



Coping with Concept Inactivation in SNOMED CT

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Audience

Implementers and commissioners of systems that use SNOMED CT's native taxonomy of clinical concepts to drive machine reasoning processes e.g. for billing, clinical research or audit, and patient alerts.

Learning objectives

To recap how 'inactivation of concepts' between different releases of SNOMED CT can cause reports to miss codes they used to return, and to explain and demonstrate a technical solution to the problem.

Outline

At each new release of the international core, or of one of its extensions, some previously 'current' concepts will become 'inactive'. Although the numbers involved are typically small, they may be disproportionately concentrated in the more heavily used fragments of SNOMED CT content; in any event, the potential clinical significance of a data phenomenon is independent of the frequency with which it occurs.

Apart from a change in its ConceptStatus, an inactivated concept also loses all its modelled attributes¹. Significantly, this includes all the IS_A relationships that previously positioned the concept correctly within SNOMED CT's primary taxonomic hierarchy; inactive concepts exist instead in a parallel, flattened taxonomy.

Because of this 'taxonomic shift', clinical data expressed using concepts *prior* to their inactivation will behave predictably but inappropriately *after* inactivation, if the underlying system does not appropriately compensate¹. Where query specifications have been written to use SNOMED CT's taxonomy to dynamically compute the result set each time the query is run then, in most cases, EMR patient instance data expressed using inactive codes will not be returned by otherwise appropriate query specifications.

To compensate for this phenomenon, systems should post-process the Historical Relationships (RF1) or Historical Association RefSets (RF2) published in each new SNOMED CT release. Theoretically, a table can be derived listing the current active concept substitute(s) for each inactive concept. This table can then drive a *physical* global search-and-replace: all instances of inactive concepts still existing within the cumulative EPR instance data, or in any system design artefacts (template data entry definitions, query specifications, message constraints etc), can be overwritten with the relevant active substitute, in order to restore correct taxonomic reasoning. In practice, however, this data update can be both practically and computationally challenging - especially in large systems - and it also introduces a new medicolegal audit trail requirement.

The tutorial will explain and demonstrate an alternative technical solution, in which the search-and-replace function is performed only logically and transiently at runtime, by simple extension of an existing recommended SNOMED CT implementation artefact: the SNOMED CT transitive closure table². The audit trail implications will be discussed.

Prior reading

1. SNOMED CT Technical Implementation Guide 20110731 s5.3.7.2 (pp 155-165)
2. SNOMED CT Technical Implementation Guide 20120731 s7.4.2.2 (p294) and s7.7.5.2 (pp338-344)