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Citation: Randell, R., Mamykina, L., Fitzpatrick, G., Tanggaard, C. & Wilson, S. (2009). Evaluating New Interactions in Healthcare: Challenges and Approaches. Paper presented at the CHI2009 Conference on Human Factors in Computing Systems, 03-04-2009 - 09-04-2009, Boston, MA, USA.

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Evaluating new interactions in healthcare: challenges and approaches

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CHI 2009, April 3 – April 9, 2009, Boston, MA, USA
ACM 978-1-60558-247-4/08/04.

Abstract
New technologies for supporting the provision of healthcare are increasingly pervasive. While healthcare computing previously referred to a desktop computer within the consulting room, we are now seeing an ever broader range of software, hardware and settings. This workshop is concerned with how to conduct evaluations which allow assessment of the overall impact of technology. The workshop will explore challenges and approaches for evaluating new interactions in healthcare. In this paper we outline the goals for this workshop and summarize the issues and questions it intends to explore.

Keywords
Healthcare, evaluation

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction
New technologies for supporting the provision of healthcare are increasingly pervasive and we are now seeing an ever broader range of software, hardware and settings. While previously IT was predominantly based in the consulting room, clinicians now have

access to an increasing amount of information, including electronic patient records (EPRs), via devices such a PDAs, computers-on-wheels (COWs), and tablet PCs (e.g. [6, 10]). The mobility of these devices means that they can be accessed on wards, by the patient bedside and during ward rounds. Healthcare technologies are also making their way into patients' homes, e.g. as telecare and assistive technology packages, to enable them to take greater control of their health, including in the management of chronic diseases such as diabetes [5].

While previous evaluations of healthcare technologies have focused on certain aspects of the technology, such as specific user interface features, or the impact on certain aspects of individual or group behaviour, such as the time taken to complete a task or communication within a clinical team, or on clinical outcomes, this workshop is particularly concerned with how to conduct evaluations which allow assessment of the overall impact of technology in its context of use. User acceptance is an enduring problem for the introduction of healthcare technologies, suggesting a need for evaluation techniques that allow us to demonstrate to potential users a clear benefit.

The introduction of healthcare computing applications involves a number of components – technological, social and organisational. If the results of an evaluation are to inform wider implementation, it is necessary to not only know whether or not an application brings benefit but also to know the nature of the components and the specific context in which it was introduced [8]. As healthcare computing increasingly moves away from the desktop, into hospital wards and patients' homes via mobile technologies, additional challenges to evaluation arise. For example, current evaluation reports on homecare technologies focus largely on clinical outcomes [3] but ignore aspects of the lived experience of the technology and its social acceptability and fit into domestic life or its impact on community care processes [2]. While progress has been made in HCI in developing evaluation methods for such challenging settings (e.g. [7]), we are interested in how these can be interpreted for healthcare settings and incorporated into coherent evaluation methodologies which allow assessment of the overall impact of healthcare technologies. Lack of recent discussion of evaluation methodology within CHI has been noted [1]; we hope this workshop will reignite debate on this topic within the specific context of new healthcare technologies.

Workshop goals

The goals for this workshop are as follows:

- To provide an opportunity for HCI researchers to share and learn from each other's experiences of evaluating new healthcare technologies.
- To elaborate the challenges in the evaluation of new healthcare technologies.
- To understand how these issues play out in different settings, e.g., hospital and home.
- To explore how existing methods of HCI evaluation could be adapted and expanded.
- To work towards an agenda for the evaluation of new technologies in healthcare, identifying key components of the intervention to be studied, appropriate processes and outcomes to be reported, and methods for doing so.

- To develop a community of HCI practitioners to take the agenda forward.
- To draw together the discussions that emerge from the workshop to be disseminated to the HCI community through a special journal issue.

While the specific issues to be addressed in the workshop will be determined by the paper submissions, we outline below some potential issues to explore, arranged according to the broader questions of what, how, who and where.

Workshop questions

What?

The components of a healthcare technology intervention include the type of hardware, the functionality provided by the software, particular interface features, the physical configuration of the hardware, the aesthetic design of the device, the training provided, and the organisational culture. Is it necessary to explore the impact of all of these components? If not, which should take priority? What other components should we consider? How can we understand the impact of these different components? Should we be testing multiple designs in order to, for example, understand the benefits of different interface features [11]?

Looking at the impact of the technology, how do we determine appropriate process measures and patient outcomes for systems, such as EPRs, that do not have an easily visible and quantifiable relation to patient care? Or that have a clear quantifiable relation to patient care but more subtle yet critical experiential aspects that are critical to their acceptability and success?

How?

The choice of evaluation methodology must arise from and be appropriate for the problem or research question under consideration [4]. Should we use quantitative or qualitative approaches, or a combination of the two? CHI is currently dominated by quantitative empirical evaluations [1] but new healthcare technologies may result in consequences more subtle than expected and difficult to capture quantitatively [12]. What is the relevance of expert evaluation, and who constitutes an 'expert' in this context? Are there methods from other domains that could be usefully adapted for the evaluation of new healthcare technologies, e.g. from health services research?

Who?

New healthcare technologies may be designed for either clinicians or patients, or they may be designed for clinicians and patients to use together. Where technologies designed for clinicians are used when interacting with patients, to what extent should we be paying attention to the experience of the patient and the impact on interaction and communication? Are there other groups of 'users' that we also want to consider? For example, if a technology is being used in the home, the extended family is likely to be involved.

What role do we want to give users in the evaluation? Where we have multiple users and multiple interpretations of the system, how do we draw these together to provide an overall assessment [9]?

A review of CHI evaluations highlights a decrease over time in the number of subjects in quantitative empirical studies [1]. What are the challenges in recruiting participants to evaluation studies of new healthcare technologies and how could these challenges be overcome? How do we determine an appropriate 'sample size' for such evaluations?

Where?

Evaluating new healthcare technologies in the context of use can be difficult but evaluation strategies that fail to do this may not succeed in gauging the true impact of the technology [13]. What are the challenges of evaluating technologies in home settings and what approaches can we use to overcome these challenges? What is the potential of lab based studies for evaluating new healthcare technologies? Traditional HCI evaluation is appropriate for settings with well-known tasks and outcomes [4]; how do we develop appropriate tasks and how can we judge their success?

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