The "computable" electronic Medical Record (eMR 2.0) defined

It has been almost a half-century since the benefits and principles of a computer based medical record were first described by Schultz and Weed. Why have we yet to achieved these putative benefits? Since the required computing horse power is now cheap enough the answer lies in understanding what computing is and how it can be applied to medical records.

An "Excel" spread sheet is computable (with regards to numbers) but a "Word" document is not. If you enter letters into the cells of a spread sheet they "do not compute" because the machine understands the semantics of numbers but not letters and words.

To make words and letters computable they must be represented as numbers. This is what lexicons such SNOMED CT and ICD9 do by assigning unique identifiers to clinical entities. For the specified terms to participate in more sophisticated integration and semantic communication they require information to be attached. This meta data is the basis of information models such as the clinical document architecture (CDA) and detailed clinical models (DCM) from HL7 and the archetype from openEHR.

By using terminologies we can sort information in complex ways such as listing all patients aged 65 with diabetes type two. With detail rich terminologies such as SNOMED CT we can support clinicians at the point of care. By adding meta-data we can ask for a list of all patients with diabetes type two who have not had an A1C test in the last six months.

To achieve the type of assistance from the computer that will revolutionize clinical medicine and allow for real-time case specific research, such as published this week in the NEJM, the terminology with its attached meta data must be organized in a good ontology. A good ontology is a veridical relational hierarchy based on single parent child inheritance (i.e. each child has only one parent term); a limited number of upper level categories; and is congruent with the Open Bio-medical Ontology (OBO) which derives from the Basic Formal Ontology (BFO), one of the most widely used upper level ontologies in science. This is the process that the IHTSDO is trying to achieve for SNOMED CT.

We can now ask patient specific questions such as what is the best treatment strategy for this patient's situation according to the last one thousand patients of the same profile, taking into consideration his proteomic phenotype. Or we can ask what is the most common guideline non compliance in this group of medical residents.

The potential benefits of a computable medical record support the three classic domains of academic medicine; service, education and research. There is much talent in Canada and a lot of silo development is occurring. A national approach to specifying the clinical content of the eMR such that is truly "computable" will avoid waiting another half century.

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