interchange — Part 1: Basic rules~~

~~ISO~~ 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country ~~codes~~<u>code</u>*

ISO 3166-2, *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*

ISO 3166-3, *Codes for the representation of names of countries and their subdivisions — Part 3: Code for formerly used names of countries*

ISO ~~/IEC 11179-1, Metadata registries (MDR) — Part 1: Framework~~

~~ISO~~ 18668-1, *Traditional Chinese medicine — Coding system for Chinese medicines — Part 1: Coding rules for Chinese medicines*

ISO 18668-3, *Traditional Chinese medicine — Coding system for Chinese medicines — Part 3: Codes ~~of~~<u>for</u> Chinese ~~Herbal Medicine~~<u>Materia Medica</u>*

~~ISO 19100 series standards — Geographic information~~

~~3~~ ISO 6709, *Standard representation of geographic point location by coordinates*

3 Terms and definitions

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

ISO and IEC maintain ~~terminological~~<u>terminology</u> databases for use in standardization at the following addresses:

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

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

3.1
conceptual data model
data model that represents an abstract view of the real world

Note 1 to entry: A conceptual model represents the human understanding of a system, which can be anywhere from a paper-based system to a complex database in an IT system.

[SOURCE: ISO/IEC 11179-1:2023, 3.2.25]

3.2
Chinese medicinal herb
CMH
medicinal parts of medicinal plants after preliminary processing, which are used as raw materials in Chinese medicines

Note 1 to entry: Except for animal, mineral, and composite materials.

~~[SOURCE: ISO 18662-1:2017, 3.1 , modified — Note 1 to entry has been added.]~~

3.3
producing area
~~the~~ area where medicinal plants grow naturally or artificially

3.4
microscopic ~~-~~ examination
examination of a test specimen by microscope with a magnification of generally × 50 to × 500, with or without etching

[SOURCE: ISO 17639:~~2003~~2022, 3.2]

3.5
physical and chemical identification
qualitative or quantitative analysis of the active ingredient, main ingredient or characteristic ingredient of ~~CMH~~a Chinese medicinal herb by physical or chemical means with the purpose to tell its authenticity and grading

4 ~~4~~ Conceptual data model for CMH

4.1 ~~4.1~~ Overview

The ~~organization of~~ data model for each CMH ~~consists~~shall consist of its medicinal attributes, plant attributes, geographic attributes and identifications. ~~Conceptual~~The conceptual data model for CMH is shown ~~as~~ in Figure ~~-~~ 1.
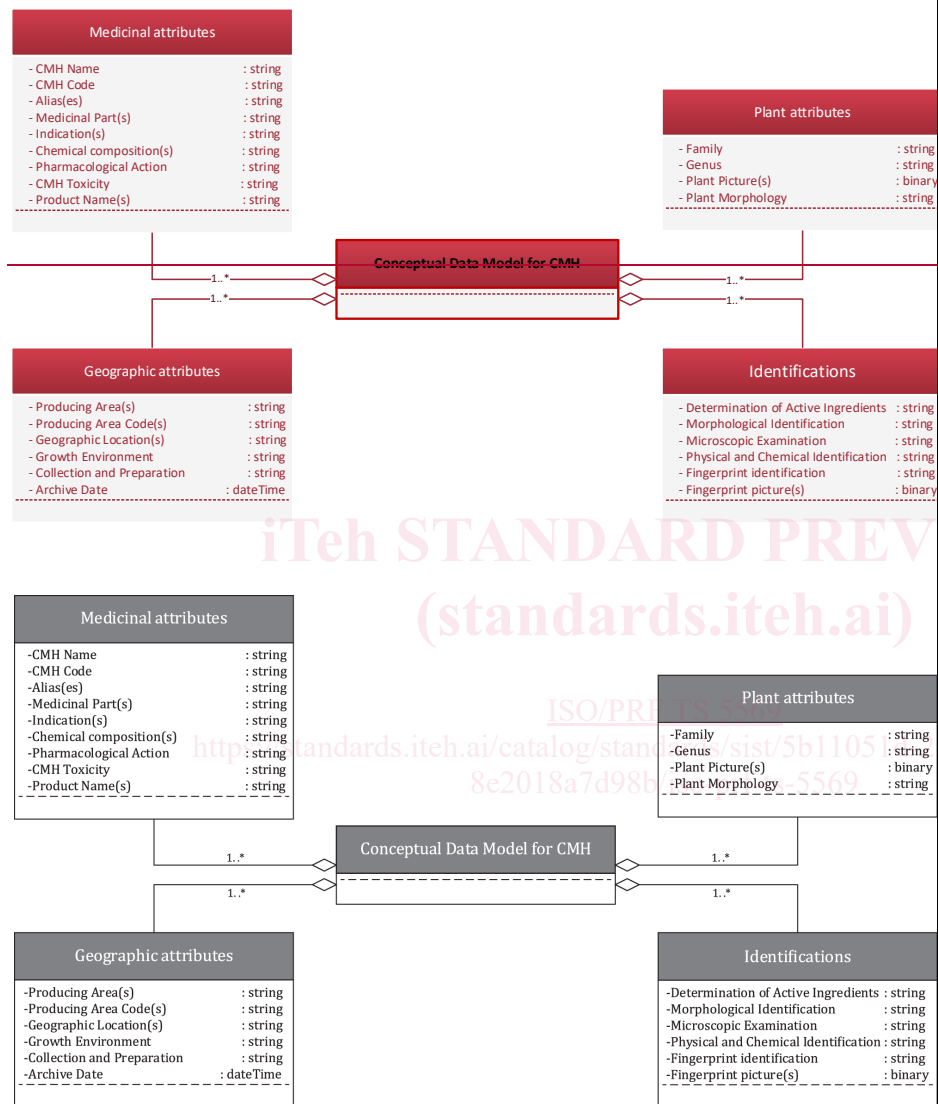
Figure 1 — Unified Modeling Language (UML) diagram of the conceptual data model for CMH

~~4.3~~4.2 ~~4.2~~ Medicinal attributes

~~4.3.1~~4.2.1 ~~4.2.1~~ Overview

~~Medicinal~~The medicinal attributes shall include: CMH Name, CMH Code, ~~Alias(es),~~ Medicinal Part(s), Indication(s~~),~~.

The medicinal attributes may include: Alias(es), Chemical Composition(s), Pharmacological Action, CMH Toxicity and Product Name.

4.2.2

~~4.3.2~~4.2.2 CMH Name

The attribute of the CMH Name is represented by "CMHN~~. This field is required and the~~". Its datatype is string. According to ISO 18668-3, each CMHN field ~~shall~~must include Latin, English, Simplified Chinese characters, Traditional Chinese characters~~,~~ and Chinese Pinyin. If a CMH is unique to a country, the official ~~text of~~name in the country may be added to the name.

~~4.3.3~~4.2.3 ~~4.2.3~~ CMH Code

The attribute of CMH Code is represented by "CMHC~~. This field is required and the~~". Its datatype is string. CMHC shall be in accordance with ISO 18668-3. If there is a CMH not included in ISO 18668-3, it shall be encoded in ~~compliance~~accordance with ISO 18668-1.

~~4.3.4~~4.2.4 ~~4.2.4~~ Alias(es)

The attribute of Alias(es) is represented by "ALI~~. This field is optional and the~~". Its datatype is string. Each ALI field may include Latin ~~(optional),~~, English ~~(optional),~~, Simplified Chinese characters ~~(optional),~~, Traditional Chinese characters ~~(optional),~~or Chinese Pinyin ~~(optional).~~.

~~4.3.5~~4.2.5 ~~4.2.5~~ Medicinal Part(s)

The attribute of Medicinal Part(s) is represented by "MP~~. This field is required and the~~". Its datatype is string. MP describes where CMH can be used as a medicinal material, such as roots, rhizomes, leaves, flowers, fruits, and seeds.

~~4.3.6~~4.2.6 ~~4.2.6~~ Indication(s)

The attribute of Indicator(s) is represented by IND. ~~This field is required and the~~Its datatype is string. IND describe the efficacy and indications of CMH.

~~4.3.7~~4.2.7 ~~4.2.7~~ Chemical Composition(s)

The attribute of Chemical Composition(s) is represented by "CC~~. This field is optional and the~~". Its datatype is string. CC describes the known effective chemical compositions of CMH.

~~4.3.8~~4.2.8 ~~4.2.8~~ Pharmacological Action

The attribute of Pharmacological Action is represented by "PhA~~. This field is optional and the~~". Its datatype is string. PhA describes the pharmacological effects of effective chemical constituents of CMH, including processes such as absorption, decomposition, metabolism, and excretion in organisms.

~~4.3.9~~4.2.9 ~~4.2.9~~ CMH Toxicity

The attribute of CMH Toxicity is represented by "CMHT~~. This field is optional and the~~". Its datatype is string. CMHT describes the toxicity of Chinese medicinal herbs.

~~4.3.10~~4.2.10   ~~4.2.10~~ Product Name(s)

The attribute of Product Name(s) is represented by "PN~~. This field is optional and the~~". Its datatype is string. ~~In case~~If there are finished products on the market, the PN may be included in the database with a brief description.~~~~

~~4.4~~4.3 ~~4.3~~ Plant attributes

~~4.4.1~~4.3.1   ~~4.3.1~~ Overview

The Plant attributes shall include: Family, Genus, Plant Picture(s) and Plant Morphology.

~~4.4.2~~4.3.2   ~~4.3.2~~ Family

The attribute of Family of CMH is represented by "FCMH~~. This field is required and the~~". Its datatype is string.

~~4.4.3~~4.3.3   ~~4.3.3~~ Genus

The attribute of Genus of of CMH is represented by "GCMH~~. This field is required and the~~". Its datatype is string.

~~4.4.4~~4.3.4   ~~4.3.4~~ Plant Picture(s)

The attribute of CMH Plant Picture(s) is represented by "CMHPP~~. This field is required and the~~". Its datatype is binary. PPCMH ~~must~~shall be in JPEG (JPG), PNG, BMP or GIF format, and the main features of the CMH should be legible.

~~4.4.5~~4.3.5   ~~4.3.5~~ Plant Morphology

The attribute of CMH Morphology is represented by "CMHM~~. This field is required and the~~". Its datatype is string. The internal and external morphology and structure of CMH ~~must~~shall be described in detail, including the law of variation of organ formation and development, cells, tissues, organs in different environments and during ontogeny and phylogeny.~~~~

~~4.5~~4.4 ~~4.4~~ Geographic attributes

~~4.5.1~~4.4.1   ~~4.4.1~~ Overview

The Geographic attributes shall include: Producing Area(s), Producing Area Code(s), Geographic Location(s), Growth Environment, Archive Date.

Geographic attributes may include: Collection and Preparation~~, Archive Date~~.

~~4.5.2~~4.4.2   ~~4.4.2~~ Producing Area(s)

The attribute of Producing Area(s) is represented by "PA~~. This field is required and the~~". Its datatype is string. PA describes the origin of the CMH, including countries, provinces or regions~~, according to~~. It shall be in accordance with ISO 3166-1, ISO 3166-2, and ISO 3166-3.~~~~

~~4.5.3~~4.4.3   ~~4.4.3~~ Producing Area Code(s)

The attribute of Producing Area Code(s) is represented by "PAC~~. This field is required and the~~". Its datatype is string. The PAC ~~provides the corresponding code according to 4.4.2 and~~shall be consistent with the codes provided in ISO 3166-1, ISO 3166-2, ISO 3166-3.~~~~