Understanding Context of Electronic Messages Between Diabetes Patients and Physicians

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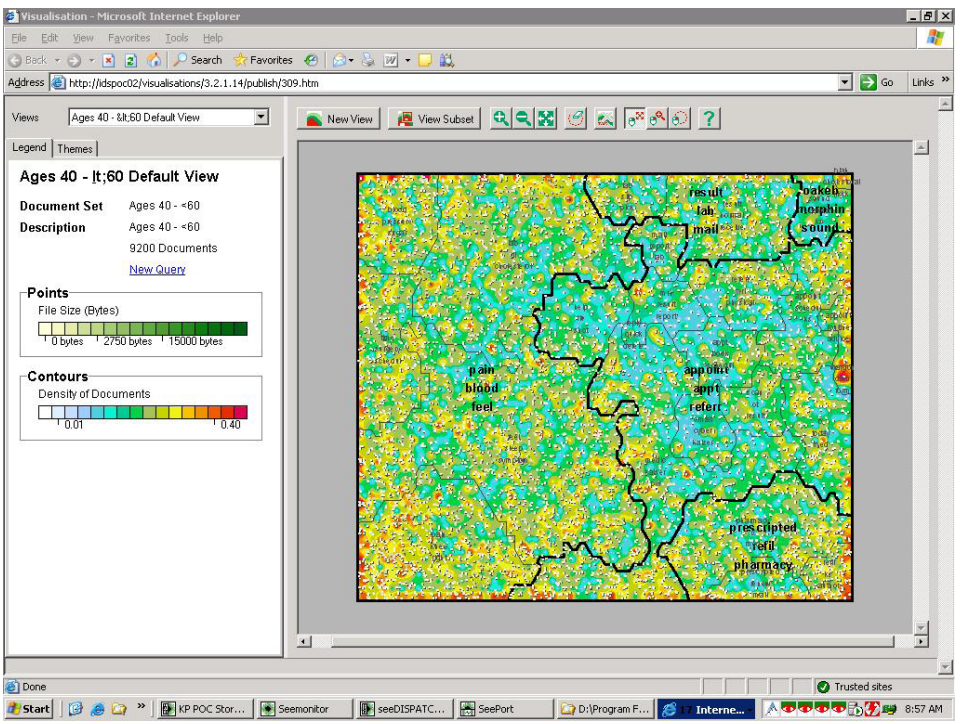
One of the first articles to discuss online delivery was Jerome Kassirer's editorial to New England Journal of Medicine in 1995, where he foresaw the internet as next transformation in the delivery of health care. The application of information and communication technology in healthcare has since grown exponentially over the last 15 years and its potential to improve effectiveness and efficiency has been recognized worldwide. Internet use has grown exponentially over the last decade and consumers' searching healthcare information has become a large part of the phenomenon (Baker, Wagner et al.2003; Ferguson 2000). Bundorf et al. (2006) suggested that the emergence of the Internet as a new media for health information provides a new impetus to study the determinants of demand for health information. A study from anadian shows that 10% to 15% of all patient encounters with primary care physicians involve patients who have already consulted sources on the Internet (PriceWaterHouseCoopers 1999). Remote patient management technology will change the way patients are treated, operated on, monitored and counseled. If patients could communicate with physicians or be monitored through the Internet, more than 20% of in-office visits could eliminated, according to respondents the PriceWaterHouseCooper survey (1999). The survey also concluded that more than 30% physicians' time will be spent using web-based tools by 2010.

Patient-physician messaging, email over secure connection is increasingly used to improve communication between patients and physicians. The Institute of Medicine identified email as valuable tool for flexible consulting and speculated that "instead of a $65 office visit and a half-day of work, a 2 minute email communication could meet many patients' needs more respectively and at a lower cost". Chronic patient care requires frequent communication that is often routine in nature. The asynchronous nature of online consultation also renders it more acceptable and efficient from the provider perspective than other remote but synchronous means of communication such as the telephone. Brown (2004) found that patients tend to be much more enthusiastic about messaging than their physicians, particularly for simpler issues. One particular study showed that patients also preferred messaging for more complex issues; perhaps owing to a particularly long waiting list for appointments. This research presents some core findings from an extensive statistical and contextual evaluation of patient-physician messaging on chronic patient care.

This paper is a part of an extensive research, where our overall objective is to understand the implications of messaging service to provider efficiency and use of resources. We wish to map the intervention's effects to patient care processes and use of different communication medias. From earlier results of studying the

Figure 1. Self organizing map (SOM) of the patient messages



same cohort we know that online messaging replaces communication in via other channels such as telephone and visits to the office. The objective of this paper is to analyze the nature of messages sent via the online channel. This study looks at two specific research questions: 1) What types of requests are submitted by the patients 2) how can the requests be categorized.

A study of 350 diabetes patients is conducted at Kaiser Permanente in Oakland, California. The cohort consisted of self-selected patients using the CyberKaiser system. We combined Electronic Health Record Data, messaging free text data and demographic data for our analysis. Diabetics were selected based on ICD-9 codes. We are using Foundation™ software to analyze the unstructured data of the patient messages and are categorizing the messages manually to 12 different categories (e.g. appointment request, medical advice, lab result interpretation etc.) based on the requests made in them. The software used draws Self Organizing Maps (SOM) from the unstructured data and helps us to find major categories and to identify most used terms in the messages.

Figure 1 presents and example graphic of a Self Organizing Map (SOM) used for the context analysis. However, in-depth analysis of the complexity of the messages required categorizing them by hand. We chose first message of each tread send by the patient within the study period of one year for review. Requests and length are categorized and statistical analysis will be performed on the results.

We are hoping to present significant findings on the nature of messages send via the online messaging services. Context analysis findings and categorization of the requests are expected to advance the future development of these services and answer to some concerns on the messaging as an appropriate media for healthcare communication.

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