

# Chapter 7

## Computerisation of Clinical Pathways

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### ABSTRACT

*Patient safety incidents are becoming more common in medical situations. The challenge of achieving significant improvements in patient safety is one of the key tasks facing healthcare at the start of the 21st century. Clinical pathways and clinical guidelines provide a measure of standardisation to help reduce medical error, but are often manually created and also prone to human error. This chapter explores the error issues regarding clinical pathways. It presents a method for generating clinical pathways from a semiotic perspective that can address social and informal/safety factors which conspire to influence the outcome of patient interaction and safety.*

### 1. INTRODUCTION

Large numbers of people continue to be successfully cared for and treated in the National Health Service, but a significant number of errors and other forms of harm occur. It is calculated that around 10% of patients admitted to NHS hospitals are subject to a patient safety incident and that up to half of these incidents could have been prevented

(Chang, Schyve et al. 2005). Increasing costs of health care, fuelled by demand for high quality, cost-efficient health care has propelled hospitals to restructure their patient care delivery systems. One such systematic approach is the adaptation of an engineering project management methodology, the critical path method (CPM), as a tool to organise, standardise and improve the quality of healthcare delivery and hence patient outcomes (Yang, Liu et al. 2010). Clinical Guidelines (CG) are developed as a standard way to manage medi-

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cal activities since the 1980's and are structured multi-disciplinary care plans or medical processes in which diagnostic and therapeutic interventions performed for a particular diagnosis are described.

However, the application and adaptation of CGs in local hospital setting, inevitably has some limitations of process management in practice. Despite the benefits, there are many instances which show that CGs fail to offer a clear description of activities, conditions, sequence and authorities of action of a care process. Therefore current application of CGs cannot very well handle situation where decisions are made solely on human judgement and do not specify a facility for specifying how decision making (exceptions) can be handled. This issue is mostly related to healthcare settings where processes are complex, less structured and are made up of social agents such as physicians, departments with goals that they actively pursue in constant interaction with a network of other social agents (Mould, Bowers et al. 2010). Healthcare settings are dynamic networks of interrelated activities. As a result, current adaptation of CGs becomes a source of patient safety incident (Carthey 2010). Viewing errors as the result of poorly designed systems more so than incompetent or misguided individuals introduces variables that operationalize dynamics seen process management levels. Workflow management has been cited as potentially important in addressing medical errors and patient safety in many publications like the "To Err Is Human" and "Crossing the Quality Chasm" (Corrigan 2005). For example, "To Err Is Human" places at the core of a successful systems-based approach to reducing error the need for a strong patient-safety culture, simplified process design, development of clear work flow of activities and use of patient-centric modelling approaches in adaptation of CGs to local settings (Carthey 2010).

The proposed modelling approach to generation of Clinical Pathways (CP), adopts organisational semiotics to capture and represent the CG knowledge by determining the underlying semantics and the relationship between agents and

their patterns of behaviour. We use Norm Analysis Method (NAM), one of semiotics methods (Stamper, Liu et al. 2000) to extract and analyse patterns of care activities and informal safety norms that affect patient safety outcomes. NAM identifies responsibilities and rules that govern human behaviour in an explicit and articulate manner. It recognizes conditions and constraints of the actions driven by their responsibilities. The extended method aims to enable the generation of CP from a semiotic perspective by capturing all necessary knowledge from syntactic level to social level and guiding the modelling of clinical pathways using Business Process Modelling Notation (BPMN) best practice (Aguilar-Saven 2004). The extended method adopts a socio-technical approach to map informal safety norms in to CP. This will result in a rigorous control over the process of care ensuring completeness, consistency and comprehensiveness of clinical pathway knowledge representation.

## **2. PATIENT SAFETY**

The challenge of achieving significant improvements in patient safety is one of the key tasks facing healthcare at the start of the 21st century. There is broad international agreement on the nature of the task faced and the importance of achieving improvements to quality in this area.

Large numbers of people continue to be successfully cared for and treated in the National Health Service, but a significant number of errors and other forms of harm occur. It is calculated that around 10% of patients admitted to NHS hospitals are subject to a patient safety incident and that up to half of these incidents could have been prevented (Vincent et al., 2001; NPSA, 2004). The Department of Health Expert Group in June 2000 estimated that over 850,000 incidents harm National Health Service hospital patients in the United Kingdom each year. On average forty incidents a year contribute to patient deaths in

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