From plans to planning: the case of nursing plans

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ABSTRACT
Drawing on a critical perspective stemming from socially informed studies of medicine, we analyze an ongoing effort to establish electronic nursing plans at the university hospital of central Norway (St. Olav’s hospital). We argue for an alternative interpretation of the relative lack of success to date of making the nurses use the nursing plans. Rather than a preoccupation with the singular artifact – the plan – we emphasize the process of planning as a collective, ongoing and heterogeneous achievement. Our perspective on plans implies that they should be recognized as more of a network and less a singular artifact.

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Documentation, Human Factors, Standardization

Keywords
Planning, Cooperation, Coordination, Redundancy, Formal, Informal, Nursing, HealthCare Work.

1. INTRODUCTION
The history of modern Western medicine is characterized by a gradual process of rationalization through increased professionalisation, institutionalization, codification and standardization of terminology and practice [2]. As a result, medicine has been transformed from ‘art’ to ‘science’ [4]. A forceful expression of this is the increased emphasis on plans such as clinical guidelines, protocols and care plans [31][37]. Plans thus embody the purposeful intention of increased uniformity of practice, higher quality and better cost containment. They are placed at the very core of patient care delivery [23][30][31], directly connected to commonly used expressions like shared care, seamless integration and continuity of care. This pivotal role of plans together with the empirical documentation of low actual compliance to clinical and nursing plans [5][31], forms the background for efforts to impose more planned practices.

Drawing on a critical perspective stemming from socially informed studies of medicine [2], we analyze an ongoing effort to establish nursing plans at the department of Rheumatology in the University Hospital of the Mid-Norway health region. The very modest current use of such plans is the source of considerable concern [5][31].

Nursing plans are paper-based or electronic artifacts. Planning is assumed to take place through the use, i.e. filling in and subsequent reading off, of these plans. The use (or lack thereof) of these artifacts is what is traditionally focused. We argue for an alternative interpretation of the relative lack of success to date of making the nurses use the nursing plans. Rather than a preoccupation with the singular artifact – the plan – we emphasize the process of planning as a collective, ongoing and heterogeneous achievement.

Two examples from our case are used to illustrate how planning unfolds in practice. The first portrays a nurse in the process of producing the written report. The second example looks at the collective effort of handing over information and the way responsibility is distributed among nurses on a shift. In both examples it is illustrated how, in the process of planning, information is being distributed across a variety of nodes, and how planning is achieved by a network of artifacts, structures and people. There is planning but no singular plans. Plans, in the sense of the practice of planning, are rather a trajectory that is constantly changed, altered, negotiated in response to changes in the surrounding nodes that constitute the heterogeneous network of planning.

Our perspective on plans implies that they should be recognized as more of a network (distributed, heterogeneous, and negotiated) and less a singular artifact. Robust, working plans are achieved, not by the absence of, but by the presence of distributed and redundant information sources. The design and implementation of electronic based nursing plans needs to acknowledge them as such.

The remainder of this paper is organized as follows. First we conceptualize the mixture of perspectives underpinning therole and function of plans. We then go on to describe the method used
followed by two concrete episodes from the case were planning takes place. Finally we analyze and discuss our findings and conclude the paper.

2. CONCEPTUALISING THE ROLE AND FUNCTION OF PLANS

The implementation of Electronic Patient Records (EPR) in Norwegian hospitals has revitalized the awareness towards electronic based nursing plans [8][17][20][21], in line with broader international trends [14][23][24][25][34].

A nursing plan is an overview of probable nurse-related diagnoses (problems) for a particular patient group combined with relevant measures. The actual classification of a patient group may be based on medical diagnoses, a particular surgery or medical procedure or the like.

The motivation for using nursing plans, both paper-based and electronic ones, is compound. From a managerial perspective, the international nursing research literature reports that:

“Over the past three decades, public and private purchasers turned to managed care plans to stimulate greater hospital competition and reduce hospital expenditures and costs” [7](pp. 419-420).

From a clinical perspective, nursing plans are expected to improve the quality of the documentation [5][31][37], which again is considered crucial for a safe and high quality deliverance of care. To be more specific:

“It is a severe threat for the individuality and safety of patient care if important aspects of nursing care remain undocumented. One cannot rely on information that is not documented. (…) Ultimately, the documentation practices reflect the values of the nursing personnel.” [37](pp. 79-80)

“It is expected that nurses obtaining appropriate and accurate information when they need it will improve the chance of making better decisions about patient care.” [23] (p. 38).

These prospects are furthermore connected with current efforts of introducing EPRs in western hospitals. As Hellesø and Ruland [17] put it:

“Information technology has gained a larger and more fundamental role in the management, distribution and storage of information in healthcare. The patient record and electronic nursing documentation is expected to reduce redundancy and increase access to up-to-date information as an integrated part of the EPR” (p. 799)

Nursing plans are also assumed to ensure a well-functioning communication between caregivers, for instance across hospitals and care homes [30] as well as improve the efficiency of the nurse handover:

“If the care plans were updated, the incoming nurses could read them and identify the patients’ problems and the nursing strategies to manage them, thus eliminating this information from the handover” [31](p. 38).

Similar arguments are also echoed in Norwegian policy documents [11][20]. For instance the Nurses Forum of ICT argues that:

“An EPR may easily make available normative information (…) by showing current guidelines or procedures and then it is possible to document just the deviation (…) this may simplify the documentation and increase the quality of nursing” [11](p. 17).

Fulfilling the “promises” of electronic based nursing plans is closely connected to the expectation of replacing a lot of existing dispersed and redundant information sources in the hospital:

“the information presented may be irrelevant, repetitive, speculative or contained in other information sources” [31](pp. 37-38).

“The documentation of the nursing process is carried out within different areas such as palliative aid, treatment, and rehabilitation and preventive health aid. Therefore, it shall exist a ‘collected thing which documents all health assistant that is given to, or planned for a patient. This collected thing is (…) denoted the nurse documentation. The purpose with this collected thing is to have everything concerning the nursing process collected in a common place” [20](p. 26).

“A nursing information systems should contain all components that are part of the nurses’ systematic care plan process, that is, the nurse assessment, the establishment of problems, goals, planned and accomplished measures, and evaluation” [21](p. 8).

“Grouping of patients in the EPR for a team (…) may replace many of the notes which the individual nurse make today in connection with the changing watches” [11](p. 27).

“Written handover may lead to an increased focus on ensuring accurate and thorough nursing documentation and improved utilization of nursing care plans, as these become the primary focus for patient care delivery” [31](p. 42)

However, given the high expectations outlined above, the actual use of nursing plans has so far been disappointing. Studies have pointed to how “nurses have problems integrating the nursing process and care planning into their daily record-keeping” [5](p. 35). In a survey referred to by Sexton et al. [31](p. 38), “nursing care plans were referred to in handover only 1% of the time and this was probably because care plans were not being updated”. One explanation may be that the “nursing process is thought to be time-consuming to document” [38](p. 80) and its value were questioned (ibid). For instance, some have argued that nursing plans are more significant for the professionalism of nursing than for patient care [23].

We employ a perspective on the challenge of establishing working nursing plans that draw heavily on insights from the social organization of health care [1][4][13]. More specifically, we build on a critique of prevailing assumptions about the use of formal tools (like electronically based nursing plans) as worked out most clearly by Berg [4]. His critique is highly relevant to a firmer understanding of the underlying reasons for the relative lack of success of nursing plans for nurses. There are two aspects of Berg’s analysis particularly relevant in relation to nursing plans.

Firstly, Berg emphasizes the essentially distributed nature of plans. Rather than thinking of plans as captured by any singular plan, he points out how the plan is distributed across both a number of human actors and different artifacts. To make a working plan, it has to be distributed and delegated across a whole
network of social and material/technical nodes: "It is a whole, hybrid practice – including nurses, physicians, data items, and organizational routines – that must be made sufficiently docile" (ibid, p. 91).

Secondly, instead of the traditional focus on a plan as an artifact, we should focus on the practice of planning, i.e. the process through which actual planning unfolds. This, as Berg (ibid.) explains, gives rise to an understanding of plans as a kind of trajectory:

"The resulting trajectory is not a product of consciously developed plans, nor is it the result of a sequence of 'decisions'. There is no overall 'plan': the actual itinerary of the trajectory is the emergent effect of the interlocking of entities performing subtasks. The complexity and diversity of the managed array of heterogeneous elements, moreover, necessitates continual adaptation and reaction to upcoming contingencies. … The trajectory is continually reset on the spot, as the outcome of the continual articulation work" (4) (p. 138)

3. METHOD
3.1 Research setting
Rheumatism is a general term covering over 200 different types of diseases with different causes and types of treatment. It characterizes a fluctuating, but progressive developing disorder with potentially severe disabling outcome and reduced life expectancy. Its incurable nature and negative influence on health and quality of life makes it a disease of considerable concern throughout the world. Only in Norway, with a population of approximately 4.5 million people, more than 300,000 people are diagnosed with a rheumatic disease.

The problems facing patients are complex, and health care professionals with different areas of expertise are involved in the treatment. This interdisciplinary approach to treatment and care together with a rather complex case history make the paper-based medical records of rheumatic patients thick (i.e. holding a substantial amount of information).

The case study was carried out in the inpatient ward at the department of Rheumatology in the University Hospital of the Mid-Norway health region. The main clinical undertaking of the ward is chronic inflammatory rheumatic diseases such as inflammatory joint diseases and connective tissue diseases. The ward is organized as a primary care unit, and patients are admitted both for medical treatment and surgery. Three physicians and about 20 nurses work there together with a physiotherapist, an occupational therapist and a social worker. The ward has 16 beds and treats approximately 650 patients per year with an average hospitalization-length of 8 days.

The nurses play a crucial role in ensuring quality patient care. They are the only group of professionals that stay with the patient 24 hours a day and thus need to master a whole range of skills, such as helping with activities of daily living, post surgery observation, pain management, patient education, counseling, and so on. The variety in proficiency makes the nurses highly dependent on tools to aid planning and coordination of work.

3.2 Research method
Methodologically, the study adheres to an interpretive research tradition [22] and relies on participant observations as a primary method [12]. It comes close to what is commonly labeled ethnographic studies of technology [35], which again places our approach in the broader landscape of similar studies [3][19][32][40].

The first author has followed the introduction of electronic nursing plans at the ward. He was told about the project and invited to take part in its evaluation while working as a nursing assistant at the ward (approx. six months prior to the actual launch of the project). In November 2004, when the project formally started, he thus knew most of the people working there and did not have to spend too much time explaining his presence and involvement in the project. He had already gained legitimacy and had become a trusted member of the community, without going native [18].

Collected data includes 450 hours of observation, tape recordings of handovers and meetings where nursing plans where discussed, 31 interviews, examination of official as well as unofficial documents and informal discussions with employees. To capture the “non-moveable” aspects of nursing like for instance the paper-based medical record, the chart, nurse’s personal notes, etc, a digital camera was used. In addition, emails and other types of documentation relevant for the case have been forwarded to him from various actors involved in the project.

Observations have been carried out at all hours to cover all nursing shifts. However, the majority has taken place during the day and the evening shift. Handwritten fieldnotes were taken during the observations and transcribed immediately afterwards. To supplement the observations documentary material like the Kardex, nursing plans, running notes, nurses’ personal notes, procedures and so on have been collected as supplements.

Interviews were carried out with nurses at the ward as well as project managers and representatives from the EPR-vendor. In all cases questions related to the introduction of the electronic nursing plans were discussed, for example their expectations to electronically based nursing plans, their usage of the paper based patient record and what they regarded as essential information for the delivery of proper care.

The analysis of the data is based on a hermeneutic approach where a complex whole is understood “from preconceptions about the meanings of its parts and their interrelationships” [22](p. 71). This implies that the different sources of field data are all taken into consideration in the interpretation process. The method included relatively detailed case write-ups (see for instance [9]) followed by an examination of the data for potential analytical themes. Main analytical categories have emerged gradually and served as a basis for the selection of the two empirical examples presented in the paper (among a collection of similar candidates).

Regularly during the fieldwork, data have been validated through discussion with key informants as well as transcripts being read by informants for approval and verification of their content.

4. CASE
Electronic based nursing plans were first introduced in the ward in November 2004. The new tool was expected to support decision-making and make it easier to document the process of nursing. The introduction of nursing plans did however take some time.
For various reasons the nurses struggled to integrate the nursing plans as a part of their documentation practice, for example, differences among the staff in computer skills, lack of resources allocated to the project, in-house training that was delayed several times due to problems of combining it with the rotation scheme, lack of specifications on how to actually use the system and so on. In fact, at the time when the empirical investigation was ended (one year later), the nurses still struggled to integrate the new tool as a part of their documentation practice.

As have been described elsewhere, the new tool was used, yet not as anticipated prior to its implementation (see [27][28]). A main reason thereof was the nurses somewhat idealistic expectations regarding the tools capacity (and effects). That is, planning was assumed to take place through the use, i.e. filling in and subsequent reading off, of the electronic based nursing plans. However, this did not resemble well the way planning actually unfolded in practice. Rather, the process of planning seemed to be more of a collective, ongoing and heterogeneous achievement. As we will demonstrate below, the plan was hardly visible in practice, but the process of planning was.

In the following we present two examples as illustrations of how planning unfolds in practice. The first portrays a nurse in the process of producing the written report while the second looks at the collective effort of handing over information and distributing responsibility among nurses on the oncoming shift. We try to illustrate how, in the process of planning, information is being distributed across a variety of nodes in order to comply with both formal requirements and as a way to delegate and coordinate work distributed across a variety of nodes in order to comply with both formal requirements and as a way to delegate and coordinate work according to a local division of labor. Various, partly overlapping, information sources continuously emerge and disappear in the process. Both examples are based on empirical data from the old documentation practice (i.e. prior to the actual integration of the electronic-based nursing plans). Even though it was available and promoted by several of the nurses as an important tool, the paper-based nursing plan was hardly used (and updated) in practice. Rather the nurses would draw more extensively on the written report and other artifacts.

4.1 Writing the report

It’s almost three o’clock Thursday afternoon. The nurses’ office is filled with nurses preparing for the handover. Two of them, Anne and John, have picked up a patient from recovery. The patient has just undergone a surgical operation for an upper femur rupture.

We enter the nursing office, as Anne, the nurse responsible nurse, is about to write the report. She is sitting in front of one of the many computers in the room. On the desk in front of her lies a binder. It typically holds official nursing documents like the main card, nursing reports, information from and to relatives, and so on. Today however, some additional documents have been put there including a surgery chart that holds information about the status of the patient prior to and during the surgery, and a couple of observation forms. Next to the binder lies the patient list. It is an A4 sheet of paper annotated with information from Anne’s activities during the shift. Finally, on the computer-screen in front of Anne the EPR-application is open. IT is however not used by during the writing of the report.

The nursing report is written on a preformatted paper-form. Individual reports are sorted out successively by the date and a signature, which both are placed in a column on the left hand side of the form, Anne picks up the latest report. The form is only half full. She enters the current date and starts to write:

The patient came back from intensive care at 14:30 today

She stops, takes a quick look at the surgery chart and picks up the main card. The following text is written on the main card:

**Physio ... X-ray post-operative + 7 days.**

A bit hesitant, but eager to find out, I interrupt and ask why this is written in the main card. Anne replies:

“These are follow-up instructions that the surgeon has written in it in the surgery chart (…) It is crucial that all nurses in charge of a patient know, and that’s why I write it here rather than in the report. If I write it in the report it will only get lost in the text” (Nurse Anne)

With me occupied writing down her answer, Anne turns her attention back to the report:

**Blood pressure was a bit high during the operation**

Anne remembers something being said about the medication when the patient was picked up from intensive care, but cannot remember what. Unable to find the answer in the surgery chart, she turns to John, her colleague, sitting next to her. John doesn’t remember either. They both look through the surgery chart again.

Together they are able to locate it, whereupon Anne writes the information in the report:

**Got seloken during the operation without any effect.**

Having done that, Anne picks up the patient list and the observation form. Strictly speaking she should have had access to the medical chart, but at this time of the day it is unavailable because the physicians use it. Anne rather relies on observations and medication that has been temporarily recorded in the patient list. Some of the information in the list and the observation form are extracted and merged into one account in the written report:


iv [intravenous]. Has been to control X-ray after the operation

The report is now complete. Anne reads through it once more while at the same time putting the documents, which now are spread out on the desk in front of her, back into the binder. Afterwards she leaves the room. The binder is left behind on the desk. She returns a few minutes later with a yellow post-it note in her right hand. She opens the binder again and places the post-it on top of the main card (which usually is the form first appearing in the binder). The yellow post-it holds the following information:

8/7... called the public administrative office.... agreed to call back when the patient is being discharged from the hospital... nurse Anne.

Post-it notes like these are usually stucked to specific places on specific forms in the binder. This is because they typically hold information that is primarily of temporal relevance (and interest) and thus do not fit any of the preformatted fields found in any of the standard forms. In this case, the message (i.e. post-it) is placed below a field called “Others involved”. It is placed exactly there to denote where in the record the information belongs and thus also where the nurses normally would look when they need to contact the public administrative office again.
As demonstrated in Figure 1, various entities enter the scene in the process of writing the report. Their integration is in effect allowed by the narrative nature of the report. What to include and exclude is however not obvious. Things are left out for various reasons. For example, although it is actually not prescribed, Anne wants to give the patient fluid intravenously. She explains why:

“No fluid is actually prescribed, but I believe we’re better off just giving it to her [the patient] anyway…It has been said that she has gotten 1500ml already and that she should continue to eat and drink, But the “old” lady will probably not eat much anyway, so I believe she’s better off if we give her fluid intravenously . . . also because of the heat… I will discuss this with the oncoming nurse” (Nurse Anne)

In discussing the issue with the oncoming nurse later on, the argument was the same:

“Talking to Anne was important to be able to understand the reason why the patient needed fluid intravenously”
(oncoming nurse)

Both the written report and the oral brief were necessary for the oncoming nurse to decide what needed to be done. Hence in the context of the handover conference and from the perspective of the nurse, the report and the plan were not separated entities but rather intrinsically intertwined in one and the same process.

4.2 The morning meeting - handing over information and distributing responsibility

Our second example takes place in the department’s meeting room. The room is placed at the heart of the ward, denoting its importance in planning and coordinating work. Encircled by chairs, a large table holding diverse magazines, books, papers and documents is placed on the middle of the floor. The walls are almost covered by bookshelves, whiteboards, billboards, posters, pictures and various reminders. At one end is a computer attached to the local network and connected to a projector. The projector is placed in the middle of the table, pointing towards a screen on the wall at the far end side of the room. In one corner is a kitchenette with a small fridge, a sink and coffee-machine, emphasizing that the room is also used for more informal activities.

The performance of the morning meeting is basically the same every day. It follows a certain sequence of events and is carried out within certain time limits. The meeting formally starts at 07.30. However, most nurses show up a couple of minutes earlier. While waiting for the meeting to start they read through the overview of enrolled patients. The overview is recorded on the large whiteboard on the wall as well as in the newly updated patient-list, which is lying on the table.

The entrance of the head nurse formally signifies the start of the meeting. A brief is provided both by nurses on the night shift as well as by the nurses from the afternoon shift the day before. This “double reporting” ensures that the oncoming shift get a story as coherent and complete as possible from all activities the last 24 hours.

Nurse Per from the night shift is ready to hand over information. He is looking at a patient list. The list is annotated with information from activities during his shift. The patient list is actually not approved as an official document. Yet all nurses find it extremely useful. As one nurse did put it:

“…I write keywords down on the list and afterwards I transfer my observations into the documentation (…) For example when you need to take a patients temperature at certain intervals during a shift (…) I also use it as a reminder. For instance if a new patient has been admitted during a evening or night shift it is important to notify the patient and the responsible nurse on next shift about [standard procedure like] the urine specimen the next morning, the temperature in the evening, blood samples and so on…” (Nurse)

Structured by the list and told by Per, an account is provided for all admitted patients. From time to time, while giving the report, he checks the official documents to make sure that information has also been entered there. Oncoming nurses listen and take notes on their own “blank” patient list. Their presence clearly contributes to the accomplishment of the brief. Typically they would ask questions or make supplementary comments to the brief. This clearing up of ambiguities and adding of details improves both the quality and relevance of the brief. Halfway through the report a discussion starts:
Per: I just didn’t know that the patient was put on a new regime [new medicine] – somadrill, … The medication was already prepared by the day-watch.

Oncoming
Nurse A: The physicians must make sure to tell us when changing the medical chart after we have prepared the medicine.

Per: Yes, at least tell the nurse in charge so that she can tell me… nobody told me anything yesterday, and as long as the patient manages his own medicine it is difficult to control…

Head nurse: I’ll discuss this with the physicians.

Normally changes to medication is decided and documented in the medical chart during the previsit, at which point the nurses set it up for the next twenty-four hours. A signature by the nurse preparing the medication serves as a guarantee that the right medication and correct dosages have been prepared. In the example above, the physicians have made changes in the medical chart without informing the responsible nurse. During the nightshift, medical charts are normally updated and signed and medication prepared in the middle of the night, typically after the patients have fallen asleep. In this case the change was discovered too late, leaving the patient mistakenly on the old regime.

Around 07.40, the two nurses from the nightshift have completed their brief. As they leave the room, they put their personal patient-list in a box labeled ‘destruction’. The box is placed on one of the shelves on the wall nearby the kitchenette.

The attention is now shifted to the whiteboard (see Figure 2), which is about to be updated by the head nurse. The whiteboard holds an overview of enlisted patients and their status. The nurses always keep it up to date. Yet, sometimes information is entered there by others. For example, if a patient needs to be examined by a physiotherapist, he or she might write an F behind the patients’ name on the whiteboard (see an example in Figure 2). This makes the information on the whiteboard relevant for several people and activities. Nearly all professionals, including the ones that hardly ever visit the unit, know that the most recent and updated overview of the state of affairs in the ward is to be found on the whiteboard. As one nurse said during an interview:

"It’s important for us as well as for outsiders. For instance, when someone from the laboratory is here to take blood-samples, they always check the whiteboard before they go find the patient (…) We also frequently move patients, for instance if a man is lying in a double room and two women are admitted to the ward" (Nurse)

<table>
<thead>
<tr>
<th>Room</th>
<th>Name</th>
<th>Pri / sec Nurse</th>
<th>Resp. Nurse</th>
<th>Miss. Red Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 - 1</td>
<td>Jonas Wolf</td>
<td>Brit / Lef</td>
<td>Brit</td>
<td></td>
</tr>
<tr>
<td>9 - 2</td>
<td>Svein Hansen</td>
<td>Jorunn / Lise</td>
<td>Ola</td>
<td>E / F</td>
</tr>
<tr>
<td>10 - 1</td>
<td>Sigrid Nilsen</td>
<td>Ma / Ola</td>
<td>Pia</td>
<td></td>
</tr>
<tr>
<td>15 - 1</td>
<td>Per Olsen</td>
<td>Surg</td>
<td>Leaf / Ola</td>
<td>Arnold</td>
</tr>
<tr>
<td>Korr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: The whiteboard that holds an overview of all admitted patients

While updating the whiteboard, the head nurse makes sure that the patients are distributed evenly among the nurses on the oncoming shift. Because this is a primary care unit, people more or less know in advance which patients they will be responsible for. In addition, she writes the names of the primary and secondary nurse on the whiteboard. In cases of doubt, if, for example a patient is re-admitted to the ward, the information is also recorded in the main card in the nursing documentation.

A nurse makes a remark while looking at the whiteboard:

Nurse A: For how long are we actually going to have Sigrid in 9.2. at our ward? She disturbs the other patients and she denies taking her medicine.

Nurse B: I thought she had been referred to the local nursing care centre?

Head nurse: We have sent an application, but haven’t got any answer yet [she writes ‘application to home nursing care’ behind the nurses’ name on the whiteboard – see figure]

Nurse A: We need to get rid of her, she doesn’t actually belong here. Even her daughters want her out of here.

Head nurse: I’ll see what I can do. I’ll try to speak to our head physician, maybe he can help us.
Many of the patients suffering from a rheumatic disorder are old and in some cases mentally disturbed (which is the case in the example above). These types of patients might behave quite unpredictably and thus nursing them might involve a lot of work. The patient discussed in the extract above is waiting to be transferred to a local nursing home. However, this process might take some time. In this case it obviously has taken too long. In order to speed up the process, the head nurse promises to talk to the head physician. Notice how the head nurse also enters the information on the whiteboard. This is done to communicate to all nurses, including those not working in this shift, that an effort is being made to handle the problem.

Also, in updating the whiteboard, the head nurse makes sure that newly admitted patients are divided evenly between the two assistant physicians working on the ward. The distinction is easily visible as names are written in red or blue, matching the color of the two binders holding the medical charts (see example of the blue medical chart in Figure 1). In fact, the act of writing new patient names on the whiteboard is only a small element in a long chain of performances made by several, people and artifacts. A professional evaluation made by the chief physician decides who is going to be admitted and who is not. The decision is documented in the admission plan. Prior to the arrival of the patients, their names are copied from the admission plan into the program-book, which again is kept in the meeting room easily available for nurses and others to write messages in. Because she has participated in this longer chain of events, the head nurse does not merely copy new names from the program book to the whiteboard. In the process she also talks about the patients, and in that sense shares her personal knowledge about them with the rest of the nurses.

Finally, the head nurse reads out loud the program of the day. This concludes the formal meeting. The program of the day is written in a book, which is normally kept in the meeting room, and typically includes practical things and messages as well as X-ray schedules and the surgery plan. That is, the surgery plans are not entered directly into the program book, but rather a copy of it has been downloaded from the EPR the day before and put into the program-book. It is important to know about ‘surgery patients’ and when they have been scheduled for surgery as, among other things, they have to go through preoperative and postoperative procedures. This is also underscored on the whiteboard, a remark saying ‘surgery’ is written behind the names of surgery patients.

5. DISCUSSION

A main objective with electronic based nursing plans is to replace and integrate information found in an assembly of heterogeneous, redundant and informal information sources. The implementation of such a tool is however a complex undertaking and more often than not it fails to produce the anticipated effects. In this chapter we elaborate further on how plans are heterogeneously distributed and how redundant information and informal documentation practices contribute to, and are a part of, robust plans.

5.1 The heterogeneity in planning

From time to time, in our case at regular intervals, various entities are drawn together in order to make a coherent account of the state of affairs and plan future events. This is evidently the case with Anne. The report is an outcome of a rather intricate, contingent and heterogeneous process. It is, in effect, a product of the various entities that enter the scene in the process of producing the report. For instance information about the medication is not remembered by Anne, but by the surgery form. In locating it, another actor, John, is introduced. Hence the final sentence “Got seloken during the operation without any effect” is the product of the effort of a network that includes Anne, John, the surgery form, the written report and the fact that it was Anne and John that picked up the patient from intensive care.

In Anne’s case, notice also how the output is in fact not reducible to one artifact alone (e.g. the written report). Information sources serve different purposes and are used differently in different situations. Hence in many cases they are purposely put in various places, for example information about the next X-ray is entered into the main card because it is where Anne expects other nurses to search for it; the insertion of the post-it note in a certain spot on the main card; the phone call to the public administration office and so on. Information about the state of affairs and future events is in fact deliberately distributed across several material artifacts as well as people. This makes the process of handing over information to the next shift irrefutable to the written report alone. Equally important are the oral handover conference taking place just afterwards, the oncoming nurses’ familiarity with the patient, the place where the handover is carried out, the availability of the different documents, and so on.

The same line of reasoning is applicable to the second example. The distribution of patients is made collectively available through the act of updating the whiteboard. However, it is not a performance of the head nurse alone; rather it is an accomplishment of a network including all the nurses, the whiteboard, the patient list, the program book, and so on. In the process, information is not merely transferred between entities. Rather it is being distributed on several entities. Yet, what appears to be a duplicate is not necessarily so as information entities are changed in the process of making and using them. As [39] put it:

“Information simply cannot be transmitted between settings without also being changed, as information is tied to its materiality” (p. 47)

By commenting on each patient while entering the names of the patients onto the whiteboard, the head nurse is simultaneously sharing her personal knowledge with the rest of the nurses. The information appearing on the whiteboard is in this sense not only a copy of the names found in the program, because, in the process, the knowledge attached to them is changed.

Planning entails more than filling in and reading off forms, whiteboard or the like. Neither the report, as illustrated by Anne or the handing over of information by Per, nor the distribution of responsibility by the head nurse can be depicted only as processes of moving (or transmitting) information. Rather, they are all processes of transforming information entities with the purpose of making them fit with a specific sociotechnical practice. The plan is in this sense in effect heterogeneously distributed in time and space and needs to be acknowledged as such in the design and implementation of electronically based nursing plans.

5.2 The redundancy in heterogeneity

In the theory section it was described how the design and implementation of nursing plans are embedded in an arena of competing interests (managerial, professional, vendor, practice, and so on). Making them work in practice thus entails finding a
realistic balance between the documentation of tasks and the natural flow of carrying out these tasks ([33]).

On one hand, embedding the plan into one artifact seems appealing as it may simplify both organizational information and work and contribute to fulfilling objectives related to e.g. organizational accountability. On the other hand, several studies have pointed that overlapping information sources and redundancies indeed have a role to play, as they are potential sources for reliability in collaborative work (see e.g. [6][10][19][36]). The redundant character of artifacts and information contributes in making components robust since if “one component fails for lack of knowledge, the whole system does not grind to halt” [19] (p. 86). In addition, information from different information sources may be compared in order to ensure proper information quality. This important role of artifacts and redundancy imply that people must pay attention to work context well beyond their primary work tasks.

One recent conceptualization of redundancy is put forward by [6] (pp. 159-161). A distinction is made between redundancy of functions, efforts and data. Redundancy of functions is referred to as the overlap in skills among people that enables a seamless flow of work and/or substitution of labor. Redundancy of effort is referred to as the repetition of tasks by one or more persons, while redundancy of data denote the existence of the same data entities in several places (for this latter category, see also [10]). As will be illustrated below, all these various forms of redundancy can be discerned also in our case. Given the heterogeneous nature of planning, we furthermore claim that redundancy is always in the making. It is an ongoing process of questioning, negotiating and validating. Finally redundancy might serve secondary purposes like alleviating frustration, enabling different focus of attention, building trust, etc.

Heterogeneity absorbs redundancy, and as illustrated in both our examples, redundancy is crucial for the ongoing accomplishment of work. Perhaps the most obvious example is the patient list. Information found on the list is copied there from various entities. The list thus exemplifies what Cabitza et al. [6] would call redundancy of data, as does the whiteboard, the program-book and even the oral account provided by the reporting nurse. Assuming that information is tied to its materiality (see also [16]), these artifacts are however not identical.

To clarify our argument let us return to Anne and the production of the report. In Anne’s case a coherent account is not produced despite of, but rather because of the existence several, distributed and redundant entities (including redundant functions, efforts and data). For instance, she is asking John (cf. redundancy of functions), she is drawing on the list (cf. redundancy of data), she is checking the surgery form twice (cf. redundancy of effort), and so on. Redundant information is also produced in the process. As illustrated in figure 1, the written report is more or less containing elements of information also documented elsewhere. Despite the fact that all forms and documents are available for, and used by, the oncoming nurse, it is exactly the redundant feature of the written report that enables an efficient and high-quality handover. Anne explains why:

“I know that a lot of the information in the report is also written elsewhere. Still I write it in the report to make sure she [nurse starting the next shift] is aware of my main observations and medication. It’s important for her and helps her find out what to focus on, where to look for more detailed information [different forms], and so on” (Nurse)

Anne’s explanation is valid also for the second example. In the collective process of distributing patients, elements of information are intentionally made redundant in order to facilitate various functions. For instance, when the head nurse writes ‘application to home nursing care’ on the whiteboard behind the name of the patient that is frequently stirring up the ward, it is not a planned act, but rather carried out because of an escalating discussion among the nurses. The content of the whiteboard is in this sense negotiated in response to changes in its surrounding network. Information is made redundant because it serves a specific purpose. When recorded, the remark serves the purpose of continuously reminding the group of nurses that an effort is being done to solve the problem.

Health care relies on a mixture of formal and informal concerns [26] and here we have merely touched the surface of the issue. Still it is our observation that that reducing redundancy and circumventing informal practices are largely framing current efforts of introducing EPR’s in modern hospitals [17][31] So far, though, the results have been disappointing. Fully integrated EPRs are rare [15]. Hence the growing body of literature addressing the relevance, and indeed the importance of redundancy in health care work [6][10][36], is highly welcome as it evidently plays a crucial role in the production of coherent and effective health care services.

6. CONCLUSION AND IMPLICATIONS

There is planning but no plans. The prevailing perception of an almost total lack of use of nursing plans is ill founded and ultimately misconstrued. The practice of planning does not take place through the filling out and subsequent ‘use’ of a (paper-based or electronic) nursing plan. Rather planning unfolds (i) distributed across a network of material/technological and human resources and (ii) continuously through ongoing and negotiated additions, deletions and changes. The official nursing plan, which is hardly visible in our case, is in this sense merely a node in a network of interconnected, mutually dependent nodes of material arrangements, practices and different professionals.

Planning is a process where information entities are continuously contextualised and de-contextualised to make them relevant for particular events or to adapt them to certain material arrangements (such as the whiteboard). Redundant information entities are created on the spot in order to preserve an efficient, continuous and high quality delivery of care services (i.e. preserve the flow of work). It is this heterogeneity of information sources that finally makes up for, and serves as a premise for, a high-quality nursing plan. Thus, in practice, the plan should be conceptualized as a multitude of relations that are constantly changed, altered, and negotiated in response to changes in the surrounding nodes that constitute its heterogeneous network.

We outline two aspects that follow from our analysis. Firstly, the implicit, at times explicit attempts to cram planning into one, singular artifact is misconstrued. Rather than designing the nursing plan, planning should be supported in a distributed manner and embedded in the many, existing information systems. Secondly, the dangers and, indeed, ‘the problem’ of duplicated and redundant information are readily understandable – but exaggerated. Robust, and effective planning presupposes a certain level of redundancy (see e.g. [10][29]). By this we do not claim
that our focus should be only on the consequences of reducing redundancy based in the old work practice as the expression of redundancy (and artifacts used) may change and new forms of redundancy may be shaped when as technologies are being implemented.

Future research needs to further explore the role of informal and redundant information sources in healthcare work. This involves in particular situations where new technologies (such as electronic based nursing plans) are being introduced into existing work-practices. Also, the interconnected, and mutually dependent entities of material arrangements, practices and different professionals underscore the need for doing empirical studies that follow the whole process of implementing a new system (before, during and after). Such studies may reveal both explicit and implicit dependencies that must be taken into account. They may also indicate how, and to what degree, a new system is used, as this may not be entirely clear to the users themselves.

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