Process Oriented Information Systems in Health Care

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NTNU – IDI/NSEP
HelsIT 17/9/2013

Wednesday, September 25, 2013

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Trondheim, Norway

ELSEVIER

International Journal of Medical Informatics 69 (2003) 223–234

International Journal of Medical Informatics

www.elsevier.com/locate/ijmedinf

The mantra of modeling and the forgotten powers of paper: a sociotechnical view on the development of process-oriented ICT in health care

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Abstract

The recognition that restructuring care processes is central to effective and efficient health care will result in the emergence of process-oriented electronic patient records (EPRs). How will these technologies come into being? Within informatics, it is often stated that to informate something, we should first model it. This paper queries whether a detailed modeling of work processes and data flows is the primary step that needs to be completed before such EPRs can be developed or tailored. Building upon a sociotechnical understanding of ICT development, we argue for a reinterpretation of 'models' in such development processes. We do so through a reverse engineering of parts of the paper-based medical record, which has received little attention in medical informatics. In process-oriented EPR design, we argue, modeling should not be conceived as the crucial first step in this design, but rather as an intervention in the organizational change-processes that constitute proper ICT development.

Keywords: Medical records systems; Computerized information systems; Order–communication systems; Software design; Modeling; Computer system development; Organizational innovation; Sociotechnical system development

1. Introduction

In the medical informatics literature as well as within health care organizations, the electronic patient record (EPR) has so far mainly been conceptualized and designed as a data-repository. In such a view, its advantages over the paper record lies first and foremost in its enhanced storage and retrieval functionality, including the ability to provide smart search functions, instantaneous and multi-location access, and the virtual integration of data elements stored in geographically disperse

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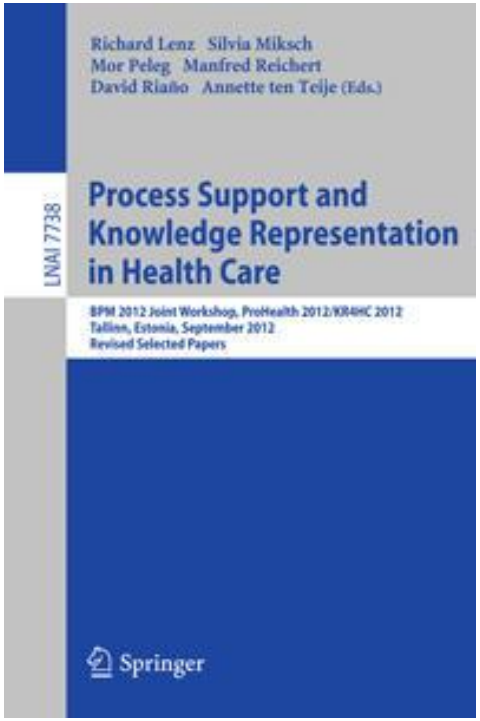
1386-5056/02/$ - see front matter
PII: S1386-5056(02)00178-8

"Moderne IKT-verktøy i helse- og omsorgssektoren bør tilby funksjonalitet for beslutnings- og prosesstøtte. Dette støtter helsepersonells arbeidsprosesser basert på retningslinjer, veiledere, prosedyrer og forskningsbasert kunnskap. Slik funksjonalitet bør være tilgjengelig for helsepersonell via den elektroniske pasientjournalen."



"The emerging situation necessitates computer-based support of healthcare process and knowledge management as well as clinical decision-making."

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Agenda

- What makes it so difficult?
- A tale of two types and three perspectives
- Two research challenges

What are we talking about?

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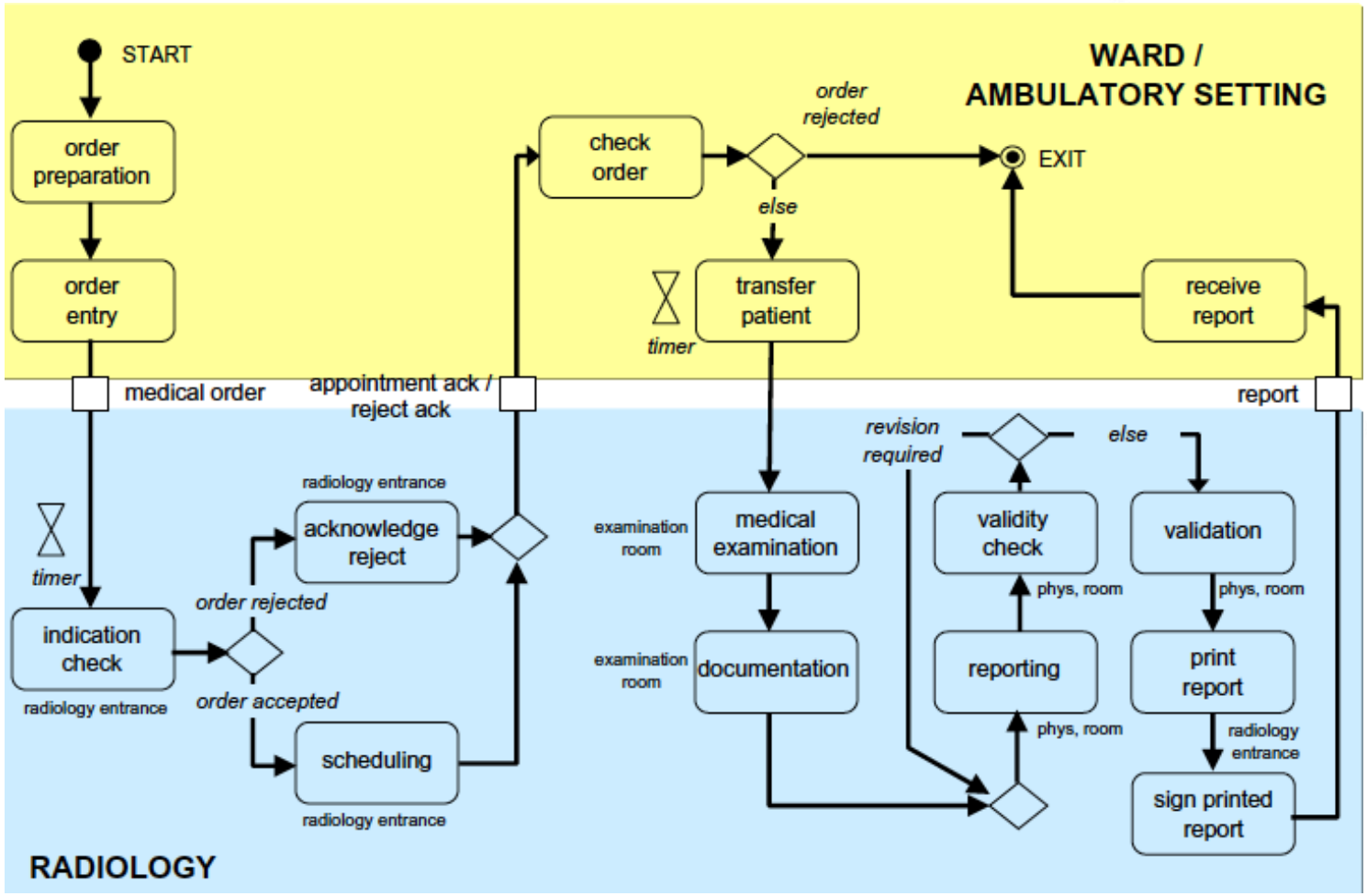
The Tale of Two Types

- Organisational Process: designs the allocation and coordination of work
  - IT issues: functional and data integration of information systems; Workflow management and communication support.
- Medical Treatment Process: designs solving medical problems
  - IT issues: knowledge management; decision support.



From: Lenz, R. & M. Reichert, *IT support for healthcare processes – premises, challenges, perspectives,* Data & Knowledge Engineering 61 (2007) 39-58

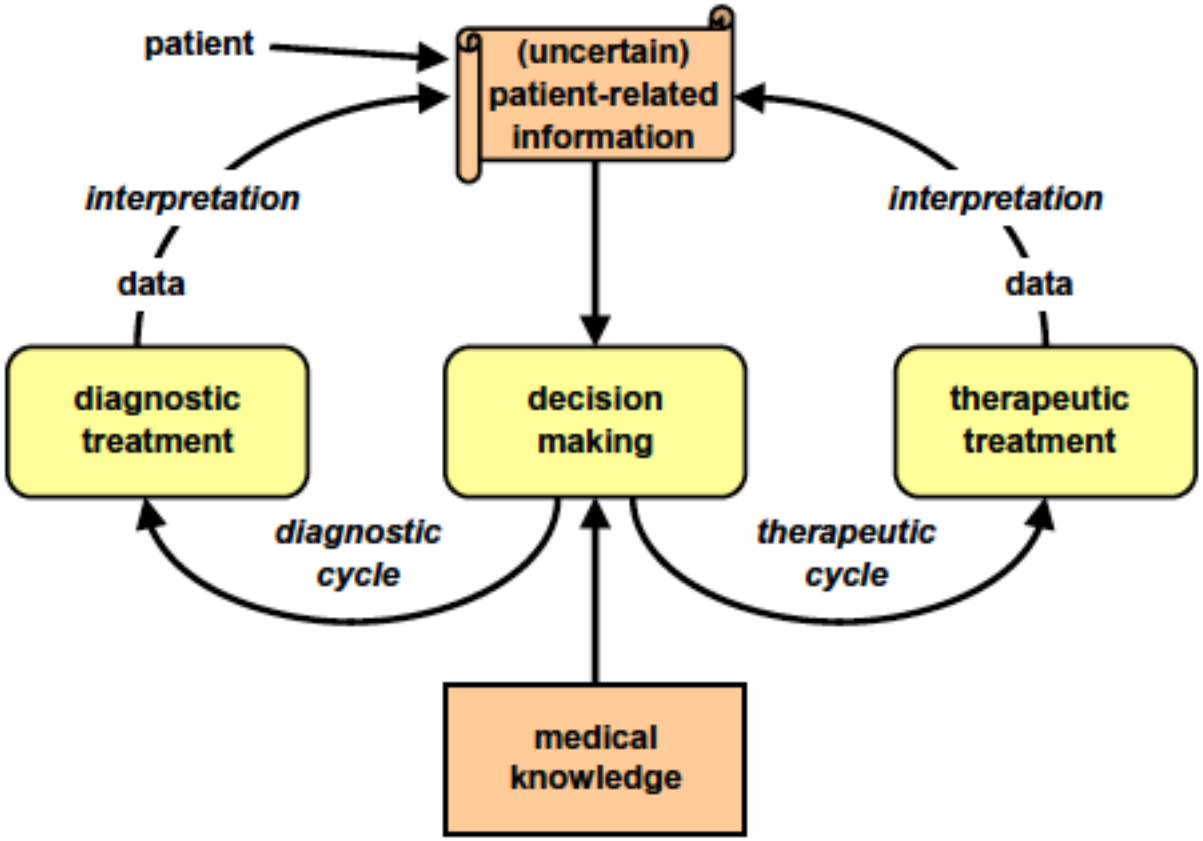


Fig. 2. Diagnostic–therapeutic cycle.

From: Lenz, R. & M. Reichert, *IT support for healthcare processes – premises, challenges, perspectives,* Data & Knowledge Engineering 61 (2007) 39-58

Are the

practice?

Patient example 4: IM from OR 5 to OR coordinator

OR 5 «We are starting to close up the patient in 5 min:0)» 12:08

INTERNATIONAL JOURNAL OF MEDICAL INFORMATICS 82 (2013) 753–761

ELSEVIER

journal homepage: www.ijmijournal.com

Instant messaging at the hospital: Supporting articulation work?

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ARTICLE INFO

Article history:
Received 3 December 2012
Received in revised form 8 May 2013
Accepted 9 May 2013

Keywords:
Instant messaging
Healthcare

ABSTRACT

Introduction: Clinical work is increasingly fragmented and requires extensive articulation and coordination. Computer systems may support such work. In this study, we investigate how instant messaging functions as a tool for supporting articulation work at the hospital.
Purpose: This paper aims to describe the characteristics of instant messaging communication in terms of number and length of messages, distribution over time, and the number of participants included in conversations. We also aim to determine what kind of articulation work is supported by analysing message content.
Methods: Analysis of one month's worth of instant messages sent through the perioperative

Patient example 5: IM communication between OR 5 and OR 2

OR 5 «Harriet Schulenburg, femur fracture. Is she to be positioned prone or supine?» 11:28

OR 2 «prone, if Jake hasn't told you» 12:26

Patient example 1: IM communication between OR 8 and ward 2

OR 8 «Sue White is to be made ready for surgery» 10:22

Ward 2 «Ok, she will be ready in 5 min» 10:31

International Journal of Medical Informatics (2005) 74, 783–790

ELSEVIER

International Journal of Medical Informatics

www.intl.elsevierhealth.com/journals/ijmi

Pilot study of the development of a theory-based instrument to evaluate the communication process during multidisciplinary team conferences in rheumatology

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Received 10 January 2005; received in revised form 22 March 2005; accepted 22 March 2005

KEYWORDS
Team conferences;
Communication process;
Theory;
Information and communication technology (ICT);
Rehabilitation;
Measurement instrument

Summary
Background: Coordinated teams with multidisciplinary team conferences are generally seen as a solution to the management of complex health conditions. However, problems regarding the process of communication during team conferences are reported, such as the absence of a common language or viewpoint and the exchange of irrelevant or repeated information. To determine the outcome of interventions aimed at improving communication during team conferences, a reliable and valid assessment method is needed.
Aim: To investigate the feasibility of a theory-based measurement instrument for assessing the process of the communication during multidisciplinary team conferences in rheumatology.
Method: An observation instrument was developed based on communication theory. The instrument distinguishes three types of communication: (I) grounding activities, (II) coordination of non-team activities, and (III) coordination of team activities. To assess the process of communication during team conferences in a rheumatology clinic with inpatient and day patient facilities, team conferences were videotaped. To determine the inter-rater reliability, in 20 conferences concerning 10 patients

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doi:10.1016/j.ijmedinf.2005.03.016

On the Record: Information and Communication in Medical Contexts — **February 23–27, 2013, San Antonio, TX, USA**

Shared Decision Making Needs a Communication Record

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ABSTRACT
Increasing dependability in collaboration work among health professionals will directly improve patient outcomes, and reduce healthcare costs. Our research examines the development of a shared visual display to facilitate data entry and validation of an electronic record during multidisciplinary team meeting discussion, where specialists discuss patient symptoms, test results, and image findings. The problem of generating an electronic record for patient files that will serve as a record of collaboration, communication and a guide for later tasks is addressed through use of the shared visual display. Shortcomings in user-informed designed, structured data-entry screens became evident when in actual use. Time constraints prompt the synopsis of discussion in acronyms, free text, abbreviations, and the use of inferences. We demonstrate how common ground, team cohesiveness and the use of a shared visual display can improve dependability, but these factors can also provide a false sense of security and increase vulnerability in the patient management system.

Author Keywords
Large Shared Display; Data entry; Validation;

method of patient management, by an MDT, has become the standard of care for cancer patients in the UK, and in most European countries as well as Canada and Australia. Group decision-making in this clinical setting is considered superior to individual decision-making, because i) synchronous review of the results of independent diagnostic processes improves the diagnostic accuracy and overall reliability of the diagnostic process [31], ii) having all of the necessary specialists together is believed to improve the coordination of highly complex treatment protocols, and iii) peer review is conducted in this MDT process. The MDTM forum facilitates collaboration and knowledge is created through the interaction [17].

Communication failures are acknowledged as a leading root cause of medical error [18]. While effective teamwork is considered one of the ways to improve communication and reduce the number of errors, the majority of communication breakdowns occur in verbal communication when patients are being transferred among clinical staff [27]: a practice recognised as a frequent activity at meetings [21], a regular outcome of an MDT discussion, and an acknowledged challenge for researchers in this area [10, 27]. Moreover, inadequate medical record-keeping is known to threaten health care qual-

Medical Treatment processes

Organisational processes

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A Tale of Three Perspectives

- Workflow perspective
  - Computer-Interpretable Guideline systems, Computerized Provider Order Entry systems (CPOE)…
- Information perspective
  - Electronic Patient Records, Registries…
- Communication perspective
  - Electronic Message Exchange, Chat…

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User Centred Networked Health Care
A. Moen et al. (Eds.)
IOS Press, 2011

doi:10.3233/978-1-60750-806-9-359

When Information Sharing is not Enough

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Abstract. This paper explores information sharing in multidisciplinary clinical collaboration between three hospitals. Our study draws on qualitative interviews with surgeons and radiologists in two county hospitals and one university hospital. The analysis shows that the actors shared a restricted amount of information about the patients they have in common and that different actors used the shared information in different ways. However, much communication was still needed to clarify and negotiate the meaning of shared data and its implications for collaborative care. To conclude, while the arguments for a shared information space may appear convincing, the communication practice observed should illustrate that IS also needs to support the communicative process in clinical collaborative work.

Keywords. Shared record, communication support, trans institutional collaboration, aortic aneurysm, surgery, radiology

1. Introduction

The process of planning and subsequent execution of clinical activities, including the coordination of information and transfer of patients, works reasonably well in small clinical units. Actors that are involved in the care of a patient have access to the same clinical information in a shared record system. At the same time, the actors have excellent access to each other, facilitating discussions and negotiations on care issues by allowing less formalized exchange of information. In multidisciplinary contexts, this practice might cause different disciplines to use presumably the same information elements in multiple ways [1].

Most clinical domains are characterized by a steady introduction of new clinical methods and techniques, innovations that must be accompanied by education and more specialized training of the personnel [2-4]. Clinical units that deploy new and improved services by taking sophisticated techniques into use, rapidly find themselves attracting patients from other hospitals. The less innovative clinical units might find a new role as a collaborating and contributing partner. In such situations, collaboration will have to be extended across institutional borders.

Clinical domains characterized by trans-hospital collaboration face particular challenges with regards to achieving efficient clinical information exchange [5]. It has been assumed that establishing shared information spaces will lead to more effective collaboration [6], for example when healthcare actors have to exchange information within or across units to provide patient care. Even if the involved actors get access to

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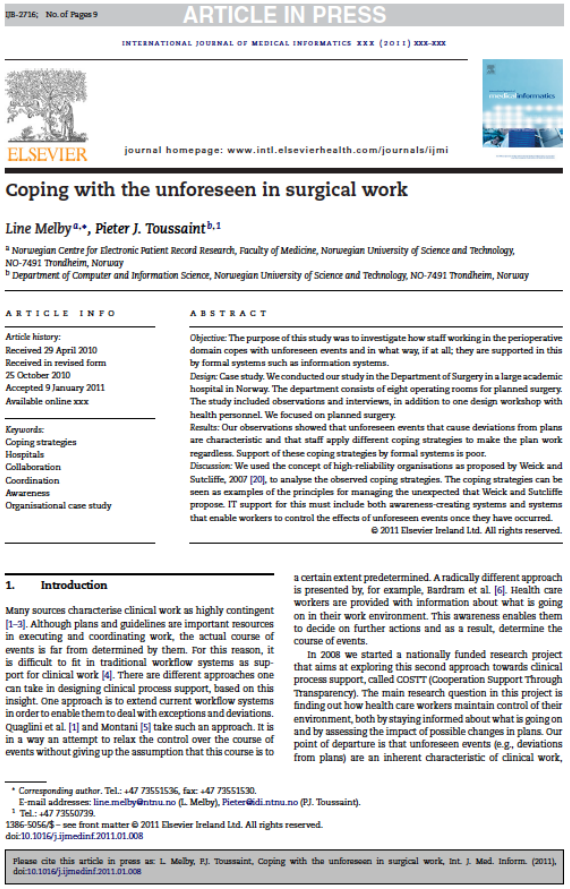

IJB-2716; No. of Pages 9
ARTICLE IN PRESS
INTERNATIONAL JOURNAL OF MEDICAL INFORMATICS XXX (2011) XXX–XXX
ELSEVIER
journal homepage: www.intl.elsevierhealth.com/journals/ijmi

Coping with the unforeseen in surgical work

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ARTICLE INFO

Article history:
Received 29 April 2010
Received in revised form
25 October 2010
Accepted 9 January 2011
Available online xxx

Keywords:
Coping strategies
Hospitals
Collaboration
Coordination
Awareness
Organisational case study

ABSTRACT

Objective: The purpose of this study was to investigate how staff working in the perioperative domain copes with unforeseen events and in what way, if at all; they are supported in this by formal systems such as information systems.
Design: Case study. We conducted our study in the Department of Surgery in a large academic hospital in Norway. The department consists of eight operating rooms for planned surgery. The study included observations and interviews, in addition to one design workshop with health personnel. We focused on planned surgery.
Results: Our observations showed that unforeseen events that cause deviations from plans are characteristic and that staff apply different coping strategies to make the plan work regardless. Support of these coping strategies by formal systems is poor.
Discussion: We used the concept of high-reliability organisations as proposed by Weick and Sutcliffe, 2007 [20], to analyse the observed coping strategies. The coping strategies can be seen as examples of the principles for managing the unexpected that Weick and Sutcliffe propose. IT support for this must include both awareness-creating systems and systems that enable workers to control the effects of unforeseen events once they have occurred.

1. Introduction

Many sources characterise clinical work as highly contingent [1–3]. Although plans and guidelines are important resources in executing and coordinating work, the actual course of events is far from determined by them. For this reason, it is difficult to fit in traditional workflow systems as support for clinical work [4]. There are different approaches one can take in designing clinical process support, based on this insight. One approach is to extend current workflow systems in order to enable them to deal with exceptions and deviations. Quaglini et al. [1] and Montani [5] take such an approach. It is in a way an attempt to relax the control over the course of events without giving up the assumption that this course is to a certain extent predetermined. A radically different approach is presented by, for example, Bardram et al. [6]. Health care workers are provided with information about what is going on in their work environment. This awareness enables them to decide on further actions and as a result, determine the course of events.

In 2008 we started a nationally funded research project that aims at exploring this second approach towards clinical process support, called COSTT (Cooperation Support Through Transparency). The main research question in this project is finding out how health care workers maintain control of their environment, both by staying informed about what is going on and by assessing the impact of possible changes in plans. Our point of departure is that unforeseen events (e.g., deviations from plans) are an inherent characteristic of clinical work,

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1386-5056/$ – see front matter
doi:10.1016/j.ijmedinf.2011.01.008

Please cite this article in press as: L. Melby, P.J. Toussaint, Coping with the unforeseen in surgical work, Int. J. Med. Inform. (2011), doi:10.1016/j.ijmedinf.2011.01.008

Wednesday, September 25, 2013

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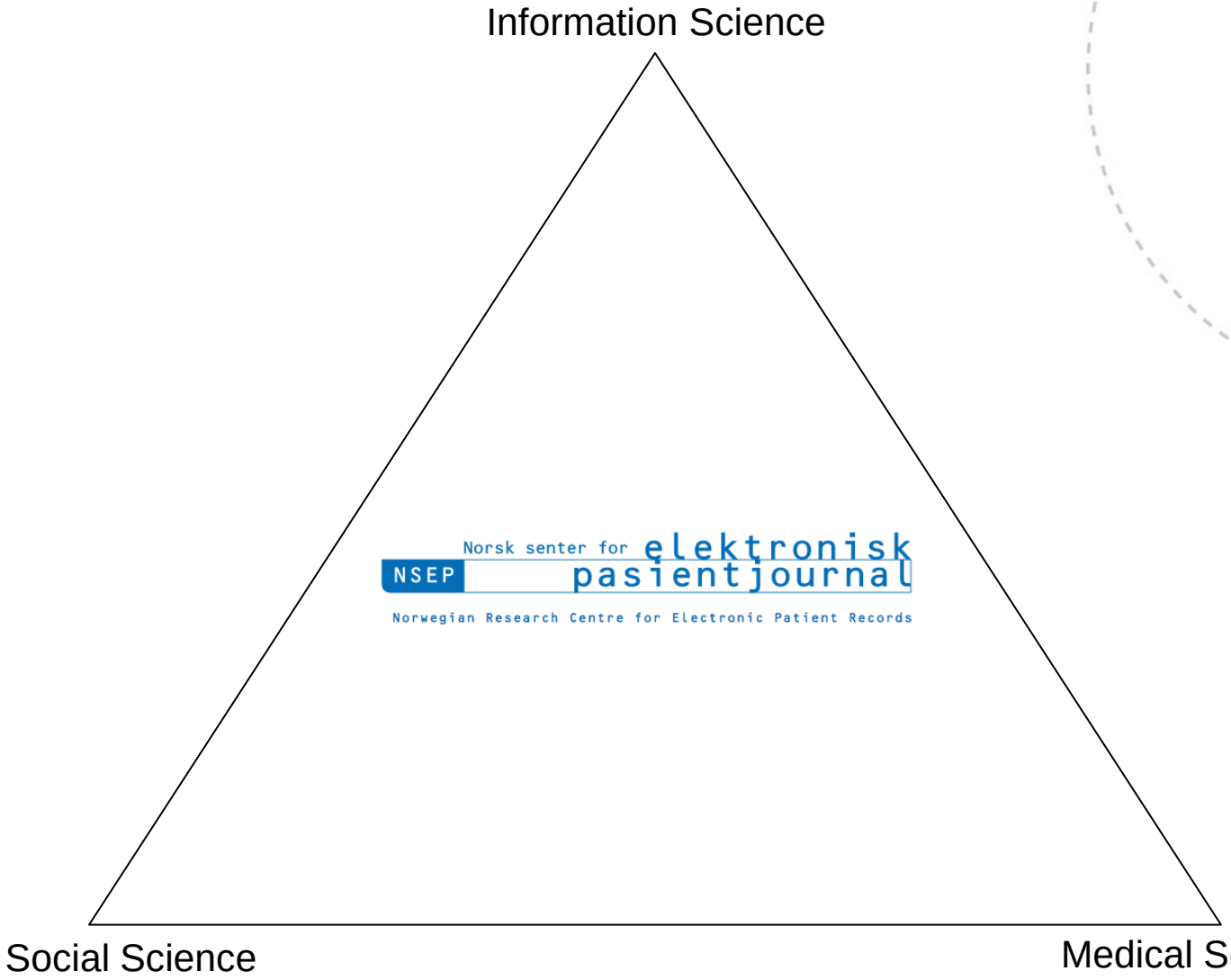
Two Research Challenges

- How are organisational work and medical work integrated in health practices?

- How can supporting information systems integrate the three perspectives?



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