

Chapter X

Modelling in Clinical Practice with Web Services and BPEL

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ABSTRACT

The aim of increasing the quality of health care has led to the development of a number of “guideline” systems whereby clinicians receive assistance in decision making in a given care context—for example in areas such as prescribing or therapeutics. These guidelines range in complexity and functionality from simple textual references through to executable modules which can subsume some of the clinical decision making process. In the latter case, ensuring consistent and interoperable engagement between the guideline engine, clinical information system and patient record can become problematic. Critical areas include vocabulary and terminology (in differing use contexts) and the interfaces and interaction between different sub-systems where traditional approaches have been focussed on tightly coupling of sub-systems and in the generation of special purpose “glue” languages and logic. In this paper, we briefly describe an approach to clinical, information and service modelling. This approach uses tools and techniques gaining increasing acceptance in the e-commerce domain, which shares many of the technical and interoperability problems present in e-health.

INTRODUCTION

Integrating decision-making and computing practices in the clinical environment is a key objective

of health informatics. A key factor in the adoption of new computing practices in clinical contexts is the careful survey of clinical practices and decision-making, in order to design and develop

applications that can be used within accepted practices rather than orthogonal to them.

The Modelling the Clinical Processes of Prescribing (MCPOP) project (Liaw, Morrison, Lewis, Deveny, 2004) uses the FRAMS (Falls Risks Assessment and Management System) methodology, based on expert and professional reference groups and rigorous modelling, to translate clinical practice into computing structures.

In the MCPOP project we faced the requirement to (1) have a model for the underlying patient record systems (2) anticipate a clinical information system for use by a GP (3) refine/extend vocabularies and term-sets for use in the project domain (4) elucidate and define “best practice” in prescribing for asthma through researching an appropriate clinical process/workflow model, and (5) define interfaces to services such as guideline systems, decision support systems or terminology/taxonomy services.

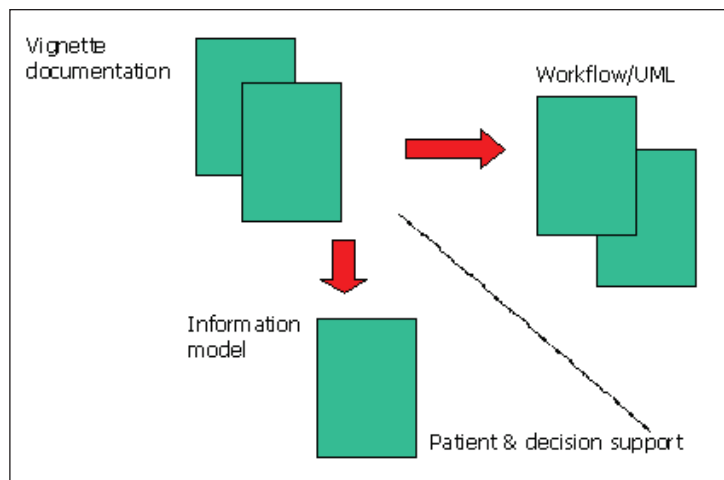
In this paper we will focus mainly on the last two requirement areas. Their more generic features are shared by many similar projects in the domain.

As a precursor from requirements (1-3), we note that we used the general practice data model (GPDM) (General Practice Computing Group,

2000) as our underlying information model for the Clinical Information System. The GPDM is a patient-centric data model developed in Australia following wide stakeholder representation. At the level of clinical data (transactions/events) it has much in common with openEHR/CEN13606 but lacks the management and organising structures of that emerging standard.

We translated the GPDM Entities and Data Elements into accessible electronic forms including UML and XMI to produce a base structure. These were then imported into two tools for further modelling, instantiation and development. We used Eclipse for Java-based development (with the eclipse modelling framework) and Protégé, a Knowledge Engineering Tool developed at Stanford Medical Institute and in use in a number of existing Health Informatics Projects, as a decision support aid. By using Protégé, we obtain the capacity to also capture instance (patient) data and a means of researching decision support artefacts through its built-in query language and constraint modelling plug-ins, without committing to prior application software development. Protege also has a Java API and through its XML-based persistence mechanism (ontology and instance data) and also Java-XML Binding (JAXB), we are able to export

Figure 1. Modelling outputs



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