



SemanticMining

NoE 507505

Semantic Interoperability and Data Mining in Biomedicine

Deliverable 25.1

Concept Systems for Laboratory Medicine

Delivery date: month 11

Report Version: 1

Report Preparation Date: 2004.12.20

Dissemination level: RE

Associated work package: WP25

Lead contractor:

LiU-cNPU, prof Urban Forsum, Linköping University

Project funded by the European Community under the FP6 Programme "Integrating and Strengthening the European Research Area" (2002-2006)



Table of Content

ADMINISTRATIVE INFORMATION	1
SUMMARY	1
1 OVERVIEW	2
1.1 Objectives	2
1.2 Milestones	2
1.3 Project meetings	2
1.4 Deviations from Plan	3
2 MAIN RESULTS	3



Administrative information

Lead contractor/partner for WP/Deliverable: LiU-cNPU, Linköping University

Author list: prof Urban Forsum, PhD Daniel Karlsson

Summary

The work package is meant to provide a forum for researchers developing connectivity between biobanks, analytical laboratory medicine and the electronic health record. The first phase of the project focus on ways of interaction between the c-NPU and LOINC in meeting communication and laboratory needs for systematic and metrological correct nomenclature in describing and communicating properties in laboratory medicine.



1 Overview

1.1 Objectives

<i>Objectives</i>	<i>Progress towards achieving objectives</i>
The work package is meant to provide a forum for researchers developing connectivity between biobanks, analytical laboratory medicine and the electronic health record.	Ongoing activities: to work out ways of interaction between the c-NPU and LOINC in meeting communication and laboratory needs for systematic and metrological correct nomenclature in describing and communicating properties in laboratory medicine.

1.2 Milestones

<i>Milestone</i>	<i>Planned date</i>	<i>Actual date</i>	<i>Comments</i>

1.3 Project meetings

<i>Meeting</i>	<i>Planned date</i>	<i>Actual date</i>	<i>Comments</i>
Regular, monthly project meetings, Linköping University			
Meeting on Terminology in Laboratory Medicine November 2004, at the Regenstrief Institute University of Indiana. Attending: Daniel Karlsson, Urban Forsum, Clem McDonald, Gill Hill and Stan Huff.		November 22-26	Purpose: to discuss and work out ways of interaction between the C-NPU and LOINC in meeting communication and laboratory needs for systematic and metrological correct nomenclature in describing and communication properties in laboratory medicine.



1.4 Deviations from Plan

<i>Causes and Description</i>	<i>Corrective actions</i>

2 Main Results

The first phase of the project is orientated on ways of interaction between the C-NPU and LOINC in meeting communication and laboratory needs for systematic and metrological correct nomenclature in describing and communication properties in laboratory medicine.

Pertinent issues worked on and summarised in a November meeting with representatives from C-NPU (Europe) and LOINC (USA):

The C-NPU database (<http://dior.imt.liu.se/cnpu/>) is upgraded as of November 20004 with codes for the most common properties used in Clinical Chemistry using mass concentrations, codes for Clinical Molecular Biology and for Transfusion Medicine and Immunoheamatology. The generic C-NPU database is the property (intellectual content and the physical database) of IFCC and IUPAC. This statement is to be seen in the light of the twofold purpose of the coding scheme endeavour: the generic database should be a permanent record of codes and systematic names for properties useful in Laboratory Medicine with a high degree of metrological correctness and secondly the content of the generic database must be published for use in IT-communication and LIS's around the world. The second part of the statement means that the publishing endeavour can be (should be) different from the generic database and that any way of effectively using the C-NPU codes in coding schemes for Laboratory Medicine is laudable since it fosters the use of properties expressed in a systematic way and in accordance to metrology.

The general acceptance of the LOINC coding scheme in the western hemisphere and many countries around the globe and on the fact that LOINC has been chosen as the preferred coding scheme by most of the large referral laboratories in the U.S. A five-year federal funding to support the LOINC exists.

The adoption of properties in the C-NPU date base based on mass concentration was well received by the present LOINC proponents as it has been a major obstacles for universal acceptance of the C-NPU coding scheme in countries not customarily using amount-of-substance concentrations in laboratory work.

A main thrust of the LOINC effort is to map information objects to one another using software tools. This results in flat tables of pertinent information without, necessarily a syntax to join the various entries, this is different from the C-NPU approach with a stringent syntax. The information that needs to be represented is collected and mapped to other information needed. This approach does not relay on models of how the real world, its conceptual understanding in the mind of man and its representation should philosophically and logically be structured. The approach is not terminology driven per se but does include, and recognize,



the importance of metrology in expressing properties. This makes the suggested mapping activity (see below) possible.

The mapping of the C-NPU and the LOINC databases item per item was brought up as feasible and as a necessary task. The C-NPU and LOINC representations of properties are different but not without common ground. The C-NPU uses a multi axial approach while the LOINC database is a flat table of fields with specified contents. It was agreed that the C-NPU generic database should be compared for similarity with the LOINC database using the RELMA software tool developed by Regenstrief Institute developers. The outcome was expected to be a list of properties that are represented in the C-NPU and LOINC databases in a mutual exact 1-to-1 relationship, while the other properties needs careful reasoning, property by property, by domain experts and informatics specialist. The task is by all probability huge and personnel recourses and financing was discussed.

The C-NPU and LOINC coding schemes are important in that they contain codes for representing properties in laboratory medicine that can be used to populate future message standards (CEN ENV12264, HL7 RIM v3) and the reusable components (CMET's and GPIC's) of such standards. At present the LOINC is used in the HL7 v2. and populates the coding scheme field of OBX segments. The C-NPU coding scheme is used to populate national (language variants) schemata for expressing examinations in laboratory medicine in Denmark and Sweden. In Switzerland the CUMUL project (based mainly on LOINC codes) is of a similar scope reflecting the need for multilingual representations within one country.

Medical Imaging - In principle the basically narrative report and the image produced during diagnostic imaging should be stored in a suitable digital format and the more "unstructured" narrative part of the report mined for concepts in the narrative that forms strings of words that are central to the diagnostic message. By searching for such strings representing important concepts more systematic ways of formatting the report could evolve.

Implications for C-NPU and the IFCC and IUPAC.

The generic C-NPU database must be a metrological project in the domain of laboratory medicine that is driven by the experts (i.e. IFCC and IUPAC). How to publish the properties in real informatics milieus is a different story that in part depends on cultural and business driven differences on how health care is provided. The LOINC project is perhaps the most successful project for coding laboratory examinations in IT-milieus.