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Safety of Health Information Technology: Identifying and Mitigating Risks

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Abstract. This EFMI HOFMI WG Workshop will address following topics: the occurrence and causes of risks of health information technology (HIT) as a complex sociotechnical system and its potential effects, the challenge of improperly designed human-computer interaction and human-centered design issues and strategies to mitigate risks of health IT.

Keywords. Health information technology; Risk; Adverse effects; Human-centered design

1. Background

Health information technology (HIT) if poorly designed, implemented or used may pose a risk to patient safety [1-5]. HIT is broadly defined as, "hardware or software that is used to electronically create, maintain, analyze, store, receive, or otherwise aid in the diagnosis, cure, mitigation, treatment, or prevention of disease, and that is not an integral part of (1) an implantable device or (2) medical equipment" [6].

An understanding of the causes, consequences and outcomes of safety problems is critical to identifying and mitigating risks associated with HIT. A patient safety incident is an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient. The reporting of patient safety incidents is now widespread and is regarded as a "cornerstone" of initiatives to improve patient safety [7]. Analysis of narratives about adverse events and near misses should inform policy and practice for safer care. It is important to note that incident reports do not yield true frequencies of adverse events because they do not capture numerators or denominators, and are subject to bias from a number of sources [8]. Nevertheless, with large collections of inci-

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dents, characteristic profiles may be identified, allowing incidents to be aggregated and analyzed[9]. Incident reports provided by healthcare professionals have been shown to be useful in examining the risks and harm caused by HIT [10-12].

In terms of human factors analysis usage adopting a user-centered approach to the design of HIT, incorporating iterative usability evaluations, might prevent errors [13]. This is for example a EU requirement for the design of medical devices, effective since March 2010. Another approach of mitigating usage errors is to focus on specific dimensions impacted by the implementation of HIT, such as collaborative work between clinicians.

Finally the workshop will address broad strategies to mitigate risks, based on the notion that in the complex socio-technical systems such as HIT preventive action is not always possible, but that fast response to incidents may be more effective. The strategies are based on the concepts of risk causation, the mitigation of unintended consequences HIT and barriers towards safe HIT [14, 15].

This workshop will focus on a scientific discussion amongst professionals to examine the safety of HIT. As human and organizational factors are closely linked with many of the safety problems of HIT, this workshop has been designated as an EFMI Working Group on Human and Organizational Factors in Medical Informatics event.

2. Goal of the workshop

The overall goal of this workshop is to examine ways of improving the safety of HIT. We will focus on:

a. The application of incident reporting, human computer interaction and field studies for understanding the causes, consequences and outcomes of safety problems with HIT (Farah Magrabi),
b. Human-centred design to reduce use related risks (Marie-Cathérine Beuscart-Zéphir and Christian Nøhr),
b. General strategies for mitigating risks of HIT (Jos Aarts).

3. Format and speakers

The workshop will be conducted in three parts. Part 1 will focus on the use of incident reports as a critical resource for understanding how and why incidents occur. In part 2 we will focus on design issues taking into account. Part 3 will address the general strategies.

Speakers will give a 10-minute slide presentation summarizing the state of the art in their topic area. In their last slide each speaker will present a list of questions to stimulate a 10-minute discussion. The goal of these discussions is to identify gaps and areas for further work. We expect an audience of 10-20 people. FM and JA will document the discussions; JA will moderate and summarize the group work and the overall results from the workshop discussion.

4. Expected achievements and outcomes

The outcome of this workshop will be an outline and structure of a status paper on methods to identify and mitigate risks arising from poor design, implementation and use of HIT. At the conclusion of the workshop the authors will meet to review the findings.

Statement of participation: All authors have agreed to take part in this workshop.

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