

ELECTRONIC PATIENT RECORDS IN INTERPROFESSIONAL DECISION MAKING: STANDARDIZED CATEGORIES AND LOCAL USE

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Abstract: *Electronic patient records (EPRs) are a constitutive element of medical practice and are expected to improve interprofessional communication and support decision making. The aim of the current study is to explore the ways in which access to structured information from multiple professions within EPRs enters into the phases involved in arriving at final agreements about patients' future care. The results show that decision making in interprofessional team rounds involves a prestructuring of a pathological reality. Further, the results demonstrate how information in EPRs is deconstructed and recast into patterns that presuppose knowledge about the EPR's structural organization. This means that EPRs are highly flexible technologies and that their design does not determine their usefulness. A major conclusion is that the members' knowledge on how to bridge between standardized categories in EPRs and their local meanings is decisive for understanding the basic conditions necessary for how EPRs could support interprofessional collaboration.*

Keywords: *Electronic patient records, decision making, categories, standardization, communication, information technologies.*

INTRODUCTION

In the present study we explore the ways in which digital information systems for documenting patient care feature in interprofessional decision making. A common characteristic of systems of this type is that they provide an extended access from not only a single profession, but also from other professions involved in the provision of patient care. One crucial issue addressed in the present study is how information from various professions is used to present a typical case, and how such cases are reformulated in the processes of decision making in respect to the patient's future care.

In addressing these issues, we concur with a number of studies in areas such as computer supported cooperative work (CSCW) and human–computer interaction (HCI) that suggest that, in research on digital technologies, it is necessary not only to focus on technical elements, but also on how such work is carried out in situ (e.g., Hindmarsh, Jenkins, & Rapley, 2007; Kane, Groth, & Randall, 2011). Further, our study aligns with an increasing interest in going beyond doctor–patient consultations and in the direction of collective decision making. In so doing, the forms of communication that arise “between members in health care teams” (Pilnick, Hindmarsh, & Gill, 2009, p. 5) thus become of central concern. Much of the research in this field has a focus on the ways in which health information systems function as constitutive elements of organizational memories (Ackerman & Halverson, 2004), thus pointing to the centrality of these systems for making informed decisions about patients’ ongoing and future care (for organizational implications, see also von Krogh & Nâden, 2008). Not only is it widely acknowledged that patient records function as a hub in health care (Berg, 1996), but there is a growing consensus that the introduction of electronic patient records (EPRs) can extend possibilities for interprofessional decision making (Napolitano, Ranaghan, Middleton, & Gavin, 2011), mainly by serving as a source of adequate, timely, and location-independent information for understanding patients’ problems (Bossen, 2006). In this context the present study forms a contribution to the growing body of research on the role of technology in the types of problem solving that take place in medical team meetings (Måseide, 2003, 2007, 2011). Not only do these studies suggest that such processes are deeply intertwined with the institutional order and its responsibilities, but they further demonstrate how decisions emerge as a result of the interaction between experts, where cases become reformulated and reconstructed as part of a sequenced process. The reformulations and reconstructions that take place at such meetings ultimately aim at the professionals involved arriving consistently at joint decisions regarding what “can and should be done” with a patient.

Having said this, the ambition of implementing technologies such as EPRs in complex organizations and work processes can often involve overlooking existing problems and, indeed, creating new ones (Clarke, Rooksby, Rouncefield, Procter, & Slack, 2006). This poses a particular risk if the information in EPRs is seen or treated as a self-sustaining entity that can be used and understood in uniform ways, irrespective of the context. Many aspects require attention in order to further improve the understanding of the multifaceted interplay among the organization, professionals, and technologies in collaborative decision making (Niazkhani, van der Sijs, Pirnejad, Redekop, & Aarts, 2009; Tang & Carpendale, 2007). These include problems of cooperation and coordination; of time, space and place; of institutional and professional obligations; and the conceptual knowledge of the professions built into the technology (Bossen, 2002; Martin, Currie, & Finn, 2009; Svenningsen, 2003; Timmermans, Bowker, & Star, 1998).

An important point of departure for the present study is that the meaning of information cannot simply and unproblematically be transferred between one context and another. Rather, such transfers presuppose a shared knowledge among health-care workers as to what the information actually means and the implications that are to be drawn (Hartwood, Procter, Rouncefield, & Slack, 2003). The meaning of information thus cannot be taken as a given. Because EPRs are intended to serve a multiplicity of information needs, considerable demands are placed on users to make sense of data that are relevant for the specific purposes at hand (Berg, 1996). Consequently, local interpretative work in discerning the meaning of

texts, signs, and data is needed before transforming it into a locally relevant fact in the process of decision making (cf. Østerlund, 2008).

A fundamental feature of EPRs is that they enable both intra- and interprofessional decision making, where decisions are built upon categories that facilitate the communication of similar and precise meanings within and across professional boundaries. For this reason EPRs are organized according to certain terminologies and hierarchically structured categories which, simultaneously, are intended to obstruct the input of unformatted information (Timmermans & Berg, 2003; Tjora & Scammler, 2009). This development also relates to ambitions that EPRs should serve a wide range of processes, such as patient-directed care, quality assurance, and administration. Because of this multiplicity of needs, the information provided in EPRs is often open-ended and not readily available for use.

As previously mentioned, a common characteristic of EPRs is that they are constructed from a series of hierarchical categories organized as main, sub-, and subordinated categories. This organization provides a means to make visible the ways in which the categories are related to one another and how they fit into the hierarchical order. The structure with sub- and subordinated categories also systematically organizes data and results from different observations. In the system used in this particular study, all of the main categories for the nursing staff have the prefix *care* (*omvårdnad* in Swedish), which functions as a way of linking the data to the nurses' patient module. Similarly, data stored in the physicians' modules have the prefix *medical*. The most common way of relating documentation from different professions to each other in the EPR is to divide it into separate modules for each particular profession. Even though the members of a particular profession are able to read the records of the other professions in the EPRs from this study, they are not permitted to create new entries. When accessing the EPR, the professionals initially have to choose records either from all professions or from just a particular selection. Moreover, EPRs regularly include a wide range of primary functions as well as complementary functions, such as the management of text, laboratory readings, referrals, and the results of examinations, tests, and x-rays.

A contested issue that is prominent in the research on information technologies for health-care purposes is whether or not such technologies should be regarded as determining what counts as relevant knowledge or if technologies are shaped by the social context in which they are used. Proponents of the first perspective have suggested that EPRs are based on a logic of standardization that functions as a form for organizing knowledge (Ericson & Haggerty, 1997; Rowley & Hartley, 2008). These researchers lean on Giddens (1990) in their argumentation that decision-making instruments, such as EPRs, tend to formalize knowledge-creation processes, and that built-in categories and classifications prescribe how topics and items should be related to one another and understood by professionals. In a similar vein, Postman (1993) claimed that there are ideological biases embedded in technologies of this kind because their structures, categorizations, and classifications attempt to construct and value skills and knowledge. This kind of argument has been taken even further by scholars such as Lyotard (1999) and Franko Aas (2004), who argued that, due to their category and classification systems, technologies maintain a certain logic that prescribes what knowledge is. Hylland Eriksen (2001) adopted an opposing position, arguing that technologies are nonacting tools for generating actions and activities. From this perspective, the foci of analyses rarely lie on the technology itself or its use but, rather, on social aspects of health-care work. The technology is thus seen as a highly flexible instrument available to be used in any number of different ways.

In the current study, based in the tradition of workplace studies (Heath & Luff, 2000; Luff, Hindmarsh, & Heath, 2000), a third perspective is adopted: a *technology-in-practice* approach. From this point of view, technology is analyzed as one of many actors at play in any given activity. Understanding the logic of decision making is thus based upon how, as used in everyday work, the categories are understood by the participants. Such an understanding can emerge only as a result of studying the practical use of such categories; it is not to be found embedded in the categories themselves. Rather, understanding depends on the knowledge of the professionals involved in making sense of the relations between categories and the information they embrace (cf. Bowker & Star, 1999). This means that a specific, locally relevant meaning cannot come into being without knowledgeable interpretative work by the professionals involved. Such work presupposes knowledge about how information is structured in the system (Winman & Rystedt, 2011), and, of particular interest in the present study, the specific meaning of categories and their relations in a particular context, that is, what Garfinkel (1967) referred to as the indexicality of categories.

The aim of the current study is to explore how access to structured information from multiple professions in EPRs features in the process of making decisions about patient care. More specifically, we wanted to closely examine the ways in which staff members make use of EPRs to retrieve information about their patients and how this subsequently is factored into the negotiations involved in collaborative decision-making processes. Further, we discuss the implications that the introduction of digital formats might have on decision-making process and the reconfiguration of the needs for professional knowledge inherent in such work. In addressing these aims, three questions have guided the analysis:

- How is information provided by EPRs selected and organized in the preparation for patient briefings?
- How do staff members transform information in EPRs into argumentative resources in the processes of decision making?
- How is the logic of decision making established when using EPRs in team rounds?

DATA COLLECTION

The data collection took place in a hospital ward at a medium-sized hospital in Sweden, where care was provided for patients suffering from stroke-related disorders. Both the data collection and data analysis were guided by qualitative ethnographic principles (Agar, 1986; Hammersly & Atkinson, 1995).

In order to gain a grasp of the workflow and the ways in which the work was organized (Jordan & Henderson, 1995), approximately 190 hours of observations were carried out. The observations, which were conducted by the first author over a period of 6 months, were documented in field notes. These field notes were transcribed the same or the following day and were used to guide subsequent observations.

After an initial observation period, the focus of the observations was changed from a general observation of the workflow to a focus on team rounds. These events were revealed as an activity where the EPRs played a critical role in organizing and coordinating work and where the staff on the hospital ward regularly met to form a holistic understanding of needs of further care. In other words, team rounds were arenas for interprofessional decision making.

The data corpus includes video recordings of the nurses' preparatory work prior to the team rounds. Here, a video camera was placed beside the nurse in order to capture how she interacted with the computer and how she made use of a notepad. A second video camera captured the occurrences on the screen. The purpose of this strategy was to capture the user interface and show how the nurse assembled information from the different modules and sections in the record.

Although originally five team rounds were observed, an additional nine team rounds were included in our observations in order to capture more detailed aspects. The team rounds collective involved approximately 90 patients. Each round lasted about 45 minutes and was audio recorded, and all of the field notes and audio recordings were transcribed the same day.

All data, including field notes from observations and transcriptions from audio recordings, were used to form the basis for analysis of the staff members' use of information as part of their decision making. The initial analyses from the observations showed that the technology was very concretely integrated in construing and juxtaposing crucial information concerning patient care. Therefore, field notes and the transcribed video recordings of the nurses' preparatory work were examined repeatedly in order to scrutinize how the nurses selected the information presented in the EPRs when preparing for patient briefings. The analytical focus was put on which pieces of information within a complete EPR were selected and how this information was organized in the subsequent briefing.

Our analysis also involved repeatedly listening to the audio recordings of the team rounds and reading through the transcriptions. Re-readings and notes in the margin of the transcriptions (Hammersly & Atkinson, 1995; Silverman, 2000) guided the further analysis in order to understand how arguments in the decision-making process were related to information provided by the record. Here, the focus was on structures and interactional patterns in the team rounds. In our initial analyses, we discerned a pattern of discrete phases in the process, which seemed to be sequentially ordered. This directed our focus toward the relations between the phases in the team round and how information from the different modules in the EPR impacted typical reconstructions of cases. The latter involved an analysis of the knowledge inherent in transforming the information into argumentative resources in the progression of decisions.

TEAM ROUNDS AS AN ARENA FOR DECISION MAKING

The team rounds were held once a week in a meeting room on the ward for the purpose of coordinating and organizing work activities. The staff of the ward (registered nurses, various physicians, physiotherapists, occupational therapists, auxiliary nurses, and psychologists) held such meetings as a means of making decisions about patients' future care. For each patient, the team was obliged to decide what can/shall be done with this patient, for instance whether the patient should be discharged or if she/he would still need further rehabilitation.

The team rounds were held in a meeting room located at the end of a long corridor of the ward. The meetings were held primarily in the morning, and participants sat around a large oval table. Participants from the same specialty, if more than one attended, usually sat together. Following a welcome by the doctor and a patient-consideration prioritization, each patient was discussed by order of bed number. The first step involved the nurse from the ward making a short presentation to the group about the patient. This patient briefing had to be succinct to fit

the time schedule, but it also had to include enough information for the staff to develop a general view of the case. Thereafter, the group started their discussion, with the goal of reaching a mutual agreement of the past, present, and future care and status of the patient, and make decisions about the patient's future. Viewed in this way, a team round consists of two phases: the patient briefing and the decision making. Analytically, these phases are inseparable from each other because they both are parts of an overall process of team round decision-making process, even if very different logics are in operation. By illustrating these processes separately, though, it becomes possible to reveal both their common and divergent features and to show how medical decision making is bound up with the EPR in use. Moreover, it shows how the technology constitutes a resource that can enable staff members to achieve collective understandings and to frame and formulate decisions in relation to their own profession-specific obligations.

Therefore, to make this analytical point, the results below are divided into two sections. The first section illustrates how the EPR is used in presenting a patient in a briefing. The multiple steps in the second section illustrate how categorized information in the EPR is used in the medical representation (i.e., how to understand the case), and how this serves as a means in a process of negotiation.

The general pattern in the team rounds comprises five phases: (a) presenting the case, (b) framing the main problem, (c) elaborating the case, (d) agreeing about the case, and, finally, (e) making the final decision. In order to illustrate the reasoning of the staff members in each of these steps, one case at a team round will serve as an example. The chosen case is typical of a general pattern that was found in the analysis of all 90 cases dealt with in the team rounds. Below we will follow the case of Bertil (a pseudonym) from the nurse's briefing until the point where the team has recast his problems into a solvable case and aimed at a final decision. As will be demonstrated in the section immediately below, carrying out a patient briefing demands that the nurse knows what the other team members expect and need for meeting the objectives of the team round.

Presenting the Case

The case presented here concerns a relatively new patient (Bertil), who several of the participants at the team round had not met. This implies that the nurse could not assume that her colleagues knew anything particular about the patient in advance, or, at best, that she must assume that such knowledge would vary among the staff members involved. As we will show by analyzing Excerpt 1, the nurse tried to present Bertil's case in a way that was relevant and comprehensible to everyone present.

By looking more closely at the preparation for the team round (Excerpt 1), it is possible to see it as a process of making information intelligible. During the preparatory work, the nurse looked for relevant information in the EPR, and she knew where in the modules of the different professions the information sought was located. In addition, she knew how the information within these modules was organized into different categories.

The data available in the EPR about this specific case corresponded, overall, to eight printed pages of information created by the professionals. By selecting and reorganizing the information available, the nurse ended up with a small selection of notations on her notepad.

[Verbatim translation from Swedish]	Physicians' Record	Nurses' Record
(a) Yes, then we've got Bertil Karlsson in [room] five two, born [in 19]35.		General Other info
(b) Bertil came here on January 14 [feeling] poorly with [a] weak left side and lack of vision.		Care anamnesis Contact reason
(c) He got the increase here in-- wasn't it when he was at Kava before he got here, or, well, Ward 4, and then he became substantially worse .	Admission Reason for admission	
(d) And then it subsided a little... has ...and then--it seems--became worse.		
(e) He was in over Christmas, too, when he had had a Tia there.		Care-anamnesis Health record
(f) ... is waiting for a reply from Gothenburg [hospital] regarding Carotis; he has a Carotis Stenos.		Care anamnesis Care experience
(g) If there's something you would operate on--then it is probably the, the thing which blasts the clots then.	Status Additions	Admission Consultants

Excerpt 1. The source category in the EPR from which the oral briefing information originated.

Note: *Kava* is the ward for surgical emergency care (*Kirurgisk akutvårdsavdelning*). *TIA* stands for Transient Ischemic Attack, a transient episode of neurologic dysfunction caused by loss of blood flow. A Carotis Stenos is when the blood vessel in the throat is clogged.

Such a reduction is necessary because a patient briefing is useful only if it is based on a specific amount of relevant information sufficient for the team to use as a point of departure.

By sorting out data such as “weak left” and “lack of vision” (Excerpt 1, b) from the EPR, the nurse transformed information about the patient into a shorthand representation that was relevant for the purposes at hand. The complexity of giving a patient briefing and the knowledge that is needed in the preparatory work can be seen by tracing the various data in a narrative based upon its location in the EPR.

The sequencing of talk in Excerpt 1 can be understood in terms of the way a patient briefing is traditionally performed. The overall pattern and the historicity of this activity have a specific sequential order, which is maintained in the briefings. This well-established narrative pattern (Montgomery Hunter, 1991) is generally used in team rounds as well as in other situations as a means of organizing information when staff members give oral reports to their colleagues. The order of information is generally presented as follows: (a) the patients' date of birth/registration, (b) symptoms, (c) former health problems, and (d) previous, current, and planned treatments.

The briefing is not a complete description of the patient's situation, nor is it supposed to be. Instead, it is a way of defining a case that could be acted upon (Timmermans & Berg, 2003). However, knowing what to include and how to actually construct the patient briefing involves

not only knowing what data to include for the purposes at hand, but also where and how to look for relevant information. As is apparent in Excerpt 1, the briefing does not follow the structure of the EPR, but comprises different pieces of information in the categories and subcategories in the nurses' and physicians' modules. This reconstruction of the case implies an ability to anticipate, from the perspective of the listeners, what will be perceived as relevant content (Montgomery Hunter, 1991). According to Montgomery Hunter, the patient briefing might seem incomprehensible to the untutored listener, but it is nevertheless an essential part of the decision-making process. This briefing, in the form of a narrative, eliminates irrelevances while highlighting what is essential and related to the overall aim of the round, which is what can/shall be done with this patient. This briefing illustrates how decision making is an interpretative activity founded upon the staff members' understanding of the patient.

The Decision-Making Process

Although the briefing provides a recast version of the patient's problems, it is nevertheless closely connected to the content of the EPR. It is sufficiently open to provide opportunities for the team members to start their deliberation. The initial phase of the patient briefing is characterized as a story that is comprehensible and sufficiently relevant for the colleagues assembled to engage in the activity at hand. By selecting and sequencing information from the EPR modules for each profession into a locally meaningful narrative, the patient briefing now constitutes a ready tool for the participants to collaboratively formulate what the case is about or, as Montgomery Hunter put it, to "search for a clue that will unlock the mystery of the patient" (1991, p. 4). This means that there is an inseparable relation between the historical way of reconstructing a case and the way staff members frame and deal with any particular case. In the sections that follow, we will further scrutinize the next phases of team rounds by continuing to follow chronologically the case of Bertil.

Framing the Main Problem

All reconstructions of cases in patient briefings can be seen as selections and transformations of information from patient records which, in turn, not only reconstruct the case, but also the patients' needs and the team's responsibilities and tasks. As will be seen in this particular example, there is coherence in the topics between the patient briefing and the outcome that follows, that is, the process of decision making.

It is not possible to have a fixed answer regarding what to do in a context of deliberation, which is the essence of the team round. Therefore the main characteristic of the team round is its interactional nature, where interprofessional teams arrive at joint decisions. By analyzing Excerpt 2, we further examine the ways in which the physician recycled the information retrieved from different professional knowledge domains provided in the patient briefing. Here it becomes clear how information originating in the EPR is picked up and used for formulating arguments.

The physician's first utterance in lines 158–160 can be conceived as anticipating a response to the overall question of the team round—what can/shall be done with this patient—which is embedded in the situation and was clarified during the patient briefing. Thus, the first utterance in this part of the team round works as a preliminary reconstruction, providing a relevant description upon which to proceed.

158	Physician	Well, then there is not much to say about--Bertil--then.
159		We'll have to wait for Gothenburg [hospital]. We haven't had any
160		response yet.
161	Nurse	Hmm [affirmative]
162	Physician	We can't really do anything at all until we know more.

Excerpt 2. The first sequence in the team round following the patient briefing.

These introductory utterances from the physician function as a part of a continuing chain of reformulations of information. They derive from the Consultants subcategory within the Registration category in the EPRs cited in the nurse's patient briefing, "is waiting for reply from Gothenburg regarding Carotis" (Excerpt 1, f), to the physician's first utterances, "Well, then there is not much to say about--Bertil--then. We'll have to wait for Gothenburg. We haven't had any response yet" (Excerpt 2, lines 158–160). These reformulations impact the direction of the subsequent elements of the decision-making process in that they constitute a starting point for subsequent reasoning.

The physician's conclusion, in line 162, that "We can't really do anything at all until we know more" constitutes a formulation of the patient's problems in relation to the staff/hospital's responsibility. Although the patient may have been experiencing severe problems in day-to-day life, the institution was not obliged to do anything with its available resources, methods, and knowledge at that particular instant. This matter was pointed out by the physician in line 162, when she emphasized *we*, referring to the team, and, *until*, which specified the then-present point of time. As can be seen, the physician almost formulated a preliminary decision, which means that she framed the situation as an administrative question relating to the institution's obligations and the possible discharge of the patient. This first sequence in the team round presumed access to information from various professionals and from different activities. When paper-based records were used, each profession kept its own records, which meant that if the records were drifting (i.e., if someone had taken the record out of the archive), the information was drifting as well. In this particular case, and in all other cases when EPRs are available, staff can easily access patient records from all of the participating specialties. So, even though the utterances in Excerpt 2 might seem trivial or self-evident, they presume access to information that is independent of place and time, that is, information provided by the EPR.

Elaborating the Case

The activity of the team round cannot be reduced to a matter of merely sharing information. To simply share information would not, in itself, make transparent the implications that the information might have for a particular course of action in terms of how, why, and when to act. In other words, the range of options that are possible or appropriate may not always be exhaustively encapsulated by what is officially prescribed. Moreover, sharing information also involves providing professionals with opportunities to discover the current state of care, namely, the particular circumstances of each individual patient and issues concerning how to

respond to present and future institutional responsibilities. Because the team round took place at a ward for stroke rehabilitation, the staff members had the additional responsibility to account for ongoing/future rehabilitation, and this also influenced the ultimate response to the question of what can/shall be done with this patient.

The institutional responsibility and its inclusion of a rehabilitation perspective are clearly evident in Excerpt 3. Here the physician continued to elaborate the case by turning to the physiotherapists and asking, “Or do you think there’s something that you can see?” (line 163), which can also be seen as an indication of concern to abide by institutional obligations.

The main question is still what can/shall be done with this patient and, by reformulating the case, the physician is expecting to clarify both the nature of the problem and possible courses of action. Therefore, this question does not stand by itself but, rather, is a followup based on the physician’s own conclusion, articulated in lines 158–160 and 162 of Excerpt 2. By reconstructing the case in this way, the physician clarified both problems and possible courses of action. In posing the question in line 163, the physician addressed and defined two possible ways for the physiotherapist to respond: to concur with or to distance herself from the proposed course of action. And just as the questioner’s interest is revealed in the formulation of the question, the response can be seen as an answer to the physician’s embedded stance (Hurley, Birch, & Eyles, 1995).

The physiotherapist’s utterance in Excerpt 3, lines 164–165, was both a response to the pronounced question (Excerpt 3, line 163: “Or do you think there’s ...”) and to the implicit embedded question, “Do you agree or disagree with my preliminary conclusion?” In the clause that follows, “...but it’s nothing that can be worked on ...” (Excerpt 3, lines 164–165), the physiotherapist made clear that she understood and aligned herself with the position taken, which also correspond with her entries in the EPR.

However, the problem with the hand brought up by the physiotherapist was not new information to the physician because it was entered into the physiotherapy module in the EPR. In addition, a loose translation of the physiotherapy’s EPR module noted, “Moving fingers: The patient experiences that the left hand’s digits [fingers] 3–5 are a little difficult to control.” Therefore, when the physician asked, “Is that *objective* ...?” (Excerpt 3, line 166), it can be seen that the question is a reformulation of, and has its starting point in, the EPR. The question can be hand. *Objective*, as opposed to *subjective*, reporting is a positioning used to classify the information and, thereby, to recast the understanding of the case and classify the information. Here, *objective* simply provided the clinicians’ observations, while *subjective* was used for something that the patient told the clinicians that he had experienced.

163	Physician	Or do you think there’s something that you can see?
164	Physiotherapist	Well, he, he could feel a bit under his hand but, but it’s
165		not something that can be worked on, like--
166	Physician	Is that <i>objective</i> or is he--?
167	Physiotherapist	When he did like this [clenching her fist] he was a
168		bit slow with these two fingers here.
169	Physician	But there’s no <i>obstruction</i> there [points at fingers]?
170	Physiotherapist	No.

Excerpt 3. Elaboration of the nature of the problem and continuation of team round evaluation.

The predetermined path of outcome is pursued by asking, “Is that *objective ...?*” (Excerpt 3, line 166), in that the question itself selects the information that is in line with the implicit position in the previous question. If the information is objective, the institution now has a responsibility and, consequently, something needs to be evaluated. If, on the other hand, the information is subjective, it is likely to create a problem in relation to the obligations of the rehabilitation ward.

Berg (1992) argued that quotations, question marks, or the addition of information of a subjective nature to medical records is a way of downgrading the importance of the data. By referring to subjective domains, the physiotherapist indicated that she had noted that the patient experienced a problem but, simultaneously, stated that she herself could not see the problem. While the notation can be seen as an instance of downgrading, it can also be seen as a way of positioning hospital obligations in relation to the emergent findings. If the patient (Bertil) drew attention to the fact that there was a problem with his hand, it would be the physiotherapist’s responsibility to evaluate the complaint and enter her observations into the EPR because such a problem might be of importance at some future point in time. From this point of view, it is therefore reasonable to add in the EPR that “the patient experiences that...” (a notation in the EPR made earlier by the physiotherapist). At the same time, the additional information can be seen as a way of questioning its relevance for further rehabilitation.

This elaboration of the case is a typical example of how information from different sources is used and combined in novel ways in new situations. The information, which originated from the nurses’, physicians’, and the physiotherapists’ separate modules (see Excerpt 1), as well as from the primary patient briefing, was linked together to constitute a more comprehensive foundation than any of the separate modules in isolation could have. Indeed, it is the transparency between different professions’ submodules in the EPRs that made it possible for the physician to even ask the questions in the way that they were posed in the Excerpts.

In line 169 (Excerpt 3), the physician once again asked a question with an anticipated answer: “But there’s no *obstruction* there...?” By posing these questions (lines 166 and 169), the case had been recast and all of the necessary information was at hand for the reformulation of the initial concluding decision (Excerpt 2, line 162)—now, additionally, with the extended argument that the symptoms were subjective and not relevant for the institution.

Agreeing on the Case

In Excerpt 4, the physician once again suggested a consensual conclusion to how to understand and frame the case and how to proceed with it. This was made possible by the physician’s cohesive positioning of information derived from different categories and submodules in the EPR and by utilizing the physiotherapists’ own conclusions.

A possible problem arose though when the physiotherapist said the patient’s problem was “--not something that can be worked on--” (Excerpt 3, line 165), that is, not trainable (one should remember that this was a stroke rehabilitation ward). This could appear to contradict both to the other information provided and the preliminary conclusion. When information about the patient is contradictory, questions can be presented in various ways. Thus, by asking, “But there’s no *obstruction* there?” (Excerpt 3, line 169), instead of asking, “Does this constitute any obstacles for the ability of move?” or “How does this affect the ability of move?” the question itself contains a counteract. As Berg (1992) put it, this can be seen as an

173	Physician	Hmm no, so in terms of rehabilitation, he doesn't really need to remain
174		here either... We can't help him with anything either... so this thing with
175		his loss of vision--
176	Physiotherapist	It is more of working with his motor coordination and stuff--
177	Physician	Hmm [simple acknowledgement]
178	Physiotherapist	--that which works.
179	Physician	But he copes.
180	Physiotherapist	Hmm [simple acknowledgement]

Excerpt 4. Continuing the discussion.

attempt to regain alignment in the construal of information. Therefore, the question itself is embedded with a predetermined answer, shaping the exposition of the patient. Then, when the physiotherapist reformulated her first conclusion (Excerpt 4, lines 176 and 178), she actually recast the problem in terms of being trainable. This argument, though, is disregarded by the physician when she said, "But he copes" (Excerpt 4, line 179). This was actually a new argument based on the earlier overall conclusions and on information from the physiotherapists' module in the EPR. So, even if Bertil was trainable in some respect, he could still manage on his own, which means he was no longer an obligation for the present ward.

Making the Final Decision

Because the institutional perspective prevails in the recasting of this case, the outcome is neither an open nor an unprejudiced process. It is, however, rendered visible in Excerpt 4, in the sense that the physician not only displayed knowledge of how to use information in the EPR and of what to ask, but also demonstrated knowledge about how to reconstruct the problem.

When taking a closer look at the final conclusion in line 183 (Excerpt 5), it obviously was not entirely new. Indeed, it appears as an answer to the very first question that, primarily, was articulated in the form of a statement: "We can't really do anything until we know more"

183	Physician	...No because then he really ought to be able to go home.
184	Physiotherapist	Hmm [simple acknowledgment]
185	Physician	No... because we don't normally keep them... only if there is
186		some type of--I mean he's been in bed here a whole day... We
187		know that he has
188		functions... he has even been on doppler.
189	Physiotherapist	Hmm. [simple acknowledgement]
190	Nurse	He's got his eyes [examination] next week.
191	Physician	Yeah, but--
192	Nurse	Hmm [simple acknowledgment]
193	Phys.	But there is nothing, nothing more, so without... no, so I
194		suggest that he goes home today.

Excerpt 5. The final decision is justified with arguments from various perspectives.

(Excerpt 2, line 162). The questions during the team round all corresponded well with the predetermined answer to the overall question of what can/shall be done for this patient and, as can be seen, the team round was performed in a way that simultaneously shaped the outcome.

The final conclusion suggested in line 183 (Excerpt 5) was based on both administrative and medical considerations. In lines 185–188 (Excerpt 5), the physician summed up the arguments for the decision by referring to the organization’s routines: the patient’s health status and the fact that necessary examinations had been carried out. The decision was thus firmly placed among the cases of normal procedures in terms of institutional routines and decision making. In lines 193–194 (Excerpt 5), the physician made it clear that, with the information at hand, there really was nothing the team could, or indeed was obligated to, do. Thus, based on these reasons, she proposed that the patient be discharged. As is apparent in Excerpts 2–5, several arguments were used in the team round, all of which had a substantial impact on the final decision of how to understand this patient, his needs, and the nature of the interventions that should follow. These arguments all originated from the EPR and illustrated how the EPR contributed to structuring and recasting the case into a relevant representation of the patient, as well as the knowledge needed to achieve this.

DISCUSSION

The results demonstrate the general structure of the decision-making process and how the information originating in the EPR undergoes *a series of changes throughout the team round*. The case of Bertil, as originally constituted in the EPR, was first transformed into a brief presentation, which in turn was both counteracted and recast before the team made its final decision (Figure 1).

In contrast to Lyotard (1999) and Franko Aas (2004), our argument is that databases like EPRs do not have a built-in superior logic determining their use. Instead, the logic of decision making is found in the activity itself, not in the information structure. The current study shows how standardized information prestructures the ways in which problems are understood, and how it functions as a significant resource in decision making. Furthermore, it is apparent how

Presenting the case	Framing the main problem	Elaborating the case	Agreeing on the case	Making the final decision
Selecting and reorganizing information from the modules of all professions into a coherent narrative.	Reconstructing the case in terms of the institution’s responsibilities: “What kind of problem is this?”	Inviting negotiations: “Are these symptoms subjective or objective?” Ruling out alternative interpretations.	Putting information from the EPR and the opinions of team members together.	Anchoring the decision in organizational routines and the institution’s responsibilities.

Figure 1. Presenting, counteracting, and recasting the case in the decision-making process.

information is flexible in its use and open to different interpretations. The idea that the EPR is a complete representation of the totality of information is counteracted by this study. Even though the EPR functions primarily as a formulation of how things are concerning the patient's identity, condition, needs, and ongoing treatments, the presentation of the case (Phase 1, Figure 1) nevertheless also leaves the story open for negotiation. Moreover, the analysis points to the professional competences involved in displaying the situated meaning of the different categories. Thus an understanding of the indexicality of categories lies at the core of the team members' knowledge; they will draw on this understanding in formulating relevant arguments. It is thus of vital importance to capture the characteristics of this knowledge and how it is intertwined with the use of EPRs.

Professional Knowledge

Tracing information back to its source (Excerpt 1) reveals that creating a concise and relevant briefing presupposes various kinds of knowledge. It involves, first, knowledge about how information is categorized and classified in EPRs; second, knowledge about the different professional domains; and third, knowledge about the purpose of the activity itself. In other words, it is not simply a question of stacking information in an arbitrary manner, as suggested by Hylland Eriksen (2001). Information systems, such as EPRs, cannot be used any which way. Instead, their competent use relies on knowledge about what nurses are accountable for in the team round. When the nurse is preparing for and conducting the patient briefing, she/he knows what the intended audience expects: not a complete reconstruction of the case but, rather, a short and adequate summary structured in a recognized pattern that can be seen as a descriptive, but not a deterministic, reconstruction. A briefing is thus a construction in which every omission of information, rightly so, leaves room for individual understandings of the patient's problems. As displayed in both Excerpts 1 and 2, the information in the EPR is transformed into a narrative that is shaped both by the information itself and by the context. In this briefing, the information from the EPR was transformed to fit a certain situation. The nurse's briefing thus was based on selected and reorganized information, which then was modified in view of other pieces of information and in relation to the purpose of the team round, that is, in arriving at a joint decision.

Making practical use of the information in EPRs, therefore, is hardly a matter of simply computerizing and sharing existing patient record systems. Instead, using EPRs in team rounds demands that practitioners are sensitive both to each other's perspectives and to the ways in which the activity unfolds turn by turn (cf. Måseide, 2007). In line with the current case, the medical staff knew that their colleagues were actually supposed to draw inferences from the particular remarks in EPRs. Or, as Heath and Luff (1996) put it,

They can rely upon those inferences not only to include information which might otherwise seem relatively trivial, but to exclude particular items (or even categories of object) knowing that any competent reader would be able to make sense of the entry and retrieve the relevant information. (p. 356)

Figure 1 is an example of how medical conditions, such as coordination and moving fingers, constitute the categories within the EPR that are inherently indexical and thus relate to a specific set of institutional activities. As part of such institutional activities, categories are

based on historically generated forms of knowledge and acting. The categories from the EPR (Figure 1) were used by the physiotherapists in their examinations and are further noted by the physician in the team round (Excerpt 3, line 169). Although categories mediate information, their specific meanings are construed in situ. Nevertheless, because the categories are invoked in everyday work, they also support norms and routines. For instance, when nurses prepare patient briefings, their experiences from doing team rounds in this setting become resources even before they start to search for information about patients. These activities involve historically established knowledge of what is considered relevant and necessary information, together with knowledge of how to structure a medical narrative (Montgomery Hunter, 1991). As Mishler (1984) pointed out, categories and remarks can be viewed as re-representations of the professionals' knowledge. How team members or, in the current case, the nurse reorganizes and restructures information from the EPR into a short oral briefing becomes a reflection of the understanding and knowledge in and about situations. Such knowledge appears in the current case as the use of categorized information in the EPR and implies knowledge about how to handle the technological system in which categories are embedded. Of course, knowing how to handle categories also involves knowledge about the contiguous activities that form parts of the context. From this point of view, categories can be seen as knowledge bearers in that they contain specific information not only about the content, but also how they are interrelated with and are adjusted to other categories. "Is that *objective* ...?" (Excerpt 3, line 166) demonstrates how categories in the EPRs have a constitutive role for recasting the case. Moreover, it shows how categories are not affixed to specific settings, but instead can be used in new combinations in new situations. This can be viewed as indexicality in the use of categories, which simultaneously constitutes the sensemaking processes necessary to maintain and continue the process of the activity.

A significant aspect of how EPRs work for specific purposes is that the categories that form their structure provide resources for prestructuring a pathological reality. When, for example, a physician asks questions, he/she makes relevant a set of possible answers and therefore also shapes the patient's historical data (Prottas, 1979, pp. 9, 161). This provides an example of how information obtained in a decision-making activity can be recast into pre-embodied patterns that are founded on the predefined structures. The categories that form the basis for EPRs are thus both constitutive and perspective-setting in that they transform the understanding of the problem and how it should be handled. From this it follows that EPRs function as stabilizing factors that create expectations of knowledge and processes recognizable to the actors. In other words, knowledge can be seen as being shaped and transformed by EPRs as it becomes part of such settings (cf. Agar, 1986; Bryman, 1988).

The abilities of team members to recognize and ascribe locally relevant meanings to categories indicate how competent use of EPRs is bound up with the indexicality of categories (cf. Garfinkel, 1967). This is rendered visible in this case through the physiotherapist's notation about the patient's experience of a problem in moving his fingers, which is stacked under the Coordination subcategory. From one perspective, this category mediates expectations connected to the responsibilities of the physiotherapist and points to the activity where the patient is examined. The notation can then be seen as a status report which, simultaneously, is also a response to the expectation of examination. Moreover, as can be seen, it was picked up from the EPR by the physician and used in the team round. The notation then was used to formulate an answer to the question of what can/shall be done with this patient. One specific goal of the team round is to come up with a plan for further action. So the Coordination category had, at least to

some extent, affected the physiotherapists' actions in the past (sufficiently enough to require notated information), which in turn was picked up on by the physician in the then-present situation in addressing activities in the future. This means that the open-endedness of categories also involves time, referring both to previous activities and in projecting future consequences. Moreover, EPRs, and the category system they are built on, bring together multiple activities conducted by various staff members for different purposes and which constitute the necessary coordination for making decisions decisive for patients' future care.

Institutional Implications

The ways in which categorized information is brought to life and becomes rational has to be understood in relation to the institutional context in which it is to be used (Sacks, 1992). This means that the logic of decision making can be found at the intersection of the ongoing activity and the EPR (the categorized text about the care work). This is evident in line 169 (Excerpt 3), where the physician replicated and asked, "But there's no *obstruction* there...?" when the physiotherapist framed the understanding of the situation into an administrative question of whether or not the patient should be discharged (cf. Mäkitalo & Säljö, 2002).

It is widely accepted that there is a need for standardized terminologies and information structures to enable different health-care professionals to share information (Timmermans & Berg, 2003). Even though we concur with this assumption, we nevertheless argue that working across professional boundaries also presupposes knowledge of the tasks and responsibilities of others, as is illustrated, for example, by the nurse's use of information from multiple modules in the briefing studied here (Excerpt 1). It is in the process of knowledgeable conduct that information in EPRs is brought to life in a way that makes it accurate, available, accessible, effective, and, most importantly, usable (Berg, 1996). In doing this, no fixed hierarchy exists, meaning that a certain category of information does not necessarily count more than another. Nor does information in the EPRs, in principle at least, necessarily overrule contextual factors.

The results demonstrate how the process of decision making within a particular institutional setting presupposes extensive knowledge of the indexicality of categories, something that originates in the participants' shared institutional history. This indicates the possibility that making sense of standardized information by professionals in different institutions—with different professional languages, obligations, duties, routines, and so forth—may be a much more demanding task than has been perceived previously (cf. Mäkitalo, 2002). Our contention is that the efforts to facilitate information sharing need to account for the local interpretative work needed, and for the knowledge embedded therein.

On the one hand, the increasing attempts to formalize and standardize terminology and categories can be seen as a way to remove ambiguous information that could otherwise undermine overall usability and reliability. However, on the other hand, the meaning of information is socially and temporally situated. Because categories are bound to activity (Sacks, 1992) and embody predicates for obligations and rights in specific institutional contexts, participants not only use categories to make sense of and progress with activities, but also use them as waypoints for action. This implies that personal knowledge about the context in which needs for information and understandings arise is also of consequence for the possibilities of EPRs to support interprofessional decision making (cf. Tjora & Scamnler, 2009; von Krogh & Näden, 2008).

CONCLUSION

One major conclusion is that, in comparison with paper-based records, EPRs could serve as an important resource in practices of decision making and provide an additional layer of transparency and accessibility to information. Consequently, EPRs may enhance the possibilities for crossing professional boundaries and facilitate collaboration (Martin et al., 2009). However, EPRs may also support the reproduction of the institutional order. Because the structure of EPRs is maintained by historically established categories, a general conclusion is that they can also contribute to a reification of the institutional history. This means that the structure in the EPRs, to some degree, must inevitably be seen as a historical script through which the past is preserved and a continuation into the future is constituted. This means that EPRs are highly flexible technologies and that the constraints and possibilities for their productive use are dependent not simply on their design. In addition, as suggested in the present study, the staff members' knowledge about how to bridge the standardized categories with their local meaning is decisive for understanding some of the basic conditions necessary for advocating that EPRs can support interprofessional collaboration.

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