INTERNATIONAL HEALTH TERMINOLOGY
STANDARDS DEVELOPMENT ORGANISATION

Criteria and metrics for assessing the quality of SNOMED CT value sets in clinical quality measures

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Audience

Meaningful Users of EHR data, EHR vendors, value set developers.

Objectives

To assess the quality of individual SNOMED CT value sets in clinical quality measures.

Abstract

Background: In recent years, there has been an effort to establish quality measures for health care providers, with the objective of improving the quality of health care and comparing performance across institutions. A set of 93 clinical quality measures (CQMs) was recently selected as part of the Meaningful Use incentive program. Value sets, i.e., sets of codes for a given data element, are one key component of the CQMs. The Meaningful Use value sets for diagnoses are primarily defined in reference to SNOMED CT. So far, quality assurance of the value sets performed by the US National Library of Medicine (NLM) Value Set Authority Center (https://vsac.nlm.nih.gov/) has been limited, mainly ensuring referential integrity and currency of the codes [1].

Methods: We define the following quality criteria and metrics for SNOMED CT value sets:

(1) **Completeness**: A value set should contain all the relevant codes for a particular data element. From a SNOMED CT perspective, the code corresponding to the data element in the code system should be present in the value set, along with all its descendants. As a consequence, the value set is expected to be rooted by one concept and to contain all the descendants of this root concept. *The completeness metric is the ratio of the number of concepts from the original value set found among the descendants of the root concept over the number of descendants of the root concept*.

(2) **Correctness**: A value set should contain only the relevant codes for a particular data element. From a SNOMED CT perspective, the presence in the value set of codes other than the root concept and its descendants might indicate incorrect codes, as they are outside the value domain. *The correctness metric is the ratio of the number of concepts from the original value set found among the descendants of the root concept over the number of concepts from the original value set*.

Findings: We computed these two metrics for the 526 SNOMED CT value sets for diagnoses in the 93 clinical quality measures (2014 Meaningful Use; Dec. 2012 version of the value sets). We found that 271 VSs (52%) are **complete** (i.e., have a completeness measure of 1.0), 65 (12%) are nearly complete (completeness measure > 0.8), and 190 (36%) are missing a significant proportion of the descendants from the root concept. Analogously, we found that 448 VSs (85%) are **correct** (i.e., have a correctness measure of 1.0), 33 (6%) are nearly correct (correctness measure > 0.8), and 45 (9%) contain a significant proportion of outliers. We plan to share these findings with the value set developers in order to inform the value set development process.

References

1 Winnenburg R, Bodenreider O. Issues in creating and maintaining value sets for clinical quality measures. AMIA Annu Symp Proc. 2012;2012:988-96.