# Terminology & Standards Integration: Development of an Institutional Structured Reporting System

**Fernando Plazzotta[a], Fernando Campos[a], Diego Kaminker[a], Alfredo Cancio[a], M. Florencia Martínez[a], Jerónimo Aguilera Díaz[a], Daniel Luna[a], Enrique Soriano[a], Ricardo García Mónaco[b], Fernán González Bernaldo de Quirós[a]**

*[a] Department of Health Informatics, Hospital Italiano de Buenos Aires, Argentina*
*[b] Department of Radiology, Hospital Italiano de Buenos Aires, Argentina*

**Abstract**

*A structured reporting system was designed to organize the radiological information into knowledge trees. Each one of these trees' concepts is represented in our clinical terminology server. The reports are generated and stored as a Clinical Document Architecture Release 2 including the narrative text, the links to the images, and each finding and observation represented as a coded entry.*

***Keywords:***

Radiology information systems, Methods of documentation, Clinical document architecture, Controlled vocabularies.

## Introduction

Creating radiology reports is one of the most important tasks in a radiology department. These reports contain a wealth of information about the medical condition of patients. However, much of this information is in free text, "unstructured", which makes very difficult any further analysis of this information. Structured reporting systems have additional features that could lead to a significant improvement in the radiological processes. These systems store information in a structured database, which then allows subsequent analysis.

The objective of this work is to describe the development and implementation of a structured reporting system for the Radiology Department and its later use in other reporting specialties, allowing reporting using macros and templates. code this templates and macros into a controlled vocabulary, so the report is auto-coded, and generate standard clinical documents.

## Methods

Hospital Italiano de Buenos Aires (HIBA) is a non-profit health care academic with over 1,500 physicians and a healthcare network of two hospitals with 750 beds (200 for intensive care), 500 home care patients under care, and 23 clinics. . In 1998 HIBA implemented a Healthcare Information System.

Represent the whole radiology knowledge, and after that other specialties, in a single tree is a very difficult task, and is somehow done in RSNA's Radlex®. We wanted to simplify the depth of knowledge trees (KTs) and develop our own knowledge structure by our own radiologists. And as each radiologic specialty has a different vocabulary and definition (granularity), we decided to create as many KTs as needed, with a logic and practical distribution. This way, the KT becomes the center of the system and the information model. When defining their structure we intended to keep three main aspects: keep a hierarchical structure, respect the three level depth and scalability to every reporting department.

## Results

After a 6 month testing and validation period (January - July 2008) we began to structure the information for CT Scans Reports, our first target for implementation in September 2008. The whole process of structuring, testing and reviewing the knowledge trees is a hard and time consuming task, and it took about 2 month for each of the radiology sections (8 sections implemented). In one year we have developed 63 knowledge trees for the whole radiology department. Totally we have 49544 attributes values, which is the same number of text strings and mapped Snomed CT concepts ids.

Once the reporting is done, all the information entered in the system is processed and generates a Clinical Data Architecture Release 2 document, which has the coded entries for all the findings reported in the process, mapped to Snomed CT.

## Conclusions

In our work, as the text inside the report is created in a structured manner, bringing uniformity and structure to the reports allowing future reuse of the different coded entries (statistical analysis, billing, quality control, comparison, follow up, teaching, investment, management, future planning, etc.). This application fulfilled our needs for report structure: narrative text, coded entries, link to the images.