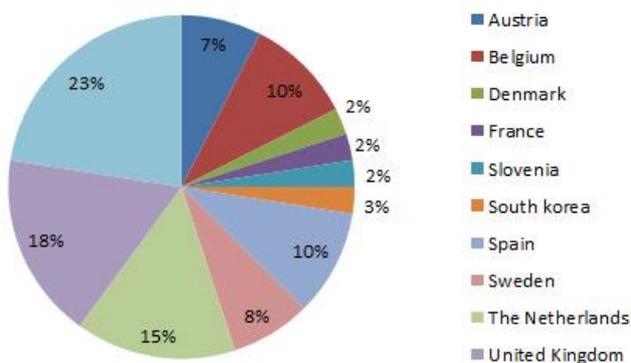


International Workshop on Semantic Interoperability

Brussels, 13-15 March 2014

International experts in the field of health information semantics came together for a three-day in-depth workshop to explore best practices in how to standardise the meaning of clinical information within electronic health records. This meeting was jointly organised by the European Network of Excellence on Semantic Interoperability (SemanticHealthNet, sponsored by the European Commission) and the Clinical Information Modeling Initiative (CIMI, a voluntary collaborative of global health informatics experts, vendors and health ministries).



Forty-one experts from ten countries met in Brussels from 13th to 15th March 2014 to review the state of the art in terminology and information modelling standards and specifications.

A shared goal is to ensure that computers as well as professionals can fully interpret the meaning of clinical information whenever communicated between healthcare organisations, and information systems. Especially the EU participants stressed the need for cross-border interoperability, e.g. when citizens need urgent health care abroad.

The particular focus of the workshop was clinical information models: structured and terminological representations of particular areas of documentation within electronic health records, such as a medications, test results, diagnoses, clinical findings or demographics.

The challenges tackled by both initiatives were the complexity of clinical information, the natural evolution of clinical practice as newer evidence emerges, and standards that are precise enough to ensure information processing. This should reach a level of reliability that supports tasks such as alert generation and decision support, and yet caters to the inherent diversity of health care and of individual patients. The scenario is complicated by the coexistence of relevant international standards. Although each of them makes a useful contribution to the representation of clinical meaning, they have not been developed in a harmonised way and are not always easy to use in combination.

The SemanticHealthNet and CIMI experts are, between them, involved in almost all of the global initiatives in this field, and therefore constitute a strong natural community to help develop the best approaches to advancing the world's capability for semantic interoperability.



The primary focus of this meeting was to:

- Review the concept of semantic patterns, which combine structural, terminological and ontological representations to enable multiple clinical models (that might have originated from different healthcare environments, be represented using different standards or be embedded within different EHR system products) to be recognised as overlapping and primarily aligned;
- Help model designers to progressively harmonise model collections, and
- Help guide those who are mapping EHR data between systems.

Through a combination of plenary and breakout sessions, the experts examined best practices in representing clinical diagnoses, laboratory results, clinical observations, physical examination findings, demographic information, patient questionnaires, prescriptions, and medication administration. In each case, the experts proposed clinical model designs that may be used to bridge across multiple alternative representations within different systems. These models will be developed further, validated using sample data, and then mapped to international standards, in the coming months. These models will all be freely available as a public good, and further models will be similarly developed.

The experts also reviewed the progress being made on the revision of EN ISO 13606, an international standard for electronic health record communication, which is now in the middle of its five yearly revision cycle. Both CIMI and SemanticHealthNet have made use of the original published standard, and these experts therefore had useful experience contributions to make to inform its review. Some of these inputs will be presented and discussed at a forthcoming joint meeting of CEN and ISO in Japan, in May 2014.

Since SemanticHealthNet has recently developed a draft heart failure shared care patient summary, it was agreed that both initiatives would work together during 2014 to develop a suite of clinical models covering this information, accompanied by ontological semantic patterns. This activity will serve as a case study to refine both approaches, deliver a useful proof of concept result, and may help to establish a case for sponsoring further similar exemplars for other medical conditions in which shared clinical care is most valuable.

Further details of the technical approaches examined during the workshop

During the meeting, the SemanticHealthNet team provided an overview of the project in general and the efforts on specifying and implementing technical solutions to improve semantic interoperability, in particular. The rationale of using ontologies to represent clinical information semantics was explained as well as their role in an interoperability scenario, where they can act as mediators of meaning across the existing heterogeneous EHR representations (based on EHR standards / specifications and medical terminologies). The importance of creating clinical models underpinned by a formal ontological model was highlighted in order to be able to use EHR standards and medical terminologies in a consistent way.

Semantic patterns (also named ontology content patterns) were introduced as intermediate representations to bridge between present clinical models and their semantic representation, guiding and facilitating their mapping.

Semantic patterns aims at hiding the ontology complexity and offering a more familiar interface to EHR modellers, used to work with clinical models such as archetypes, detailed clinical models, etc. Some examples of their use to encode some clinical models information was presented as well as the advantages they offer in an interoperability scenario, where EHR systems record information at different level of detail.

Further exploring the relationship between CIMI patterns (clinical models) and SHN semantic patterns and clarifying their differences and commonalities as well as their interaction is an important goal that is currently pursued by experts from both communities.

About SemanticHealthNet

SemanticHealthNet is developing a scalable and sustainable pan-European organisational and governance process for the semantic interoperability of clinical and biomedical knowledge, to help ensure that EHR systems are optimised for patient care, public health and clinical research across healthcare systems and institutions.

Through a clinically-driven workplan, exemplified in cardiovascular medicine, SemanticHealthNet captures the needs for evidence-based, patient-centred integrated care and for public health, encapsulating existing European consensus in the management of chronic heart failure and cardiovascular prevention. Experts in EHR architectures, clinical data structures, terminologies and ontology are combining, tailoring and piloting their best-of-breed resources in response to the needs articulated by clinicians and public health physicians.

The project will generalise and formalise the methods and best practices in how to combine and adapt informatics resources to support semantic interoperability, and how these can be developed and supported at scale. Health authorities, clinical professionals, ministries, vendors, purchasers, insurers are involved to ensure the project approach and results are realistically adoptable and viable, building on the SemanticHEALTH and CALLIOPE roadmaps.

A business model to justify strategic investments, including the opportunity costs for key stakeholders such as SDOs, industry, will be defined. This, and links with epSOS II and the eHealth Governance Initiative, will inform the shape of the Virtual Organisation that this Network will establish to sustain semantic interoperability developments and their adoption.

The consortium comprises more than 40 internationally recognised experts, including from USA and Canada, ensuring a global impact.

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About CIMI

The Clinical Information Modeling Initiative (CIMI) is an international collaboration that is dedicated to providing a common format for detailed specifications for the representation of health information content so that semantically interoperable information may be created and shared in health records, messages and documents. CIMI members recognize a multipolar world of health informatics and are dedicated to a shared vision of universally implementable clinical information models.

CIMI is committed to making these specifications available in a number of formats, beginning with the Archetype Definition Language (ADL) from the openEHR Foundation (ISO 13606.2) and the Unified Modeling Language (UML) from the Object Management Group (OMG) with the intent that the users of these specifications can convert them into their local formats.

CIMI specifications will be freely available to all. The initial use cases will focus on the requirements of organizations involved in providing, funding, monitoring or governing healthcare and to providers of healthcare IT and healthcare IT standards as well as to national eHealth programs, professional organizations, health providers and clinical system developers.

Further information

SemanticHealthNet home page: <http://www.semantichealthnet.eu>

CIMI wiki site: http://informatics.mayo.edu/CIMI/index.php/Main_Page