Chapter XI

Web-Enabled Integration of Patient Data and Clinical Guidelines for Coordinated Care

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INTRODUCTION

A variety of forces are encouraging change in the healthcare systems of developed countries. Chief among these is perception of high (and rising) cost. The arsenal of tests, medications and procedures at the hands of Western medicine is ever-increasing. This, in concert with an aging population, has brought the health expenditures in the U.S., EU, Japan and Australia edging to just under 10% of GNP. Furthermore, there is concern about waste of resources, principally through lack of coordination between healthcare facilities resulting in redundant investigations. A more subtle force comes from the rise of evidence-based medicine (EBM), as illustrated, for instance, by the extensive consolidated clinical reviews of the Cochrane Collaboration. EBM highlights that typical medical practice is not necessarily efficient or effective in all cases as compared to well-established findings of randomized controlled trials (e.g., Sydney GPs have been observed to over-prescribe antibiotics, which is both a waste and a community health hazard [Bolton et al., 1996]).

Happily, as motivations for change rise, we see the emergence of technologies with great promise for implementing solutions. The most obvious of these is of course Web technology. Cimino et al. (1995) illustrated (at a time that can now be considered early in the brief history of the Web) that intranet-based Web technology could provide a breakthrough in ease of integration of legacy information systems within a hospital environment, and thus be the basis for innovative clinical workstations within the hospital walls. More recently Cimino et al. (1998) have illustrated technical solutions to control the security and confidentiality risks associated with external access to the hospital intranet data. Moreover, as one uses an intranet for integration of patient data, they can simultaneously access internal (intranet) and/or external (Internet) decision support resources (such as access to Medline illustrated by Cimino et al., 1995).

Given that we have the technical means to make patient data and clinical decision support knowledge available, we are now left with a design problem: how to devise clinical
workstation environments that leverage the available information resources and engender a superior process of patient care. Of course, many subsidiary questions follow from this framing of the design problem. Just what patient data do we collect and share? What decision support guidance is most important? What exactly might be a superior process of care? And who, if anyone, controls this process?

In this chapter, we describe the Care Plan On Line (CPOL) system, which provides clinical guidance to general practitioners (GPs) tailored by the electronic patient record. CPOL supports the SA HealthPlus Coordinated Care trial, enrolling 4,500 chronically ill South Australians across a range of disease-specific projects. The architecture leverages a central database that integrates diverse data sources to form a disease-specific, purpose-built chronic care record. CPOL provides an intranet gateway to this record and integrates it with clinical guidelines compiled for SA HealthPlus by focus groups to give contextualised decision support. CPOL helps the GP to consider the latest evidence-based thinking to devise a holistic and proactive plan of services. Furthermore, the guidelines have a transparent and layered structure that encourages the GP to ‘opt in’ on the HealthPlus care rationale. The architecture allows profound central modification of guideline and patient record elements without modification to the client installations.

The objectives of this chapter are:

• To illustrate the features and principles of clinical user interface design wherein patient data and practice guidelines are integrated with one another and with the model of care;
• To describe the technical architecture of the CPOL system that realises such integration;
• To describe the SA HealthPlus model of Coordinated Care as a concept of interest in its own right for its GP-controlled, patient-centred approach to proactive care of the chronically ill; and
• To emphasise the power of Web/intranet-based systems to focus data, decision knowledge and control on particular health professionals (in this case chiefly the GP) to suit the requirements of a given theory of patient care.

CLINICAL GUIDELINES AND DECISION SUPPORT

David Eddy of Kaiser Permanente has said (1990) “All [evidence] confirms what would be expected from common sense: The complexity of modern medicine exceeds the inherent limitations of the unaided human mind.” Ergo, there is an opportunity to improve medical practice by appropriate provision of practice guidance to support clinical decision making.

Lam (1994) defines practice guidelines as statements that recommend appropriate practice of patient care for specific clinical circumstances. Leape (1990) puts forth the more specific definition that practice guidelines are standardized specifications for care developed by a formal process that incorporates the best scientific evidence of effectiveness with opinions of experts in the fields. Wide variations in clinical practice exist, for example:

• In Vermont, rate of removal of tonsils during childhood varied from 8% to 60% between communities (Eisenberg, 1986);
• In Maine, regional differences in prostatectomy rate for men under 85 can vary from 15% to 65% (Wall, 1993);
Medical Data Analytics in the Cloud Using Homomorphic Encryption
www.igi-global.com/chapter/medical-data-analytics-in-the-cloud-using-homomorphic-encryption/138429?camid=4v1a