
Health informatics — Quality metrics for detailed clinical models

*Informatique de santé — Indicateurs de qualité pour modèles
cliniques détaillés*

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

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Introduction

Normalization and formalization of evidence-based clinical data are fundamental requirements towards enabling a high quality and safe healthcare system. Normalized data elements and clinical models can help to ensure data consistency and comparability among users and systems, and formalized data specifications can support the sharing of clinical knowledge among diverse jurisdictions with higher efficiency and lower cost.

The goal of shareable, executable clinical guidelines is both worthwhile and challenging. One of the greatest hurdles is that of representing the clinical information in a precise and shareable manner. The Detailed Clinical Model (DCM) is an information model that is an essential part of the infrastructure supporting the codification and standardization of evidence-based knowledge elements across EHR systems. Each DCM is a logical model that shows the meaning, structure, possible content and relationships between data elements for a given subject of EHR documentation. The coded elements have explicit bindings to allowed coded values. Models are independent of any specific programming language or type of database. DCMs support explicit, unambiguous query statements against data instances. The DCM aids decision making by medical staff, and supports the valid reuse of medical data for example for epidemiology, quality assurance and managerial goals.

The DCM for supporting evidence-based clinical practice is already in common use in the EHR systems of some countries and regions. The Clinical Element Model of Intermountain Healthcare, templates defined by HL7 International, archetypes defined by the openEHR Foundation and ISO 13606, the Clinical Information Model in the Netherlands, and the Clinical Content Model by the Center for Interoperable EHR in South Korea are examples of published DCM formalisms that can be used to organize the clinical content of an EHR interoperability message and an EHR repository, share decision logic, and build a data capture form of a clinical application. Each instance of a DCM defines how a corresponding generic EHR representation is used to represent particular types of clinical information. Example DCMs include representations for allergies, problem lists, laboratory tests, medication and diagnostic orders, medication administration, adverse reaction, physical examination and clinical measurements, signs, symptoms, diagnosis, clinical documents, procedure, family history, medical history and review of symptoms.

According to the open EHR clinical community, medication, problem/diagnosis, adverse reaction, vital signs group, laboratory report, alert, blood group, procedure, admission/episode and clinical synopsis are the top ten priority archetype modelling areas. Examples of DCM instances might include representations for documenting a pain symptom, heart sounds, liver function tests, a prescribed drug, or a chest x-ray report. The standardization of EHR content through DCMs enables consistency and interoperability in many possible application areas within healthcare, quality assurance, and research. DCMs support multiple contexts as in the following:

- EHR data storage;
- message payload and service payload;
- exchanging clinical content;
- querying and analytics over clinical content;
- decision support over clinical content;
- entering clinical content;
- displaying clinical content;
- healthcare quality measures;
- clinical trials data (clinical research);
- normalization of data for secondary use;
- capture of coding output from NLP.