INTERNATIONAL HEALTH TERMINOLOGY STANDARDS DEVELOPMENT ORGANISATION

Information Model Requirements for Post-Coordinated SNOMED CT Expressions for Microscopic Examination of Histologic Tissue Slides and Support Structured Surgical Pathology Reports

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Audience

Pathology Special Interest Group members and persons investigating post coordinated SNOMED CT use and supporting information models and database architectures

Objectives

To investigate the expressiveness and completeness of SNOMED CT for use in pathology microscopic examination reports; and to develop a data architecture to manage post-coordinated SNOMED CT expressions for surgical pathology

Abstract

Microscopic examinations of histologic tissue slides represent the primary data set from which surgical pathology findings are rendered. We evaluated the expressiveness and completeness of SNOMED-CT expressions employing the July 2012 international release for the recording of microscopic, histologic findings for 85 breast needle biopsy cases. Seventy-five percent of the findings statements reported by the pathologist could be completely represented using SNOMED-CT. We developed an information model and database structure employing the SNOMED-CT expressions for use in structured, encoded microscopy reports, management of histopathology findings and capture of pathologist findings.

We found that SNOMED-CT had deficiencies in both the current model of meaning and content for representation of the pathologist findings statements. We did not find attributes and values in the model for clinical findings to represent architectural features and descriptive statements of morphologic alterations nor did values for specific immunohistochemistry methods exist. The use of role-groups and complex expressions employing SITUATIONs WITH EXPLICIT CONTEXT were required to adequately represent the totality of pathologist's findings due to requirements for expression of certainty and clinical absence.

We developed the information model and database architecture to support detailed microscopic examination findings along with information classes to represent a case, associated case specimens, tissue blocks and histopathology slides. We created a findings class to capture post-coordinated SNOMED CT observations by case, specimen, tissue block and slide. We added attributes to the slide class to indicate the staining, examination and microscopy methods employed to prepare and exam the histopathology slide. We specified an annotation class to link and store specific findings by area of interest within a slide, or slide image, as in the digital pathology environment. The findings class is bound to an attribute class that contained each SNOMED-CT attribute-value pair necessary to completely and unambiguously define the pathologist's stated definitions with complex post-coordinated SNOMED-CT expressions.

The information model and database structure we developed enhances the pathologist's ability to document detailed microscopic observations in an encoded fashion within the pathologist's workflow. The information model supports case findings and also the specific supporting evidence. The data collected during the microscopic examination can be used to create a structured microscopic examination section of the pathology report, as well as the final summary report. Structure and standardization of the microscopic findings data will enhance pathology clinical decision support systems and pave the way for enhanced training tools.