



**Workshop:
Patient Centered (Health) Care Solutions**

**Development of an Expert System for Distinguishing Headaches
from Migraines**

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Abstract

Information and communication technologies, and new governmental directives that have been implemented by academic and private health science centers, are paving the way for a new era of patient-centered care in the United States. As quality of care becomes a major focus in the 21st century, U.S. healthcare research has begun to address, and more accurately assess, the nature of medical error in the U.S. Healthcare System. These errors are alarmingly common, costly, and often preventable [Kohn, et al., 1999]. Implementing automated error-checking information systems has shown a marked improvement in reducing error incidence [Kopec, et. al, 2003]. This paper will describe one internet-based application that was developed with the objective of reducing the incidence of medical error(s) in health care practice.

Headaches in a variety of forms are one of the most common areas of complaint presented to the clinician. The International Headache Society has proposed a classification scheme for headaches; but the rules to diagnose migraines seem to be oversimplified (Olesen 1998; Troost, 2002). A Web-enabled application to distinguish between migraines and headaches, using more sophisticated rules, could provide physicians and patients with a powerful diagnostic tool. Access to a well-established knowledge base could help to reduce potential errors in diagnoses.

We have designed and developed a prototype expert system to aid physicians in the diagnosis of a migraine. We have identified the essential questions that are necessary for building an expert system that distinguishes migraines from headaches. The application includes a data collection form, Expert System Shell (CLIPS) and program with appropriate rules, written in the CLIPS language.

Telecommunication can be used to disperse expert knowledge in the healthcare domain. Currently, many healthcare data systems have been developed around the world with varying degrees of success. Many of these have been stand-alone applications, which create disparities for those in rural or remote locations who cannot benefit from the technology. This research will explore how new and emergent technologies like telemedicine can engender this evolving field of healthcare informatics.

References:

Kohn, L. T., Corrigan, J. M., Donaldson, M. S., et al. To err is human: building a safer health system. Institute of Medicine, Committee on Quality of Health Care in America. Washington, D.C.: National Academy Press, 1999.

Kopec, D., Kabir D., Reinharth, D., Rothschild, O. , Castiglione, J.). Human Errors in Medical Practice: systematic classification and reduction with automated information systems Journal of Medical Systems (Florida), Plenum Publishers, August, 2003.

Olesen, J. Classification and diagnostic criteria for headache disorders, cranial neuralgia, and facial pain. Cephalalgia Headache Classification Committee of the International Headache Society. (1988); 8 (suppl 7):1-96. Available at: <http://www.i-h-s.org>.

Troost, T. M.D. Migraine and other Headaches, Wake Forest University School of Medicine (2002). Available at: <http://imigraine.net/migraine/intro.html>

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