

# **Changes in interaction between specialists caused by the Electronic Patient Record**



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**August 2008  
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## **Preface**

This report presents the results of my master thesis research. Although it required some hard work of myself, I owe a lot to the people who helped me through this project. First of all I would like to thank my supervisors Prof. dr. N.E.J. Oudshoorn and dr. H.G.M. Oosterwijk. They taught me how to perform research and helped me to set out the guidelines of this master thesis project. Especially Nelly provided lots of feedback to organise my thoughts and intensions, and stimulated me to perform the best research I can.

Furthermore I would like to thank al the members of the Head and Neck cooperative oncology workgroup at the Radboud University Nijmegen Medical Center. They allowed me to look over their shoulder during the meetings and made time in their busy schedules for the interviews; Prof. dr. W.J.G. Oyen, dr. F. Van den Hoogen, prof. dr M.A.W. Merkx, drs. L. Liauw, prof. dr. J.H.A.M. Kaanders, dr. C.M.L. Van Herpen, prof. dr. J. Slootweg, J. Arnts, J. Boland, N. Van der Veer, M. Arts and R. Jansen. Special thanks to Prof. Dr. M.A.W. Merkx, who guided me through the medical world and helped me in formulating the research and provided a platform for my problems and questions.

Finally I would like to thank my parents and sisters who stimulated me to follow my dreams and supported me in my pursuit of my second education and my masters degree. They provided a platform where I could express my frustrations, but also my triumphs. They supported me in my attempt to reach for the stars.

Thank you all.

Judith A.G. Klarenbeek

August 2008

## **Management summary**

### **Introduction**

The majority of the hospitals in the Netherlands are developing an Electronic Patient Record (EPR). The aim of an EPR is to make patient-related information available through the entire hospital and eventually even nationally, to be able to provide improved collaborative care. However, most hospitals are still in the process of developing such an IT-application.

The Radboud University Nijmegen Medical Center has an already operational EPR and is to be seen as a frontrunner in the development of an integrated ERP. Since April 2007 a special oncology module is added to the EPR. It provides the Head and Neck cooperative oncology workgroup structured information on individual patients and access to the reports of previous meetings and data in the general EPR. This research investigates whether the introduction and use of the EPR has impact on the interaction of the specialists in the workgroup. The research question is:

**What is the impact of the electronic patient record on the interaction between specialists in the multidisciplinary meetings?**

### **Methods and theory**

A case study of the head and neck cooperative oncology workgroup is conducted. The meetings have been observed (eight meetings observed, in six of them reports are made) and interviews have been held with specialists and nurses. Of every specialty in the workgroup, one specialist is interviewed. Some specialties are supported by specialised nurses, who are also interviewed. In total seven specialists, four nurses and one secretary have been interviewed.

The sociotechnical approach as described by Berg and the SCOT-approach are used to analyse the data in order to increase our understanding of how the technology influences social behaviour and becomes part of the cooperation between health care providers. I evaluated if the EPR is in fact part of the social structure of the multidisciplinary meetings.

### **Results**

The results of this research are structured by the sub-questions. The different specialties are grouped by the type of their activities as 'treating specialists' (which consists of the group of 'surgeons' and the group of 'non-cutting specialists') and the group of 'supporting specialists', because this turned out to be a relevant distinction.

#### *Used sources of information*

The related sub-question is here: *What sources of information are used in the interaction in the multidisciplinary meetings?*

The radiological images, paper files and the EPR are used to the same extent as information sources during the meeting. The EPR is not the most important information source of the meeting (which are the radiological images). But the ERP becomes increasingly important when the patient is already discussed in previous meetings. We can conclude that when a patient is further down the line of diagnosis and treatment, the emphasis is rather on the EPR as a dynamic source of information. We can also conclude that the introduction of the EPR as new source of information has not replaced the use of the already existing sources of information.

#### *Meanings attributed to EPR and the way the EPR is used*

The related sub-question is here: *What meanings are attributed to the EPR and in what way is the EPR used in the interaction in the multidisciplinary meetings?*

Every specialist seems to describe the EPR differently. Therefore the EPR doesn't mean the same thing to every specialist or nurse, but different meanings are attributed to the EPR. The treating specialists (surgeons and non-cutting specialists) and their nurses attribute an active role to the EPR as a file to store and retrieve information for day to day work. They use the EPR extensively in their daily practice. The supporting specialties,

however, perceive the EPR more passively and rather think of it as an archive. In fact, they hardly use the ERP in their daily routine. Besides, the EPR provides not enough pixel-density to show the radiological images, which means that the radiologists still have to use their own system (and this decreases the intension to use the EPR). The supporting specialties are not in a person-to-person treating-relationship with the patient, which means that it is not necessary to have the same information as the treating specialists. Their role in the meeting is to provide the results of examinations so the treating specialties can make well-informed decisions.

The multiple meanings attributed to the EPR and the different ways of use cohere with each other. This is in line with the approach of SCOT, which explained that technologies are culturally interpreted and the description can differ according to the meaning given to it. The different groups of specialties attribute different meanings to the EPR and use the EPR according to their own meaning and interpretation.

#### *EPR used in preparation*

The related sub-question is here: *How is the EPR used by the specialists and nurses in the preparation of the multidisciplinary meetings?*

Three of the seven specialists and all the nurses prepare the meeting with the EPR. The specialists that do not use the EPR to prepare for the meeting, are mostly the supporting specialists, who also do not use the EPR in daily work or in the meeting.

Specialists, but also nurses have various ideas about the preparation of others.

Observation in one particular meeting showed that even remarks about the preparations of other specialists were made. For instance when it took some time for a specialist to find information, another specialist remarked: "like you could have seen in the EPR..." It demonstrated that the use of the EPR is not as much integrated in the work-processes of the former specialist as it is in the work of the latter.

Nevertheless, for three specialists and the nurses there is a concrete interaction with the EPR in preparation of the meeting, it is interrelated in their work and especially the nurses have adapted their preparation for the meeting, which now includes the use of the EPR. Their tasks have become less complicated, easier and less time-consuming.

#### *Differences in interaction and cooperation*

The related sub-question is here: *What are the differences in interaction and cooperation in the multidisciplinary meetings, between the old situation without the EPR and the new situation with the use of the EPR?*

Interaction is seen as the way health care professionals act and react upon each other; both in terms of the way they cooperate and communicate and on which grounds they cooperate or communicate. Interaction therefore contains multiple aspects of the contact of health care professionals; cooperation, communication and source of information.

According to Berg's sociotechnical approach (2003) the EPR should have an effect on the (social) process of the multidisciplinary meeting, because social processes and technological processes are intertwined.

Four of the seven specialists stated that the interaction between specialists has not changed. The remaining three perceive the demonstration of information in the meeting as more efficient, which leads to a more efficient meeting and has a positive impact on the interaction. The specialists and nurses stated further that the cooperation of specialists has not changed. The changes in interaction that they noticed, therefore refer primarily to the efficiency of communication. The availability and richness of information during the meeting is noticed. The discussion is therefore more goal-oriented and the communication in the meeting is faster and more efficient.

The EPR also seems to have improved the harmony in treatment-programmes of patients. The treating specialists feel that the treatments by different specialists are tuned to each other and the way the care given by one specialist fits with the care given by another specialist.

**Conclusion and discussion**

The groups of specialists have different characteristics. The treating specialists (the surgeons and the non-cutting specialists) differ from the supporting specialists in work processes. The supporting specialists do not treat the patient, but support the other specialists with additional examinations and providing results. Accordingly, their role in the meeting is to provide information so the treating specialists can make decisions. This is also visible in their way of use of the EPR. The supporting specialists can be viewed as non-users of the system, because they don't or hardly use the system in daily practice. They do not need the information from the EPR to perform their work. The example mentioned before; the EPR doesn't provide enough pixel-density for the radiologist to show images, therefore another system is used besides the EPR. The use of this separate system also decreases the intention and motivation of the radiologist to use the EPR. The only exceptions in this group-distinction are the nuclear medical physician and the medical oncologist, their use of the EPR doesn't fit with their group because of their previous used systems.

These various use of the EPR between the groups of specialties might lead to differences in the learning curve of the specialists. Users will respond in different ways to technologies; some will be reluctant while others may be eager to use the technology to enhance the efficiency and effectiveness of their own work. Especially when users feel that the technology will improve their own work, they will easier grasp the full meaning of the technology and learn to use it. Therefore in a group of specialists, such as the head-neck cooperative oncology workgroup, differences between the specialties can exist. This research showed indeed that the supporting specialists were not as advanced on the learning curve as the treating specialists. This can be explained by the previously mentioned non-use of the system, and the lacking necessity to use the EPR in their work. The treating specialists are more experienced in working with the EPR, because they use the EPR in daily work and using the EPR can improve their work.

The introduction of the EPR has meant a change in the work processes of the nurses involved in the meeting. The preparation of the meeting is less complicated, easier and it takes less time to gather, check, print and distribute the necessary data. The oncology module of the EPR organizes information in such a way, that the nurses no longer have to search for information and browse through multiple systems. The nurses are also more involved in the meeting because of their new role as operators of the EPR.

The EPR has indeed an impact on the interaction between specialists in the multidisciplinary meetings, more specifically on the efficiency of the communication in those meetings. The direct availability and richness of information leads to more informed discussions and an easier preparation of the meeting. The EPR can therefore change the practice of medicine. Even though the RUNMC's EPR is still under construction and incomplete, it has already its effect on the speed of communication, the efficiency and the decisions in the treatment-programmes of the patient during the head-neck cooperative oncology workgroup.

Therefore the real issue is not the implementation and use of an application or tool, but the EPR is all about the availability of information. That's what different in the meeting. Whether the information provided by the EPR is used or not is not even relevant. The fact that it can be used if necessary; that's what the extra value of the EPR is. The availability of information is the value of the EPR and maybe this is also its largest effect: the reassurance that the information is present and, even if nobody prepared it, it is traceable and can be used immediately. This knowledge is the effect and benefit of the EPR.

This explorative research gave some insights into the impact of the EPR on the interaction between specialists. However, it can not give a full account of all the changes

that were noticed. Based on the findings, it can be indicated that there are changes in the communication and efficiency of the meeting that are caused by the availability of information through the EPR. To be sure if this is in fact the case, further research must be conducted.

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## **Introduction**

### **Context of this research**

"Given today's explosion of knowledge, decision making has become a process of distributed cognition in which team members bring their expertise and domain knowledge to the issue at hand, collaborating to arrive at the best possible solutions. Technology has contributed to these processes by providing improved information management." (Safran, Jones, Rind, Bush, Cytryn & Patel, 1998).

Safran notices that the capabilities of computers are allowing these technologies to play a new role in complex health organisations. IT-applications can therefore increasingly facilitate healthcare providers.

The EPR is such an application; it can provide patient-related information at any time at any place. Presumably this can have an impact on the social structure of a meeting. Because social and technological structures are intertwined according to Berg, and because of that a change in the technological structure has an effect on the social structure (Berg, Aarts & Van der Lei, 2003). The social structure of a meeting consists of the interaction, participation, communication and cooperation that takes place during a meeting. The size and form of this effect can differ, depending on the change in technology.

At April first 2007 an oncology module of the EPR was introduced in the multidisciplinary meetings of the head and neck cooperative oncology workgroup of the Radboud University Nijmegen Medical Center (RUNMC). During these meetings, specialists and nurses with various disciplinary backgrounds discuss and determine the best treatment program for patients with cancer in the head and neck area. It is crucial to have complete and up-to-date information as input for those multidisciplinary meetings, to be able to make decisions. The oncology module of the EPR provides insight into the previous reports of the patient and/or to the question the patient is enlisted for. Together with access to this oncology module, there was immediate access to the entire EPR in this multidisciplinary meeting.

The use of the EPR in the head and neck cooperative oncology workgroup can be considered as a technology that has an impact on the social structure of the health care, as mentioned by Berg et al. (Berg et al. 2003). In this research, I will focus on one specific aspect of this social structure: the interaction between specialists in the mentioned multidisciplinary meetings. Considering Berg's statement, the following central research question is formulated:

**What is the impact of the electronic patient record on the interaction between specialists in the multidisciplinary meetings?**

### **Reading guide**

To provide an answer to this question a theoretical framework is used: the sociotechnical approach, which emphasises the intertwinement of social and technological structures. The theory of SCOT is used to look at the use of the EPR. These theories can be found (together with the methods of this research) in the first chapter. The second chapter gives a description of the situation of the RUNMC to be able to understand the influence and changes of the EPR: the care trajectory of a patient, a description of the old and of the new situation and a description of the work processes of nurses are all to be found in this second chapter. In chapters three, four, five and six the results will be presented. The conclusion and the discussion will be presented in chapters seven and eight. An overview of the literature and a glossary will be provided in the final chapters. At the end of the glossary a list of frequently used abbreviations is given. Documents, like the questionnaire and the observation scheme, are included in the appendices.

\*

\* In this thesis the words 'he' and 'she' are used interchangeably, for "he" can also 'she' be read. In this report the word "meetings" refers to the weekly meeting of the head and neck cooperative oncology workgroup of the RUNMC.

## 1. Theoretical framework and methods

### 1.1 Theoretical framework

The central idea in this research is that the introduction of new technology will have an impact on social behavior. We will use the sociotechnical approach as described by Berg (1999, 2003) as an explanatory framework.

#### 1.1.1 Sociotechnical approach

The starting point for sociotechnical approaches is that technological innovations are social processes, which affect organizations deeply (Berg, Aarts, and Van der Lei, 2003). It sees health care work as a social phenomenon which is guided by practical rationality, which can only be overlooked at a high price (i.e. failed systems) (Berg et al., 2003). With this comment Berg emphasizes that social processes are crucially important in the health care sector, that should be considered carefully when implementing new technology. If this is not taken into account, the technological systems might easily fail. Berg et al. (2003): "Sociotechnical approaches' aim to do just this: increase our understanding of how information systems or novel electronic communication techniques are developed, introduced and become a part of social practices. With this aim comes a concurrent ambition to *improve* these systems." Design of the technology is, according to Berg et al (2003), about finding the synergy between the specific particularities of health care work and the informative properties of ICT applications.

Thorough insight into the work practices in which IT applications will be used, is crucially important in the sociotechnical approach according to Berg (1999). A user-oriented perspective is indispensable, especially in organizations that pivot around the work of professionals. Berg (1999): "Since any benefit that IT might bring to health care has to be realized at the level of the concrete interaction with these tools, it is here that any development or evaluation process should start." The interactions should not be designed solely from the viewpoint of technology but from the viewpoint of the professionals that work with that technology and their work practices (Berg et al, 2003).

Berg (1999) explains that the sociotechnical approach to IT applications in health care can be characterized in three points: 'Health care practices are seen as heterogeneous networks', it tries to understand 'the nature of health care work' and it is characterized by an 'empirical orientation, with emphasis on qualitative methods'. I will discuss these items in greater detail.

- *Health care practices are seen as heterogeneous networks.*

The work practices in health care function as networks of humans, human action, organizational routines, documents, information etc. A health care department or ward is therefore "an interrelated assembly of humans and things who's functioning is primarily geared to the delivery of patient care" (Berg, 1999). An IT application should seamlessly fit in this interrelationship, instead of seeing it as a tool in the organization. The social and technical aspects are intertwined and according to Berg it should not be attempted to pry these systems apart because of this network relationship between the two systems. Berg (1999): "The interrelated elements (of technology and organization) constitute an assembly that should be dealt with as a *whole* rather than a technical subpart for the IT engineers and a social subpart for the social scientists."

- *The nature of health care work.*

Sociotechnical approaches focus on the *nature* of health care work as a social process and this includes working with information technologies (Berg et al, 2003).

"Sociotechnical approaches also emphasize the fact that health care practices are social settings like any other: structured by hierarchies, rivalries, institutional histories, and so forth. As any technology, information technologies affect the contexts in which they are introduced – in many different ways, and more deeply than is often expected."

The fact that it is a social process is also visible in the collectiveness of its nature. "The core activity of health care work practices is 'managing patients' trajectories: doing investigations, monitoring, intervening and re-intervening in order to at least temporarily cure or palliate patients' problems. In all but a few instances, managing patients' trajectories is a collective, cooperative enterprise" (Berg 1999).

The sociotechnical view of the work processes emphasizes this cooperative element rather than viewing the work as tasks for individuals. Berg (1999) explains this by saying that health care is characterized by its distributed decision making, by 'multiple viewpoints' and by its 'inconsistent and evolving knowledge bases'. Besides, the nature of health care work evolves during the work and in interaction with the other elements of the network. "Any concrete work activity only unfolds 'in the doing', in constant interaction with the contingent circumstances that make up the situation in which it is located" (Berg, 1999).

Introduction, implementation and evaluation of a particular technology should consider the intertwinement of the technological and social aspects. Pinch and Bijker's (1987) view of the sociotechnical approach confirms that in evaluation of a technology the social aspect is important. Their SCOT-approach identifies 2 stages. The first stage is "the interpretative flexibility of a technological-artefact must be shown", that is the demonstration that technologies are culturally constructed and interpreted. The second stage is called 'rhetorical closure': "Closure in technologies involves the stabilization of an artifact and the "disappearance" of problems. That does not mean that all problems have been solved once and for all, but that the relevant social group that has to work with the technology, feel that they can handle the problems in a satisfactory way. This again emphasizes the importance of the user-perspective as mentioned earlier. The meanings given to the technology by the relevant social groups is intertwined with their use of the system (Pinch et al., 1987).

- *Empirical orientation, with emphasis on qualitative methods.*  
 "The sociotechnical approach emphasizes the importance of deep empirical insight into the work practices in which an IT application will be used" (Berg, 1999). Berg indicates that the above mentioned network of the health care practice (with regard to size, involved persons, goals) needs to be clear before implementation or evaluation of the IT application can be meaningful.

The sociotechnical approach will be used as a focus to increase the understanding of how technology influences cooperation and becomes part of the cooperation between health care providers. To find out how technology affects social behaviour it is important to find out what meanings the participants in networks give to technology and how these meanings impute the use of technology. This can be done best in qualitative research, by interviewing health care providers who use the EPR. The perspectives and attributes of the health care providers will therefore be central in this analysis. Berg stimulates furthermore to see health care as a heterogeneous network with a nature of collective work-processes. The care provided to patients is collective and collaborative care and not provided by one individual. This too will provide a way of looking at the data.

According to the sociotechnical approach information systems become part of the social practices and the social structures of the network of health care. I will use the sociotechnical approach as a theoretical background while observing the multidisciplinary meetings to find out if the EPR influences the social structure. More specifically, is the EPR part of the interaction that takes place between the specialists or is it rather a separate tool that is used?

### 1.1.2 Flexibility and learning

In a heterogeneous network it is important to cooperate, especially when the work processes are as collective and cooperative as in health care (Berg, 1999). Multidisciplinary meetings provide the opportunity for various specialties to discuss the

treatment program of the patient. The EPR can be used to facilitate the group's decision making. In such meetings the EPR can be used to exchange information instantaneously and at the same location (Verhoef, Toussaint, Putter, Zwetssloot-Schonk and Vliet Vlieland, 2005). This has important advantages. Contrary to classical paper or word-files, which are basically static information sources, the EPR contains the latest information, is always up to date and provides the possibility to find other relevant information. It is a consistent place for information, which can be viewed at any time. It is therefore much more flexible and it provides the opportunity to navigate through relevant information sources. To have such information available at the same time and the same place is crucially important. It stimulates the awareness and conversation about a way of cooperation in the organization (Berenschot Communicatie, 2003).

The great advantage of the introduction of the EPR is the increase of flexibility to involve various information sources in decision making. However, it is not to be expected that these advantages are immediately visible from the moment the EPR is introduced. As discussed previously, the actors have to give meaning to these newly acquired technological possibilities and learn how to use the technology in their daily primary processes. If the new technology demonstrates clear advantages in the actor's processes, the willingness to use the new technology will increase. The benefits of the use of the EPR will unfold as a process of *learning by doing*. In this view, learning is the result of doing with experience as the stimulus for the learning process. Kolb (1984) has analyzed this phenomenon of a four-stage learning cycle that starts with the concrete *experience* of an actor. Actors will try to link such an experience to their own understandings and ask themselves if the new experience is somehow familiar to them, this indicates the phase of *reflexive observation*. In the next stage, called *abstract conceptualization*, they will develop a strategy to deal with this new experience and finally they will actively *experiment* with their newly developed approach. The concrete experience with such an approach is the starting point for a new learning cycle. It is to be expected that the learning process starts carefully, but accelerates throughout the process, especially when the new technology is beneficiary for the execution of an actor's primary process. This process of accelerating learning can be visualized in the following learning curve:

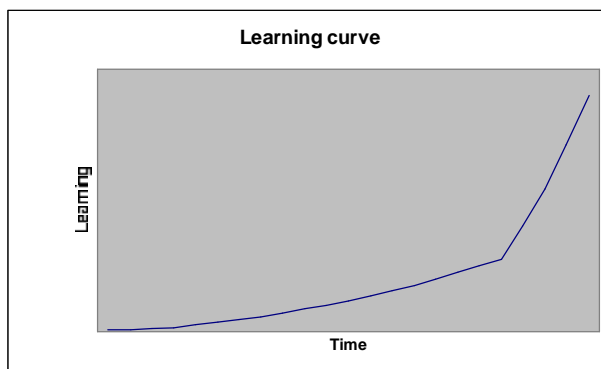


Figure 1: Learning curve

## 1.2 Specific sub-questions

The following sub-questions are formulated:

1. What sources of information are used in the interaction in the multidisciplinary meetings?
2. What meanings are attributed to the EPR and in what way is the EPR used in the interaction in the multidisciplinary meetings?

3. How is the EPR used by the specialists and nurses in the preparation of the multidisciplinary meetings?
4. What are the differences in interaction and cooperation in the multidisciplinary meetings, between the old situation without the EPR and the new situation with the use of the EPR?

### **1.3 Methodology**

Because of the lack of knowledge about the influence the EPR has on the cooperation between health care providers, work processes and health care delivery, an explorative research will be conducted. A single case study will give insight into the changes the EPR has on the previous named aspects.

First a literature search will be done in order to build an analytic framework.

After that a qualitative research is conducted, consisting of a single case study at the head-neck cooperative working group of RUNMC. The study first entails a series of observations of the multidisciplinary meetings. The third step entails in-depth interviews with specialists of various disciplines involved in the head-neck cooperative working group.

Building on the data and the pattern found, a second literature search will be performed, to determine whether the impact of the EPR on the interaction between specialists is common or stand-alone.

### **1.4 Case study**

A case-study is chosen to perform this research. For the case-study an oncology workgroup of the Radboud University Nijmegen Medical Centre (RUNMC) is chosen. The first reason for performing a case study is the limited time frame of the research. Another reason is the fact that only one workgroup in the hospital worked with the EPR, which means that only limited number of specialists can be questioned. This provides the researcher with the opportunity to deepen the answers of the specialists by questioning them during in-depth interviews, to be able to fully understand the meaning of their answers.

A description of the situation of the oncology workgroup of the RUNMC is presented in chapter two.

### **1.5 Observation of multidisciplinary meeting**

Eight meetings of the head-neck oncology workgroup will be observed. During the first and second meeting, the focus will be to familiarize the researcher with the goal, methods and procedures of the meeting, as well as to get some understanding of the content of the meeting and the medical language and jargon.

This knowledge will be used in the other meetings to observe the type of communication and interaction between health care providers, the kind of information that is exchanged during the meeting, the source of information that is used in the meetings and the comments and questions of the professionals involved. Interesting or remarkable remarks will also be noted, to indicate the knowledge the professional has of patient-related information or the source of information that is used or not.

Based on the experiences of the first two meetings, an observation scheme will be designed. The scheme contains the possible communication categories and sources of information. (The scheme is added in the appendices). During the meetings, the types of communication that occurred are registered in the scheme. It was not of interest how much time was spend on the type of communication, the important aspect was the kind of communication and not the length of it.

### **1.6 Interviews**

Of every involved speciality a specialist will be interviewed. When there are multiple specialists, the specialist will be chosen who is also involved in the meetings before the introduction of the EPR.

Nurses, attached to specific specialties will also be interviewed as well as the secretary who writes the reports of the meetings.

For two specialties there are (one or two) nurses involved in the meeting, those nurses are also interviewed. A nurse from a third specialty was also interviewed, but her information was not taken into account in the results, because she was not involved anymore in the meetings and didn't have enough knowledge about the new situation of the meeting with the use of the EPR.

The focus and structure of the interviews will be:

- the experiences in the multidisciplinary meetings, without the use of the EPR;
- the experiences in the multidisciplinary meetings with the use of the EPR;
- the way the information of the EPR has influenced their ability for decision making;
- the way the possible changes in cooperation between professionals have influenced their ability for decision making and to provide health care.

The questions are developed by the researcher, based on literature and the aspects found/ remarked in the observation of the first multidisciplinary meetings. The questions for the interviews will be tested by a test interview with an independent person, with the request to evaluate the logic of the interview questions.

The interviews will be recorded on tape (if interviewees agree). In the interview the EPR will be referred to as 'oncology EPR' (or 'oncologisch EPD' in Dutch), because the focus is only on this part of the EPR. It is called this way to prevent bias in the answers. Before the interview participants will be asked if they approve that their profession will be visible in the final report.

#### **1.7 Handling of data**

Data are collected at the Radboud University Nijmegen Medical Center and analyzed at Twente University. All the interviews are transcribed into word and will be sent to the participants for approval. The questions are assembled together with the appropriate research sub-question. The answers are compared to each other and the differences and similarities will be visualised in the results. Remarks and data from the observed meetings will be added to the results and conclusions will be drawn.

## **2. Description situation RUNMC**

To be able to understand and fully grasp the results of this research, it is necessary to give an overview of the situation of ear, nose and throat department (ENT department) at the Radboud University Nijmegen Medical Center, especially regarding the multidisciplinary oncology meeting. A brief description of the care trajectory, the old and new situation and the EPR is given in this chapter.

### **2.1 Care trajectory**

The care trajectory starts when a patient is referred to the RUNMC from their own general practitioner or dentist. Depending of the nature of the problem, the patient is referred to the ENT-department (ear, nose and throat) or to the OMF-department (oral and maxillofacial surgery). The first consultations take place during office hours on a Tuesday, when the patient is also seen by the other (OMF or ENT) specialist, by a radiotherapist and by an anaesthetics specialist. When there is a suspicion of a tumour, a variety of examinations and radiological images is requested. In some cases even a puncture is performed. When necessary an exploratory operation can be performed on Friday.

Nine days after the first consultation, when all the results are available, the patients' situation is discussed on Thursday in the head and neck cooperative oncology workgroup. (A photo of the setting of this meeting can be found in appendix four.) In this meeting the patients' medical history (when applicable) and current situation is discussed with the other specialists. The responsible physician presents the information. The results of the examinations are shared and radiological images are examined. This will lead to the determination of the type, size and sort of cancer. Accordingly the possible treatment-programme of the patient is discussed, which will lead to an agreement among the specialists and an advice towards the patient.

The nurses of the department of the primary physician will make an appointment with the patient in which the specialist will discuss the treatment-programme with the patient. If the patient agrees, the treatment will start. Usually, surgery will be performed by the primary specialist, radiotherapy will take place on the department of radiotherapy and for chemotherapy the patient will be referred to the medical oncologist. For the follow-up or aftercare the patient will be alternately seen by the ENT-specialist, the OMF-specialist and the radiotherapist in accordance with an existing schedule (Ouwens, 2008).

### **2.2 Description old situation**

This research focuses on the patterns of interaction during the multidisciplinary oncology meeting and how these interactions might change due to the introduction of novel technology. In the 'old' situation the hospital used to work with a variety of paper files. The paper files were supported by a variety of computer systems, in fact for every type of information a particular computer system was in use. For example, contact-information and basic medical information about the patient could be found in 'Labrador' (see chapter 2.3 for a description of this patient information system). To complicate things even more, the department of radiotherapy used a different dataset then the ENT-department and the department of OMF, which meant that they couldn't see each others information (Van Vliet & Van Herwijnen, 2006).

### **2.3 Content of information resources**

The below-mentioned information sources were frequently used by the specialists and nurses of the head and neck cooperative oncology workgroup.

#### **PAPER FILE**

The paper file contains information of the patient, like charts with clinical findings and notes of the specialist, consult-forms, a list of medication and drawings of the tumour. Most of the time even reports of operations and clinical pictures are

stored in the paper file. Each specialist creates his own chart and his own paper file.

#### LABRADOR

Labrador stands for: LABoratoria, RADiology Order Registration. Labrador is since 2003 the main patient information system of UMC St. Radboud in which information about the patient is stored (R. Van Vliet, G. Van Herwijnen, 2006). (Before 2003 the hospital information system ZIS provided this information.) It gives both contact information and clinical information of pathological results, examinations of blood, reports of operations and DBC-registrations. Labrador is not web-enabled, which results in compatibility problems when new parts are added to the system

#### ROCS

The programme ROCS (Radboud Order Communicatie Systeem) is an automation-programme which is used at the desks of several outpatient clinics, nursing wards and secretarial offices. It is an appointment system that contains information about the time and date of planned examinations, like an MRI.

#### IMPAX

Impax is the system of the department of radiology in which the images are visible. It contains all images and reports of those images. These cannot be extracted from the EPR, because the EPR's memory capacity is not suitable for presenting such images caused by the lacking density of pixels in the EPR.

#### DIGITOP

Digitop (DIGItale Tandheelkundige Onderwijs Praktijk) is a registration system mostly used by nurses. In this system they can keep (management) information up-to-date. Information about the speed of turnover of patients to other departments is being kept in here, as well as images and X-rays of the jaw.

#### PALGA

Palga (Pathologisch Anatomisch Landelijk Geautomatiseerd Archief) is a specific system for the department of pathology. This system stores information about pathological results and reports. Only conclusions of pathological examinations can be found within PALGA. PALGA is a nation wide system, which contains pathological data of the Netherlands.

### 2.4 Differences between departments

In the preparation of the cooperative meeting, differences may occur between departments due to access and use of different information sources. In the table below I have outlined the most important data source for the various actors of the multidisciplinary meeting.

	Paper file	Labrador	RoCS	Digitop	Pa ga	Impax
ENT	X	X				
Nurses		x	x			
OMF	X	X				
Nurses	X	X	x	x		
Radiotherapy	X	X				x
Nurses	X					
Medical oncology	X	x				
Nuclear medicine		x				X
Pathology		(x)			X	
Radiology		(x)				X

Table 1: Used systems before the introduction of the EPR.



## **2.5 Description new situation / content EPR**

In recent years UMC St. Radboud has developed an electronic patient record (EPR). By using this system health care providers of all departments in this hospital can find information about the patient. This system aims to function as an umbrella for already existing systems. The EPR is not an entirely new system; it rather takes information from the other systems. It assembles the information of the patient and provides a complete and structured overview of all relevant information.

The EPR is not complete yet; new features and storing capabilities for information are added every time. One of the goals is to fully remove the paper files from the daily work of the physicians and nurses. At the moment the EPR is still used in combination with the paper files.

The eleven oncology workgroups of the UMC st. Radboud previously used 14 previous existing oncology data information systems to provide information in the preparation of a meeting. These systems were all integrated in one integral oncology data information system (ODIS), which is the oncology part in the Electronic Patient Record of the hospital (J. Van Dijck, 2006). This is important because interaction between physicians is common within the oncology-departments of the hospital. Multiple specialties need to cooperate, to provide each other with the necessary information to be able to treat the patient.

Before the existence of the EPR, these specialists had to gain the necessary information from other specialists in the multidisciplinary meetings. These meetings were also used to indicate towards the specialists, which tasks had to be performed and to determine the treatment programme of the patient.

Since April first 2007 the EPR is presented on screen in the head neck cooperative oncology workgroup. The special oncology module, ODIS (oncology data information system), has been added to the EPR to facilitate this workgroup. The module contains the list of patients who are to be discussed in the meeting. But when required, it can also provide a list of patients who will be discussed another week.

Besides the name and date of birth of the patient, the phrasing of the medical question is also visible. This gives an indication of the reason of enlisting the patient for the meeting. This basically provides a focus for the discussion in the meeting and provides the opportunity to prepare the meeting accordingly. The patient's examinations are also visible on screen, this makes it easy to see at first glance which results have to be present during the meeting. And finally the specialty who enlisted the patient for the meeting is visible.

When a patient is selected the screen opens with the oncology reports of that particular patient. When the patient has been discussed in an earlier meeting, the report of that meeting is visible. Since April 2008 the reports of five years ago should even be visible. Those reports have been extracted from the previously used word-files and placed in the oncology module in the EPR.

Other information, which is situated in the regular EPR, can be entered by clicking on the subject in the bottom of the screen. This feature gives the opportunity to make information about results, clinical photos or reports of operations directly available.

The general EPR has a couple of modules. First of all there's the general module with patient information like contact information, date of birth etc. There's also medical information in the EPR about anamnesis, diagnosis, admittance of the patient in the hospital and the primary physician.

Reports are also visible in the EPR, reports of operations, reports of pathology results and reports of examinations of the radiological images. Some images from radiology are visible through the EPR, such as thoracic x-ray. Most of the images from radiology are however not available through the EPR because they require a high density in pixels, which the EPR cannot provide. The programme Impax is used by the radiologists to assess and show radiological images (see also the explanation of the programme in chapter 2.3).

The EPR registers DRG's (diagnostic related groups or in Dutch: DBC; diagnose behandel combinatie). Letters that have been received and sent to the patient or general practitioner are visible and referral letters from the referring physician can be entered.

A special module has been equipped for storing clinical pictures, made by a medical photographer. These are, for the head-neck cooperative oncology workgroup, often pictures of the face or mouth of the patient, from various points of view. The reports of the head-neck oncology workgroup are visible to other physicians, although they can't change that information. They can see that the patient is being treated and discussed by the head-neck cooperative oncology workgroup. Conversely the specialists of the head-neck oncology workgroup can also see if the patient is known and being treated by another oncology workgroup, like the oncology lung workgroup.

As mentioned, the EPR is not complete yet. There's currently no medication file in the EPR. The patient has still to answer questions about his/ her use of medication in multiple departments and this has to be registered in the paper file. A nursing file is also not yet available in the EPR, as are consult-forms of the various departments, private notes of the physicians and drawings of the tumour (which can provide a better view of the tumour when it cannot be captured in a photographic image). The EPR is designed to facilitate care for patients, it is therefore not yet possible to search for management-information or use the EPR for research purposes.

The differences in the two situations of the meeting (before and after the introduction of the EPR) are visualised in figure 2.

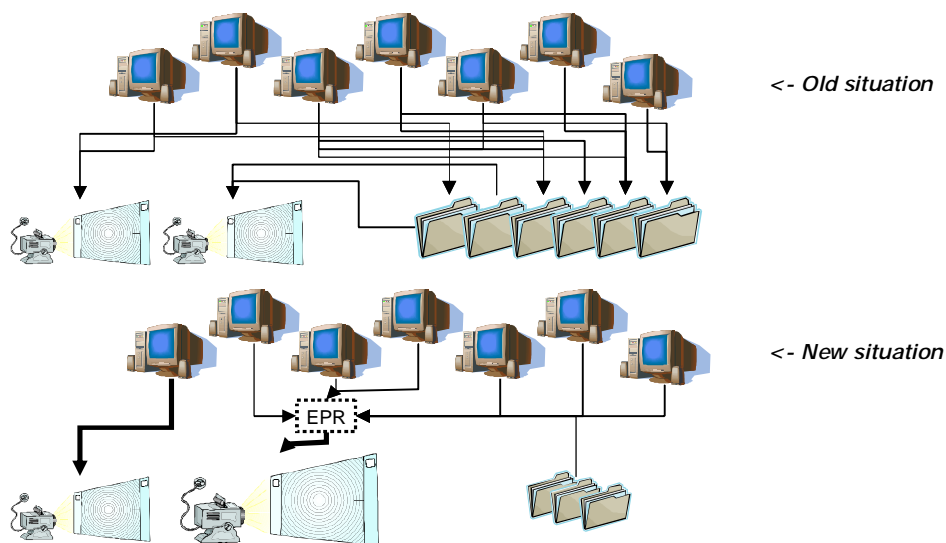


Figure 2: Before and after situation of the introduction of the EPR in the meeting.

From figure 2 it is clear to see that the EPR uses the same information sources, but has structured this information to provide better access to information and to navigate in a structured way through the information.

The great advantage of the new situation is the immediate availability of the information (all information is available) and the possibility to research the patient's medical history.

## 2.6 Work practices of nurses in preparing the meeting

The nurses of the departments OMF and ENT do much preparatory work before the meeting can start. Their actions before and after the introduction of the EPR are described below.

#### *2.6.1 Before the introduction of the EPR*

The classical pattern was that patients had to be enlisted for the meeting. Usually this was done by one of the nurses, but sometimes the secretary or the specialist would enlist patients. Enlistment could be done by sending the name and date of birth to the secretary of the meeting by e-mail.

The list of patients who were going to be discussed was sent by e-mail to each participant of the meeting. For each of the patients of the own department on the list, the information was gathered from multiple systems. Each system had to be started, the patient number had to be entered and the necessary information had to be looked at, checked and printed. The printed information had to be given to the specialist in time for him to prepare the meeting and had to be placed in the paper file. This took a lot of time, because the results had to be found in different systems and printed separately.

The patients that were not presented by the department in question were not checked as thoroughly. Of these patients only the paper files were gathered and taken to the meeting.

When a patient was enlisted late before the meeting, there was a chance that not all information was gathered in time. As a result, the other departments could not prepare for the patient in time.

The reports of the meeting were sent by e-mail and had to be printed on stickers. Each sticker should be placed on the paper file.

#### *2.6.2 After the introduction of the EPR*

Enlisting patients to the meeting is still done by the nurses and sometimes by the secretary or the specialists. The enlistment is done by each department by opening the EPR and simply clicking the buttons in the patients' electronic file in the oncology module of the EPR.

In preparation of the meeting the oncology module of the EPR is opened by the nurses and the list of patients that are going to be discussed is on screen. All the patients that are going to be discussed, including the latest enlisted patients, are visible. Of each patient that's going to be presented by the department in question the information is checked by clicking on the name of the patient. All the available information of the patient can be found without entering any number or switching between systems.

The specialists find the information themselves, so it is not necessary any longer for the nurses to print the information. The nurses check the results of information of each patient to see if all results are in and the information is complete so the patient can be discussed.

For each patient one nurse looks at the results of the examinations and shortly writes down what the results are. This information is for helping herself during the meeting and a guarantee that important issues are not forgotten in the discussion.

#### **2.7 Changes through the years**

The introduction of the EPR is another step for the head and neck cooperative oncology workgroup in the last decades. Figure 3 gives an illustration of the development through the years.

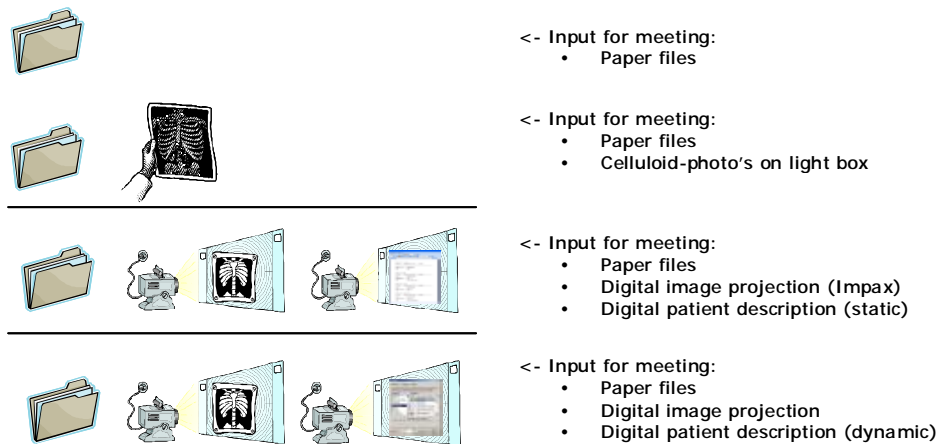


Figure 3: Illustration development input for meeting.

The initial meetings started just using paper files. The next step was that the paper files were extended by radiographic images on a light box. The third step was that radiographic images were digitally projected on one screen, while simultaneously the basic patient information (using a word-file) was presented digitally on another screen. The last step is that patient information is derived from the EPR, which provides even more information. Different kind of documents or the patients' history is only a few 'mouse-clicks' away, which allows easier navigation through patient's medical data and history.

Especially the last two stages are of interest for this research. Previously on the right screen a word file was projected. The word file contained the name, date of birth and hospital-number of the patient and a brief description of the question the patient was enlisted for. This word-file was static and couldn't be changed. In the last stage is visible that the word-file has been replaced by the EPR, which is a dynamic source. Although the number of screens remains the same, the information has become dynamic and more complete. The question rises what kind of changes this alteration entails. What does this mean for the specialists involved in this meeting, and does this mean the same thing for different kind of specialists? The involved specialties have different natures and can be grouped accordingly. These groups are visible in figure 4.

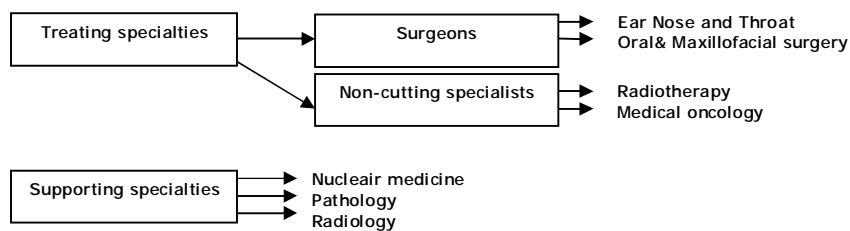


Figure 4: Groups of specialties

### 3. The use of sources of information

In the theoretical framework I have argued that the introduction of a new technology or the change of an already existing technology is most likely to change behavioural patterns and social processes. Users will respond in different ways to technologies; some will be reluctant while others may be eager to use the technology to enhance the efficiency and effectiveness of their own work. Especially when users feel that the technology will improve their own work, they will easier grasp the full meaning of the technology and learn to use it, sometimes even beyond the scope of the designer. The introduction of the EPR in the multidisciplinary meeting did not change the setting. The two screens in the conference room, where the meeting is held, still show both images and texts. When looked closely towards the right screen, which shows text, there is a difference; it is much more dynamic than before. The medical history of the patient and the results of several examinations are within reach, which allows easier navigation through patient-information. However, it is unclear if the specialists and nurses in the meeting will use these new possibilities. Will they use the information provided by the EPR in their decision-making? Here we arrive at the first sub-question in this research: ***What sources of information are used in the interaction in the multidisciplinary meetings?*** Basically the participants in the meeting have access to paper files, radiological images and the sources provided by the EPR.

The meetings are scheduled every Thursday and take on average two and a half hours. In six meetings a total of 156 patients were discussed. This is an average of 26 patients per meeting. In the longest meeting 41 patients were discussed and in the shortest meeting 19 patients. To be able to determine the best treatment programme the specialists needed an average of approximately 1,6 source per patient. The most used source was the paper file (36,76%), followed by the radiological images (32,41%) and the EPR (30,83%).

#### 3.1 Importance of information sources in interaction

The radiological images are considered to be the most important source of information by most of the (treating and supporting) specialties. The nurses (who are supporting the group of surgeons) however attribute equal importance to the radiological images as to the paper files. Only the specialist of pathology finds his own paper based pathology reports the main source of information. He is the only specialist for whom the images are of no importance for his work, neither has been in the past.

Before the introduction of the EPR in the multidisciplinary meeting, the treating specialties perceived the information by word of mouth as an important source of information, together with the paper based charts. This perception is shared by the supporting nurses.

In the new situation where the EPR is available, the non-cutting specialists think that the paper-based charts are an important information source. One of these non-cutting specialists, the medical oncologist describes that for patients who are discussed but who have not been seen by the medical oncology department (which means that there is no chart of the patient on this department) the EPR, radiology images and the information of the pathologist are of equal interest. She adds that the oncology case history is the most important information to look up, because it's not always presented correctly.

One of the surgeons (the ENT-specialist) mentioned that the paper-based information, like the referral letters and the consult-forms, were important. This seems logical, because especially cutting-specialties use these consult-forms and referral letters, while non-cutting specialists gather their information from the charts.

The EPR is mentioned by the other surgeon (OMF-specialist) as important source. The supporting nurses and secretary also think of the EPR as an important information source, together with the paper files and the radiological images.

Some of the treating specialists (and their supporting nurses) add that eventually it depends on specific patient-characteristics which information source is most important. For some patients images can be more important, while with other type of patients the examinations from the specialists during consults (which are stated in the paper files) are more important. Even though there are clear patterns in oncology, the patients may differ widely. The more a patient deviates from the general pattern, the more likely it is that all sources are used.

For a new patient, the images and consult-forms seem to be the most important source. The images have not been seen in advance of the meeting, so these results are new to each and every specialist. Also the consult-forms are not shared before the meeting, so this information is new to most of the specialists too. This increases the importance of both images and consult-forms. Yet, when a patient is discussed previously, the EPR becomes increasingly important. The EPR contains after all the reports of previous meetings, in which information about previous decisions is kept. The importance of the EPR as reported by interviewees is confirmed by my observations during the multidisciplinary meetings. This makes it risky to draw general conclusions regarding the use of sources. For new patients the emphasis is on paper sources (consult-forms) and images. If a patient has moved further down the line of diagnosis and treatment, the emphasis is rather on the EPR as a dynamic source of information. Here I conclude that on average the use of sources may be equally important in every meeting, but that the importance of the EPR increases during a patients' treatment programme. The further down the line, the more important the EPR.

### **3.2 Use of information sources in interaction**

The treating specialties (with exception of the medical oncologist) use the EPR in the interaction in the multidisciplinary meeting. Their most used sources of information are the reports of previous meetings, the clinical pictures and the laboratory reports. Most information about anamnesis and clinical information of the patient are still found in the status and paper files. Radiological images and clinical photo's are both used to discuss new patients, this hasn't changed with the introduction of the EPR, although most of the clinical photos of the surgeons are now presented through the EPR instead of handed out on paper. This causes positive changes in the efficiency of the meeting.

It is striking to me that the paper files seem to be more used than the radiological images, while the specialists don't find the paper files more important. While observing the meetings it was noticed that the EPR is showed on screen, but is only briefly looked at. It doesn't seem like the information is read extensively. The specialists are more focused on the radiological images. When uncertainty exists about some information the EPR is checked to see if an answer can be found. It is also noticed that the primary physician, who presents the patient, opens the paper file more often than the other specialists. That could be because the information that is shared is read from the consult-forms and the paper charts in the paper file. When a patient is discussed for the second time, the question is frequently asked by one of the specialists what was discussed in the previous meeting or which type or stage of cancer has been reported. For this information the EPR is used. One of the surgeons (the OMF-specialist) even states that for this group of patients the EPR is the only information source that is used. The observations show that this is not the case for every specialty. The specialists in the meeting became accustomed to the form and shape of the EPR. The information is conveniently arranged and the reports are readable. This means that the specialists know exactly where the information can be found on screen. It can therefore mean that specialists look more intensively in the EPR than is visible at first glance. A quick look into the EPR can mean that they have already searched and found the information they were looking for and therefore use the EPR more than described.

Furthermore it struck me that the supporting specialties (with exception of the nuclear medicine physician) don't or hardly look into the EPR. The treating specialists do, although the frequency differs per specialist.

When the ENT-specialists present a patient, they rarely look up from their paper files. When they do check other sources of information, they check the radiology images but rarely the EPR. It is noticed that they do look at the EPR when clinical photos were showed. When the OMF-specialists present patients, they also read from the paper file but look at both the EPR and the radiology images. The radiotherapist mentions that his use of the EPR during the meeting is increasing but it takes a while to get used to the EPR.

### **3.3 Conclusion**

Berg (1999) states that the only way that IT can bring a benefit to health care is when there is a high level of concrete interaction with the IT-application. The benefit that the EPR can bring to the meetings is therefore dependable of its role and use in the (preparation of) the meeting.

The radiological images, paper files and the EPR are used as information sources during the meeting. The EPR is not mentioned as the most important information source of the meeting (which is the radiological images). The observations confirm that these images are indeed often used. There is, however, still some interaction with the EPR, which is essential according to Berg (1999). We can however conclude from the observation that the introduction of the EPR as new source of information has not replaced the use of the already existing sources of information.

Before the introduction of the EPR in the meeting the information by word of mouth was mentioned as important, which seem to be replaced by the EPR as important information source. Although the EPR is less prominent viewed as an important source, it becomes increasingly important when the patient is already discussed in a previous meeting, because it consists of the reports of previous meetings.

Most of the supporting specialists don't think of the EPR as an important information source. This can be explained by their non-use of the system. They don't need information from the EPR during their work and during the meeting. The EPR is less relevant for the content of their work and their role in the treatment of the patient than for those of the other groups of specialties.

#### 4. Meanings and attributes of the EPR

Users can react very different to a newly introduced technology. Some may observe the technology, but don't insert it in their primary processes because it does not seem to fit in their working practice. Others may observe that same technology, accept it and adapt their work processes so the technology becomes part of it and some even accept and internalise the technology and use it even beyond the designer's perspective. The central idea is that users attribute a meaning to a technology and use the technology according to their meaning.

The users that perceive the technology as useful and can imagine the benefits the technology can bring to their work will probably give a different meaning to the technology than those who don't see benefits for their daily work and who hardly work with the technology. In this chapter I will discuss the answers to the research question: *What meanings are attributed to the EPR and in what way is the EPR used in the interaction in the multidisciplinary meetings?*

##### 4.1 Meanings attributed to EPR

The surgeons, non-cutting specialists and the supporting nurses from these departments attribute meanings to the EPR that visualize an active role of the EPR in their work. They think of the EPR as a file to store and retrieve data for day to day use, a reference work and a (possible) instrument to create structure to the meeting. Most of the treating specialists also commented that the EPR does not function in this way yet and that this could be improved. The ENT-specialist furthermore perceived the EPR (amongst other meanings) as a demonstration device.

The ENT-specialist added that there is already a slight improvement in the structure of the meeting. The fact that information is always present, causes that the meetings don't have to be interrupted to find photo's or results which have been lost in the paper status.

The supporting specialties attribute a significant different meaning to the EPR. They perceive the EPR more as an agenda for the meeting or as an archive. The supporting specialties admit that they don't know if it is used as a file to store and retrieve information, because this function is not needed for their daily work. The nuclear physician, however, does work with the EPR and adds that, even though a large part of the information still comes from the paper files, the information that is available through the EPR is certainly used. In that case it is used as an instrument to provide background and supplementary information.

Some of the surgeons can agree to the descriptions of an agenda and archive, although they don't see this as the main functions of the EPR. They perceive this as an additional feature which can attribute to the structure of the meeting. The OMF-specialist and the supporting nurses comment that the EPR functions as a file to store oncology information about the tumour, but not yet as a file to store, search and retrieve data for management purposes. From their perspective there is a desire to do so.

All specialties seem to attribute different meanings to the EPR. This is in line with the SCOT-approach (Pinch & Bijker, 1987) that suggests that technologies are culturally interpreted and the description of a technology can differ according to the meaning given to it by the social group in question. Meanings are not only culturally interpreted, but also professionally. The data indicate that there are similarities between the specialists in a group; the surgeons, the non-cutting specialists and the supporting specialists. The surgeons experience the greatest benefits from the EPR and aim to integrate it in decision-making, while the supporting specialists hardly see any benefits from the introduction of the EPR.

##### 4.2 The way the EPR is used in interaction

The way the EPR is used in the interaction in the multidisciplinary meetings might differ from the meaning specialists and nurses attribute to the EPR. Therefore it is important to



investigate whether the way in which the EPR is used is in line with or differs from the meanings attributed to the EPR.

The treating specialists and their supporting nurses increasingly use the EPR to check the information of the patient. Most of this group of specialists use the reports of previous meetings and attribute particular importance to this possibility. Only the ENT-specialist mentioned that he hardly looks at the reports of the meetings. During the observations it was noticed that the ENT-specialists indeed didn't check the EPR as much as the other specialists. The ENT-specialist also remarked that he found the use of his paper-based chart more useful because he could measure the reliability of the information based on the (handwriting of the) person who wrote the information. The EPR didn't provide this function yet. This might be a reason for not using the EPR intensively and for mostly using the paper files. It is likely he will use the EPR more when this function is added.

It was mentioned by the treating specialists that the EPR is increasingly used in daily practice as an actual, living file where information is found on the patients' situation. This is in line with the meaning these specialists attribute to the EPR.

The medical oncologist is the exception within the group of treating specialties; she hardly uses the oncology EPR, only for enlistment of patient to the meeting and occasionally to look up information. But this last form of use is hardly the case, because it is harder (for her) to look up the reports than before, when there was a link through the departments' website.

Most of the supporting specialists do not or hardly use the EPR, which agreed with their view of the use of the EPR in the meetings. They attributed passive roles to the EPR, like an agenda for the meeting and an archive, which fits with their non-use of the system. The only exception is the nuclear physician, who uses the EPR to prepare the meeting and to check patient related information, which is in line with his view of the use of the EPR.

While observing the meetings it was noticed that the EPR also functions as a reminder; when a specialist showed clinical photos of the patient to illustrate which patient it was, the other specialists responded that they recognized and remembered the patient.

The specialists did not agree whether the EPR was fully integrated in the interaction and work processes. The majority of the treating specialties and their nurses thought it was integrated (although the remark was made that this could be optimized), while most of the supporting specialties (and the medical oncologist) disagreed. They stated that the meetings were guided by information by word of mouth, paper files and images instead of by the EPR. Although the pathologist did acknowledge that the EPR could be used to collect information of which no-one has thought of preparing. He also seemed to be aware that the treating specialists use the EPR more intensively, because he frequently read his reports, starting with the phrase: "Like you've been able to read..." Again the nuclear physician is the exception within this group, because he thought the EPR was integrated and found the EPR to suit the structure of his department, which made it easy for him to use.

The observations showed that the departments OMF and pathology seem to look more at the EPR than the other specialists. This could indicate that these specialists use the EPR more during the meeting. This might, however, be a false observation caused by the fact that these specialists have to turn their head more when they look in the EPR, so that might draw the attention to their view of the EPR and not of the other specialists. It might also be that they prepare the meeting more with the EPR, so they are better informed of what is in it.

#### **4.3 Conclusion**

The role of the EPR in the meetings is described in multiple ways, which clearly demonstrates the difference in the views of the meaning of the EPR. The EPR doesn't mean the same thing to every involved specialist or nurse. The treating specialties attribute a more active role to the EPR in the meeting. While the supporting specialties saw only passive (storing-) capabilities of the EPR.

The way the specialists use the system also differs. The treating specialists (and the nuclear medical physician) use the system in day to day work with patients. Most of them also use the EPR in (preparation of) the meeting.

The medical oncologist is the only exception and hardly uses the EPR, only for enlistment of patients to the meeting and occasionally to look up information. The supporting specialties (except for the nuclear medical physician) do not or hardly use the EPR in their work or in the meeting. This probably has to do with the fact that the introduction of the EPR hardly affects their daily practice. There are no clear incentives.

Different meanings are attributed to the EPR and these different meanings seem to cohere with the different forms of use. Most of the treating specialists attribute an active meaning to the EPR as a file to store and retrieve data for day to day use. This meaning is visible in their use of the system, because they all use the EPR in day to day work with patients. These specialists also found the EPR to be an integrated part of their work and the structure of their work.

The medical oncologist describes the EPR in a passive way as a possible support to the meeting but without much influence yet, which shows that she does not notice influence of the EPR in the meeting and does not expect much of the capabilities of the EPR. This is in line with the fact that she hardly uses the oncology EPR.

The supporting specialties also didn't or hardly used the EPR, which agreed with their view of the use of the EPR in the meetings. The passive role they attribute to the EPR fits with their non-use of the system.

The multiple meanings attributed to the EPR and the different ways of use of the EPR cohere with each other. This is supported by the approach of SCOT which suggests that the meanings attributed to the technology are connected to the way the EPR is used (Pinch & Bijker, 1987). The SCOT-approach explains that technologies are culturally interpreted and the description of a technology can differ according to the meaning given to it by the social group in question. Which is indeed the case in this research; the different specialties attribute different meanings to the EPR and use the EPR according to their own meaning.

## 5. The use of the EPR in the preparation of meetings

The EPR is used in the multidisciplinary meeting in the process of decision-making, but that doesn't mean that the EPR is used in the preparation of the meeting too. Furthermore, in previous chapters I found a difference in the meanings attributed to the EPR between the different groups of specialists. The invasive specialists (surgeons) are advocates of this technology; the EPR brings various benefits to their practice. The supporting specialists however, are more indifferent regarding the EPR. It seems that the benefits for daily practice and the way they view the system are of influence for the way they use the technology during the meeting. It can be that this tendency of differences between the groups of specialties continues when looking at the preparation of the meeting, but it is not a certainty. Therefore the next question that is asked here is: *How is the EPR used by the specialists and nurses in the preparation of the multidisciplinary meetings?*

The EPR is not used by every specialist in the preparation of the meeting. Only three of the seven specialties use the EPR to prepare the meeting. This entails one surgeon, one non-cutting specialist, one supporting specialist and the nurses. This means that I cannot define differences in preparation by the group of specialties. Although I can say that most of the supporting specialists do not use the EPR in the preparation of the meeting. Those departments use their own systems in daily practice rather than the EPR, so they do not use the EPR in their preparation either. The only exception here is the department of nuclear medical science, which does prepare the meeting with the EPR. This is explained by the fact that this department works entirely digital and uses the EPR frequently in daily practice.

Of the group of surgeons the specialist of the ENT-department doesn't prepare the meeting at all, however, the supporting nurse of this department does. She gathers the necessary information so the ENT-specialist can discuss the patient in the meeting without any preparation. The surgeon relies in his preparation on the EPR system as it were it a back-up system. Most of the questions posed during the multidisciplinary meeting can be answered instantaneously, sometimes with the help of the paper files. However, might a problem occur that needs closer attention, than he can rely on the preparation of the nurses who can produce the required information in the EPR. The division of labour and the supportive attitude of the nurse towards the surgeon allow this type of preparation.

The specialists and nurses that do prepare the meeting with the EPR, mostly use the EPR to see what the phrasing of the question is. They check the completeness of the patients' information and some look into the reports of previous meetings. Sometimes the paper file is also used, because not all information is in the EPR yet (like the charts).

The greatest impact of the introduction of the EPR concerns the work of the nurses. Historically it was their task to gather all the necessary information, which consists of: collecting charts, documents, photographs and radiographic images from different sources, to provide information to the specialists, to facilitate the discussions in the multidisciplinary meeting. The possibility of the specialists to make decisions in the meeting strongly depended on the skills of the nurses to provide the right information at the right time. This used to be a time-consuming task, not in the least because at several departments the required information was often not available at first demand. Sometimes it was even impossible to get some (new) radiology reports or photos present at the meeting. But the introduction of the EPR has changed a lot. Rather than visiting departments to collect bits and pieces of information, the nurse can now sit back and check most of the information at her computer screen. This causes that the preparation takes less time, it is easier, more reliable and it is faster to find all the relevant information from the list of patients visible in the oncology EPR. The information doesn't

have to be printed or written down before the meeting, but can be presented instantaneously.

There is however no common understanding between specialists and nurses how one should prepare for a meeting. In the interview I found that only a few specialists, a supporting nurse and the secretary noticed differences in the preparation of other specialists during the meeting. One surgeon (OMF-specialist) thinks the quality of preparation has worsened because the specialists might think they can find information in the EPR anyway. A nurse agrees that the preparation has worsened.

The medical oncologist on the other hand feels that the preparation is slightly better, because the specialists seem to be better informed of the situation of the patient. The secretary also feels that the preparation of specialists seems to have improved. According to her, the meeting is more efficient and during the meeting there is less time needed to search through the paper files.

However, there is no common understanding regarding the quality of the preparation among the treating specialist. In the previous section I presented the findings of a specialist who was critical regarding the preparation of the meeting, but another treating specialist feels that the preparation is good at the moment. Yet, he emphasizes that it is not clear to him if this is caused by the EPR, it might be because the other departments are not as busy as they usually are. It does not seem to him that specialists are better informed of the situation of the patient since the introduction of the EPR during the meeting.

The group of supporting specialists don not see any changes in the preparation of the meeting, neither in their own group nor among colleagues.

The ENT-specialist feels his colleagues might be slightly worse informed, although he is not quite sure about that. This possible deterioration has, in his opinion, nothing to do with the EPR, but with the experience of the physicians. The specialists might rely on their own experience more than on their knowledge of the status of the patient. If this is indeed the case, this might mean that because specialists rely on their experience, they might know less about the particular situation of the patient in question. This enhances the importance of the EPR, because it provides the opportunity to check information that wasn't looked at in the preparation of the specialist.

Observations of the meetings showed in one occasion that remarks about the preparation of other specialists were made. When it took some time for one of the ENT-specialists to find information in his paper file, another specialist remarked: "Like you could have seen in the EPR, the question is (...) and there is no malignancy found." Even after this remark, the specialist continued to look in his paper file, instead of looking at the EPR and finally remarked: "Oh yes, now I see." This shows that the preparation of the other specialists who had found and read the information was better than of the ENT-specialist. It also shows that using the EPR is not as much integrated in the work processes of the ENT-specialist in question as it is of the other specialists.

### **5.1 Conclusion**

The role of the EPR in the preparation of the meetings depends on the characteristics of the department. The nuclear medical science department works entirely digitally and therefore without paper files. The role of the EPR in their preparation of the meeting is therefore much more apparent than at other departments. Three of the seven specialists and all of the nurses use the EPR (and most of them use only the EPR) in the preparation of the meeting. The other two supporting specialties don't use the EPR.

The introduction of the EPR meant a change in the work processes of the nurses involved in the meeting. As described in chapter 2.6, the preparation of the meeting is less complicated, easier and it takes less time to gather and check all the data. The

preparations of both specialists and nurses have changed significantly with the introduction of the EPR. The oncology module of the EPR made the preparation for several specialties a lot easier, faster and better organized.

It is interesting to see that this change in preparation doesn't lead to clear differences in the meeting. Specialists and nurses have conflicting ideas about the preparation of others. Some think it has improved, while others think it has worsened. Other specialists do not notice any change in the preparation. It seems like the apparent change in the way the specialists and nurses prepare the meeting, does not have clear effects on the meeting itself. However, a plausible explanation might be that the expectations regarding the preparation of a meeting are strongly influenced by the meaning that the actors attribute to the EPR. If one is adverse of the use of an EPR, it is likely that he or she will hardly notice any improvement of the meetings. But if the user in question is positive about the EPR, one will use the own perceptions as a critical and limiting value. If one feels that his or her own preparation has improved by the use of the EPR, he or she might expect others to experience the same benefits, thus ignoring that others perceive the benefits of the EPR in a different way.

Further research should indicate if there is or isn't an effect of the way of preparation onto the meeting.

It might be that it is more apparent that people have not prepared the meeting extensively because the meetings are more efficient and the patients are faster discussed. That can explain why one specialist thinks others might have prepared worse.

So there is a concrete interaction with the EPR in preparation of the meeting. According to Berg (1999) IT (the EPR) can bring a benefit to health care because of this interaction and the intertwinement of the technology in the social system. An IT application should seamlessly fit in the interrelationship of humans and things that a health care department is, instead of seeing it as a separate tool in the organization (Berg, 1999). This interrelationship seems to be achieved in the preparation of the meeting, because most of the specialists and nurses have adapted their preparation and use the EPR. An improved preparation doesn't seem to have clear effects on the meeting itself. Even though it was concluded that the EPR (IT) is integrated in the preparation. According to Berg (1999) this should lead to benefits. A reason for not noticing these benefits could be that those benefits take some time and are relying on the improved preparation of all the specialists.

## 6. Differences in interaction and cooperation

The EPR is used in the preparation of the meeting and influenced those work-processes of treating specialists and their nurses positively. The EPR also has a role in the multidisciplinary meeting itself. Although there are differences in the way the EPR is used in the meeting, depending on the specialty of the user. Nevertheless, the EPR is part of the meeting and is considered to be an information source.

As stated previously the introduction of a new technology is most likely to change behavioural patterns. This happened indeed in the preparation of the meeting. It seems logical that the behaviour of the specialists and nurses during the meeting also changes because of the EPR. This is investigated with the research-question: ***What are the differences in interaction and cooperation in the multidisciplinary meetings, between the old situation without the EPR and the new situation with the use of the EPR?***

The communication in the meeting consists mostly of discussions about the treatment programme; one non-cutting specialist thinks it counts for about 75% of the communication. To be able to discuss, a certain amount of information-exchange is necessary. Almost all the specialists and nurses agree that the amount of information that is shared has not changed since the EPR is used in the meeting.

The observations also show that for almost all patients who are discussed in the meeting there is some information exchange first (153 out of the 156 observed patients). In the case of 71,8% of the patients (112 patients) a discussion about the treatment-programme occurred. The other 28,2% were dealt with as a formality. Every specialist agreed with the proposed treatment-programme of these patients and no real discussion took place.

One of the surgeons (the OMF-specialist) does think that the information-exchange and the discussion are faster than before the introduction of the EPR. He thinks this is because every specialist already has the necessary information and there doesn't need to be an exchange of papers in the meeting. The information is also easier to illustrate with the EPR. One of the non-cutting specialists also remarks a change; it seems to him that there are fewer questions about information, for example when someone does not pay attention and misses some information. Because everyone can read this in the EPR, it leads to fewer questions.

The communication with specialists of other specialties is not found to be different since the introduction of the EPR. The treating specialists however, see that the communication and discussion of a patient is faster. This is not only the case within the meeting but also in daily work. When discussing a patient, both specialists can have the same information present. It is no longer necessary to send information to another department, which saves a lot of time. During the meeting this exchange of paper-based results is also no longer necessary, which contributes to the efficiency of the meeting. The richness of information and the fact that a lot of this information is presented on screen, cause the discussions to be a little shorter and the meeting to be more efficient.

A surgeon (the ENT-specialist) emphasises that this increased efficiency might be caused by the fact that the reports of previous meetings are visible during the meeting and functions as a guideline for a structured meeting.

The nuclear medical physician mentions that the way of presenting the information is more complete and this causes the discussion to become more to the point. Because the information is available, there are fewer questions about the situation and the discussion is more goal-oriented. Although other supporting specialists think it can be even more to the point.

The nurses remark that the communication with the specialists has intensified. Because a lot of information can be gathered from the EPR, the contact with the specialist is more specific. They seem to have a higher capacity to process information. This also leads to more efficiency in the work-processes of the nurses. According to one of the nurses the

fact that information can be found in the EPR saves time, because she does not have to contact other departments or specialists for this information. In this way, the EPR functions outside the meeting also as a decision support system for the nurses.

### **6.1 Interaction**

The interaction in the meeting is open and based on respect. Specialists are critical toward each other but also open for suggestions and opinions. Because of that, the interest of the patient is the most important aspect of the meeting. The surgeons describe the meeting as fraternally and constructive, critical but open, a situation where people are listening to each other.

Four of the seven specialists and the nurses stated that the interaction between specialists has not changed. The nuclear medical physician thinks that the interaction is more efficient because of the EPR. The specialists do not have to search through their paper files as much, which leads to an efficient discussion. In his view: "There is an increasing number of patients that have to be discussed and the EPR facilitates that you actually can discuss those patients." This increased number of patients is cause for an increased time pressure, which leads, according to the medical oncologist, to an awareness that efficiency is necessary.

The demonstration of information is easier and quicker with the EPR, according to one of the surgeons (ENT-specialist). This has a positive impact on the interaction. "The exact results as formulated in the histology are very important. Those formulations can cause a change in the advised treatment of the patient in about 1% of the cases, that is about five patients a year. But that is the extra value. The EPR makes it easier and quicker to demonstrate this exact information".

This is also noticed by the one of the nurses; the results can be read during the meeting at the same time they are being presented by (for example) the pathologist, this visual information leads to a more efficient meeting.

The nurses, secretary and the chairman of the workgroup have a different role in the meeting than the others. They are more facilitating to the structure of the meeting. The role of the nurses of the department of OMF changed with the use of the EPR. They operate the EPR during the meeting and are situated between the specialists, which makes them more actively involved in the interaction than before.

The chairman has also a different view of the meeting and its purpose. While the other specialists perceive determining the treatment-programme as the main goal, the chairman does not: "The interest of the meeting is not to make a diagnosis or to determine the treatment-programme, but the main goal is to look critically at the course of the patient. To be critically towards each others findings, so that specialists can ventilate their concerns about the patient. Then the discussion arises about data that is supposed to be objective."

### **6.2 Cooperation**

The cooperation between the specialists is perceived as good, both inside and outside the meeting. The specialists and most of the nurses stated that the cooperation of specialists has not changed by the EPR. One non-cutting specialist thought that the cooperation is changed a little bit, but this is caused by the organization of the office hours. They used to be held on the same ward, at the same time by the radiotherapy-, the ENT- and the OMF-department. Now the ENT-specialists hold their office hours on their own ward. One nurse mentioned that it might be a little easier to work together, since all people have the same information. She thinks this will increase when the consult-forms are in the EPR.

The only exception is the nurse of the ENT-department; she feels the cooperation changed negatively. According to her, the meetings are more chaotic than before, which can be caused by the amount of patients that have to be discussed, by different

specialists walking in and out of the room, but can also be caused by the availability of information. When information is available, it will be discussed in the meeting. A better, clearer structure of the meeting might be necessary.

### **6.3 Harmony in health care**

Harmony in health care is the way the care of different specialties in the care trajectory is tuned to each other and the way the care given by one specialist fits with the care given by another specialist.

According to the treating specialists and most of the nurses the harmony in treatment-programmes of patients is improved. Although one non-cutting specialist (the medical oncologist) thinks that the harmony in treatment-programmes of patients is not changed at all.

An important improvement for the quality of the care-decisions is, according to the radiotherapist and a supporting nurse, that the reports of previous meetings are easier available than before the EPR was used. In the past there was a tendency to forget to look at the previous report, which created room for mistakes. Now the reports are presented on screen so that the discussion in a meeting follows logically onto the previous one. Another nurse denied this by stating that she feels that the specialists do not look at the reports of previous meetings. During the observations it is noticed that the EPR is not checked frequently, although with returning patients there are regular questions about the previous reports.

The turnover of a patient towards another specialty is also perceived to be quicker, a surgeon (OMF-specialist) noticed that the patient is seen by all specialties in fewer time. Another surgeon added that it is also easier visible who requested examinations like radiological photos, so they are not requested twice.

Another benefit of the EPR is that, even though one of the specialists is not available, the meeting can continue and results from the pathologist are also available. The meeting can continue, which delivers higher quality.

There is, however, the possible danger that people rely too much on the EPR, when in fact you can not put everything in it yet. According to a nurse, some information has to be shared by phone or e-mail because it is not situated in the EPR, but it is easier to forget this.

### **6.4 Conclusion**

According to Berg et al. (2003) the sociotechnical approach is characterized by the viewpoint that technological innovations are social processes which affect the organization deeply. It aims to increase the understanding of how information systems are developed, introduced and become part of social practices. According to this theory the EPR should have an effect on the (social) process of the multidisciplinary meeting. This research shows that it has indeed an effect, although most of the specialists do not see any differences in the interaction in the meeting or the cooperation between peers and nurses. The differences that are noticed the most concern changes in the efficiency of the meeting.

The availability and richness of information during the meeting is noticed. The discussion is therefore more goal-oriented and the communication is faster. This causes the meeting to be more efficient.

The EPR facilitates the amount of patients that have to be discussed. But it also enhances the quality of the patients' treatment, because during and after the meeting the exact phrasing of the results is visible and can influence the treatment of the patient for the better. The chance of missing information is smaller, because information can be found without delaying the meeting, even when the specialist is not present. The care given by multiple specialists is more harmonized and fits to one another.



The nurses find themselves more involved in the meeting. This could be caused by the fact that their tasks changed; during the meeting the nurses of OMF are currently the operators of the EPR. Another explanation is that, because of this new task, these nurses are no longer seated behind the specialists but between them which can cause this feeling of involvement. The nurses seem to have a higher capacity to process information themselves. They use the EPR as a decision-support system to check information before asking specialists. This creates more efficient work processes and saves time because the nurses have to contact other departments less.

During the interviews the interviewees first mentioned not to know of any differences in interaction or communication. But when asked specifically they did notice the changes. This is in line with Bergs (2003) explanation: "As any technology, information technologies affect the contexts in which they are introduced – in many different ways, and more deeply than is often expected."

## 7. Conclusion

This research started with a theory from Berg that technological and social processes are intertwined. A change in technology will therefore have an impact on the social structure. While implementing and evaluating such a technology, the relationship with those social processes should be taken into account to be able to achieve full benefits of the technology.

In this research I have studied the introduction of an EPR that is used in a decision-making process regarding diagnoses and treatment of cancer in the head and neck area. Multiple specialties are involved in the meetings when these decisions are made. It is crucial to have complete and up-to-date information as input for those multidisciplinary meetings, to be able to make decisions. Previously a word document was used containing basic patient-related information. This is a very static source of information. The compilation of the files was also time-consuming and the latest changes were not visible. The technology that is used today, the EPR, is a dynamic source that can provide a lot of information at any time at any place. After the introduction of the EPR in the multidisciplinary meeting even information that was not prepared is traceable and can be taken into account.

Considering Berg's statement that a change in technology will have an impact on the social processes, the following research question was formulated:

**What is the impact of the electronic patient record on the interaction between specialists in the multidisciplinary meetings?**

To be able to answer this research question the research is divided into four sub-questions. In this concluding chapter I will first give a summary of the answers to the sub-questions and continue to discuss the conclusions in relation to the main research question. The four discussed sub-questions are:

1. What sources of information are used in the interaction in the multidisciplinary meetings?
2. What meanings are attributed to the EPR and in what way is the EPR used in the interaction in the multidisciplinary meetings?
3. How is the EPR used by the specialists in the preparation of the multidisciplinary meetings?
4. What are the differences in interaction and cooperation in the multidisciplinary meetings, between the old situation without the EPR and the new situation with the use of the EPR?

### 7.1 Answers sub-questions

*What sources of information are used in the interaction in the multidisciplinary meeting?*

We can conclude that the introduction of the EPR as new source of information has not replaced the use of the already existing sources of information. The EPR is not the most important information source of the meeting (which are the radiological images).

However, it becomes increasingly important when the patient is already discussed in a previous meeting, because it consists of the reports of previous meetings.

*What meanings are attributed to the EPR and in what way is the EPR used in the interaction in the multidisciplinary meeting?*

Different meanings are attributed to the EPR. The treating specialists (surgeons and non-cutting specialists) and their nurses attribute an active role to the EPR as a file to store and retrieve information for day to day work. They also use the EPR every day. The supporting specialties perceive the EPR more passively by thinking of it as an archive and don't or hardly use the EPR.

The multiple meanings attributed to the EPR and the different ways of use cohere with each other. This is in line with the approach of SCOT, which explained that technologies are culturally interpreted and the description can differ according to the meaning given to

it. The different groups of specialties attribute different meanings to the EPR and use the EPR according to their own meaning.

*How is the EPR used by the specialists in the preparation of the multidisciplinary meetings?*

Three of the seven specialists and all of the nurses prepare the meeting with the EPR. The specialists that don't use the EPR in the preparation are mostly the supporting specialists, who also don't use the EPR in daily work or in the meeting. For three specialists and the nurses there is a concrete interaction with the EPR in preparation of the meeting, it is interrelated in their work and especially the nurses have adapted their preparation to use the EPR. The tasks the nurses perform in preparation of the meeting have become less complicated, easier and take less time. Observations of the meetings showed that using the EPR is not that much integrated in the work processes of one of the ENT-specialists.

*What are the differences in interaction and cooperation in the multidisciplinary meetings, between the old situation without the EPR and the new situation with the use of the EPR?*

Interaction contains multiple aspects of the contact of health care professionals; cooperation, communication and the source of information they use. Four of the seven specialists stated that the interaction between specialists has not changed. The remaining three perceive the demonstration of information in the meeting as more efficient, which leads to a more efficient meeting and has a positive impact on the interaction. The specialists and nurses stated further that the cooperation of specialists hasn't changed. The noticed changes in interaction therefore refer to the efficiency in communication. The discussion is more goal-oriented and the communication in the meeting is faster and more efficient. The EPR also seems to have improved the harmony in treatment-programmes of patients. The treating specialists feel that the treatments by different specialists are tuned to each other and the way the care given by one specialist fits with the care given by another specialist.

## **7.2 Impact of EPR on the interaction**

Considering the answers to the sub-questions we will look at what this means for the main research question. The main research question is:

*What is the impact of the electronic patient record on the interaction between specialists in the multidisciplinary meetings?*

### **7.2.1 Changes and impact on interaction**

The introduction of the EPR meant a change in the work processes of the nurses involved in the meeting. The preparation of the meeting is less complicated, easier and it takes less time to gather and check all the data. The oncology module of the EPR organizes the necessary information in such a way, that the nurses don't have to search for information and open multiple systems. The nurses are also more involved in the meeting because of their new role as operators of the EPR.

The EPR has indeed an impact on the interaction between specialists in the multidisciplinary meetings, more specifically on the efficiency of the communication in those meetings. The availability and richness of information leads to more informed discussions and an easier preparation of the meeting.

The EPR can therefore change the practice of medicine. The incomplete EPR of the RUNMC with its availability of information has already its effect on the speed of communication, the efficiency and the decisions in the treatment-programme of the patient during the head-neck cooperative oncology workgroup.

Therefore the real issue doesn't seem to be the existence of a file, because the file remains the same file, only in a different form and in a different location. But it's the availability of information in the meeting that is different. Whether you use it or not is

not even the real issue. The fact that you can use it if necessary; that's what the extra value of the EPR is. Or, as one of the specialists put it: "In most of the cases this extra available information might not even change the course of action. But the one patient where this small piece of information does change the course of action of the specialists, that's the value of the EPR."

The availability of information is the value of the EPR and maybe this is also its largest effect: the reassurance that the information is present and, even if nobody prepared it, is traceable and can be used immediately. The EPR attributes to this reduction of uncertainty, which is showed in figure 5. The availability of information, whether prepared or not, gives the specialists a sense of certainty about the decisions they need to make. The decisions are based on comprehensive and up-to-date information, which enables the specialists to make informed decisions with less uncertainty. Because of this larger certainty nobody has to be sent out to gather information, which leads to a reduction of effort, time and annoyance.

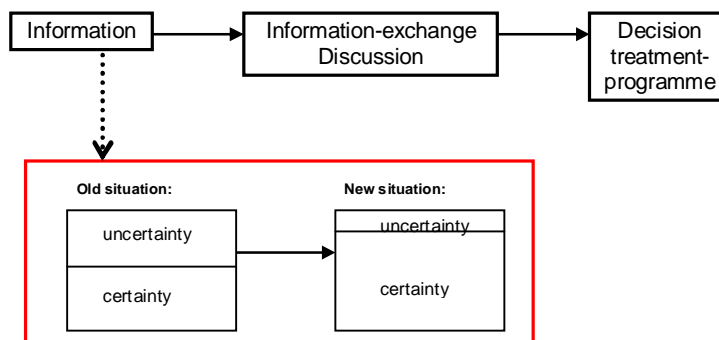


Figure 5: Decrease of uncertainty.

### 7.2.2 Differences between specialists

As stated, there are indeed changes noticeable in the multidisciplinary meetings which are caused by the EPR. To be able to cause these changes the EPR has to be used by the specialists and nurses involved in these meetings. As is visible by the arrows in table 2 most of the specialists and nurses start to replace the systems they previously used by the EPR. The use of the EPR increases. The size of the crosses shows if the system is still used, the larger the crosses the more important the system is in their daily work.

Group of specialist		Paper file	Labrador	Rocs	Digitop	Palga	Impax	EPR
Surgeons	ENT Nurses	X	↓	x↓				X↑ X↑
	OMF Nurses	X X	↓ ↓	x↓	x			x↑ X↑
Non-clinical	Radiotherapy Nurses	X X	↓				x	x↑
	Medical oncology	X	x↓					x↑
Supporting	Nuclear medicine		x				X	x↑
	Pathology		x			X		x
	Radiology		X				X	

Table 2: Used systems in relation to the use of the EPR.

Explanation of systems: 'Paper file'; file with information on paper like charts and consult-forms, 'Labrador'; patient information system, 'Rocs'; appointment-system for examinations, 'Digitop'; registration system, 'Palga'; national pathological data system, 'Impax'; system for radiological imaging.

From table 2 is visible that there are differences in the groups of the specialties. The surgeons and non-cutting specialists have decreased their use of the Labrador system and increased their use of the EPR. Their nurses still use the programme ROCS, but the use of that programme has decreased.

The groups differ from each other in their use of the EPR, both inside and previous to the meetings. This is partly because the groups of specialists have different characteristics. The treating specialists (the surgeons and the non-cutting specialists) differ from the supporting specialists in the nature of work and accordingly in work processes. The supporting specialists do not treat patients, but support the other specialists with performing examinations and providing results. Accordingly, their role in the meeting is to provide information so the treating specialists can make decisions. This is also visible in their way of use of the EPR, as shown in table 2. The supporting specialists can be viewed as non-users of the system, because they don't or hardly use the system. The supporting specialties are not in a treating-relationship with the patient, which means that it is not necessary to have the same information as the treating specialists. They don't need the information from the EPR to perform their work.

Besides this, the radiologist can not use the EPR for screening images and reporting them. The EPR doesn't provide enough pixel-density for the radiologist to show images, therefore another system (called 'Impax') is used besides the EPR. The use of this separate system, in combination with the fact that she does not need much patient-related information, decreases the intention and motivation of the radiologist to use the EPR. There is simply no 'need' to use the EPR.

There are exceptions in two groups, which is also visible in table 2. Within the group of the non-cutting specialists the medical oncologist doesn't use the EPR to the same extent. In the group of the supporting specialties this is true for the nuclear medicine physician. Their use of the EPR doesn't fit with their group because of their previous used systems. The medical oncologist previously used an oncology website to find reports; this feature is now replaced by the EPR which makes it harder for her to use the EPR. The situation of the nuclear medical physician is the opposite; his department already worked entirely digitally, which makes it easier for him to use the EPR than it is for the other supporting specialists.

### *7.2.3 Learning curve*

These differences between the groups of specialties are connected to the difference in their learning curve. The learning curve visualizes the process of accelerating learning, which originated from the learning cycle of Kolb (1984). Users will respond in different ways to technologies; some will be reluctant while others may be eager to use the technology to enhance the efficiency and effectiveness of their own work. Especially when users feel that the technology will improve their own work, they will easier grasp the full meaning of the technology and learn to use it. Therefore in a group of specialists, such as the head-neck cooperative oncology workgroup, differences between the specialties can exist. The previous section showed that the supporting specialists didn't use the EPR to the same extent and therefore were not as advanced on the learning curve as the treating specialists. This can be explained by the previously mentioned non-use of the system, and the lacking necessity to use the EPR in their work. The treating specialists are more experienced in working with the EPR, because they use the EPR in daily work and using the EPR can improve their work.

While using the technology questions arise, when looking for answers and explanations the users get more and more accustomed with the technology and begin to understand and grasp the full potential and possibilities of the technology. Because the treating specialists use the EPR every day, they will get more and more accustomed with the technology and grasp the full potential and possibilities of the EPR. This understanding of the technology increases more and more when the EPR is used more frequently.

Therefore the treating specialists are situated further on the learning curve than the supporting specialties, as is visible in figure 6. It can even accelerate in a way that the treating specialists soon might use the EPR beyond the scope of the designers.

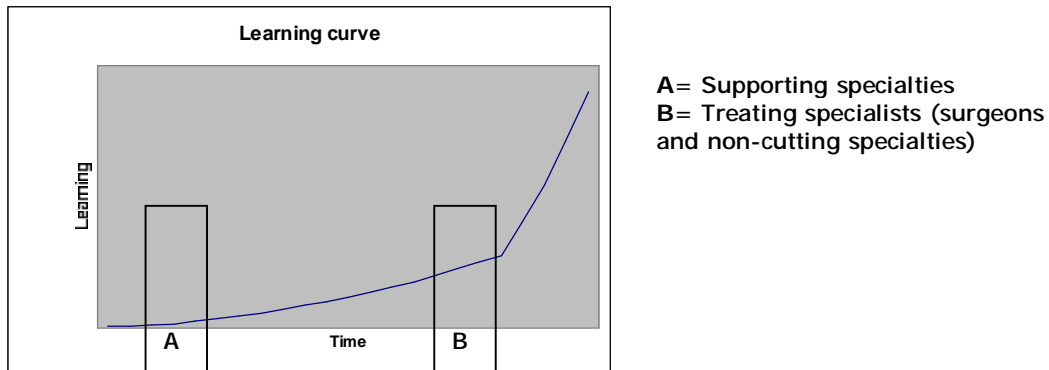


Figure 6: Learning curve with situation groups of specialties.

A danger that possibly originates here is the gap between the two groups. It is perfectly understandable that the supporting specialties work less with the EPR and it is acceptable that they are on a lower point at the learning curve. At this moment the secretary of the department of pathology crosses the gap between the groups by inserting the pathological results into the EPR, which enables the other specialists to use it. However, the development of the EPR continues and more information will be inserted into the EPR, which means that the use of other sources will further decrease. The treating specialties will accelerate on their learning curve when more information is inserted in the EPR. If the supporting specialties continue their non-use of the EPR, they will stay behind in this development, which will ultimately result in a larger gap and less understanding between the groups of specialists. A large gap will therefore jeopardize the interaction in the future. When information sources differ and there is fewer understanding about each others data sources, the mutual relations will become strained. This is dangerous for the (efficiency of the) multidisciplinary workgroup.

## 8. Discussion

### 8.1 Discussion of results in relation to literature

Previous research by Safran et al. showed that after the introduction of the EPR in an American hospital the EPR was seen as an information source where information was easily accessible and could be easily verified (Safran, Jones, Rind, Bush, Cytryn & Patel, 1998). Although the research of Safran et al. didn't focus on a meeting, the EPR did function as a resource: "When the team is discussing an issue, the computer is at the location and is included as a resource" (Safran et al. 1998). This confirms the results of this research, in which the EPR is also considered as an information source by most of the specialists and although the EPR is not considered the most important information source, it is found increasingly important when a patient is discussed the second time.

As described in chapter 7.1, this research showed that the communication has become faster since the introduction of the EPR. Communication seems to be more efficient caused by the availability of (comprehensive) information. This is consistent with the results of Safran's research, when he states that the nature of data-entry in such a computer system can lead to more complete information, available before and in a meeting and more efficient communication. "Positive benefits of electronically-mediated interactions include improving communication, collaboration, and access to information to support decision-making" (Safran et al. 1998).

The improvement in collaboration that Safran finds is not found in this research. The largest effects were the mentioned efficiency in communication and the access and availability to information to support the decision-making in the meeting (and the related reduction of uncertainty). These benefits of the EPR were all confirmed by the research of Safran et al.

The EPR, however, does not contain all (necessary) information yet. The EPR doesn't replace all other information sources (yet) and therefore doesn't fit the tasks of the users entirely. Lehoux performed a study of the impact of telemedicine and found that this is indeed important for the use of the technology. Lehoux: "the use of telemedicine would depend on the degree of fit with the tasks and on its capacity to harmonise with, or restructure the communications and social practices of clinicians." (Lehoux, Sicotte, Denis, Berg, & Lacroix, 2002). An EPR which contains more information can fit more with the tasks of the specialists and has more influence to the social practices and structure.

Adapting the work processes to include the technology in the tasks is not always easy. A problem that can arise is identified by one of the surgeons. He remarked that he found the use of his paper-based chart useful because he could measure the reliability of the information based on the (handwriting of the) person who wrote the information. The EPR didn't provide this function yet.

Care professionals indeed seem to have an effective strategy for searching through their paper file. Paper files contain many cues which make the search for information easier, like paper of a different colour or size, underlining texts, different handwritings or even text of a different colour. This made the paper file surveyable (Berg, Goorman, Harterink & Plass, 1998, p.62). The routine that specialists have developed for searching the paper file is not needed for the EPR. Because the EPR is differently organized, searching by means of looking at handwriting or writing colour is not applicable. But it can form an obstacle for the specialists to adapt their work processes to include the EPR.

The reliability of information was also an issue in the study of Lehoux, where the interpretation of the (subjective) data by another physician seemed inappropriate to the specialists (Lehoux et al., 2002). This might be a reason for the specialists at the RUNMC for not using the EPR intensively and also for using the paper files.

This research shows differences between groups of specialists. The treating specialists, who see patients, can be considered as the users of the EPR, while the supporting

specialties, which don't see patients, hardly or don't use the EPR. Lehoux also finds this difference between specialists who see patients and the ones that don't see patients in her study (Lehoux et al., 2002). Although she investigated the clinical routines of specialists with the use of telemedicine, the technologies have some similarities; they both deliver new information through a new technology. Lehoux: "Our research indicates that specialties relying on either thorough physical examinations or specialised investigative techniques are unlikely to restructure their work routines to accommodate teleconsultation, which they view as limited. Specialties that primarily exploit images or numerical data tend to perceive teleconsultation as more useful." (Lehoux et al. 2002). The situation in the research of Lehoux seems the opposite of the results of this research. Because the treating specialties (who see patients) are the users of the (oncology) EPR, instead of being the non-users like in the study of Lehoux. Contradicting the findings of Lehoux, the users of the EPR do not see the EPR as limiting their actions, but as expanding their options. While the specialties that primarily exploit images and data (the supporting specialties) see the technology as less useful.

This contradiction in the results, compared to the research of Lehoux, can be explained by the nature of the technology: whereas telemedicine can replace or change the content of the daily work of the specialist, the EPR can attribute to the work. The EPR doesn't aim for changing or replacing the nature of providing care, it enhances the information of the specialist to improve his daily work.

Finally as Safran states: "Electronic patient records and health information systems that include e-mail can change the practice of medicine." (Safran et al., 1998). This research confirms Safran's view on the EPR: an EPR can change the practice of medicine by providing improved collaborative care. The extend of this change is, however, depending on the content of the EPR and on the nature of work of the specialist using it.

## **8.2 Restrictions of research**

The aim of this research was to find out what the possible impact was of the EPR on the interactions between specialists. The focus of a cooperative workgroup was chosen, which worked with the EPR for a year.

The fact that the EPR was used for a year might implicate that the specialists are used to having the EPR and the possible impact is measurable. However, it might also be that this period of a year is too small to notice all differences. Therefore it is not completely sure that every possible change is already visible and that all the changes are noticed.

For this research every specialty involved in this workgroup is interviewed, however only one specialist of every specialty is interviewed. This might resolve in a bias, it might be that the opinion of the interviewed specialist is different than the views of other specialists of the specialty.

The focus of this research was only towards the head-neck cooperative oncology workgroup. This workgroup is known to be a good functioning workgroup which cooperates well together. The workgroup itself exists about 20 years, which creates a joint frame of reference between the specialists. They make a good team and know each other thoroughly. This can influence the way a new technology is accepted, inserted and implemented in the workgroup. A different workgroup which does not have these characteristics might react different to the EPR and it is possible that the introduction of the EPR in other workgroups provides larger or smaller differences. However, this workgroup was the first one that used the EPR in this hospital, therefore studying another workgroup was not a possibility.

During the interviews some biases might have occurred. Despite the fact that it was mentioned at the beginning of the interview that the focus was the oncology EPR, there is a large possibility that some of the answers were given about the general EPR. Because this is not always noticeable in analyzing the interviews, a bias in the answers



might exist. At the same time, the oncology EPR that is used in the meeting, gives access to the general EPR. Therefore the changes found might be caused by both the general and the oncology EPR.

Some of the interviewees were involved in the introduction of the EPR in this workgroup. It might be possible that subconsciously they might have given more positive views on the EPR to show larger effects of the EPR in the workgroup.

On the contrary, it might be that some interviewees who are not (or less) involved in this development see this interview as their opportunity to express their frustrations about the system. Although it is possible to filter those statements, it might however have influenced these answers negatively.

Another possible bias can be that interviewees, after telling a couple of times that there is no change, want to think of some changes to conclude in the study. It might be that they exaggerated some of the answers to please the researcher.

On the contrary, it might be possible that in analyzing the interviews every small change is noticed and relationships are drawn that are in fact coincidences.

It was mentioned that the number of patients that have to be discussed in the meeting are increasing. Unfortunately we will not know how this would affect the efficiency of the meeting. The change in efficiency that was subscribed to the EPR by the interviewees and by the researcher might be (partly) caused by the time-pressure and the increasing amount of patients that had to be discussed.

This explorative research gave some insights into the impact of the EPR on the interaction between specialists. However, because it was only studied in one specific workgroup and only eleven people were interviewed, it can not give a full account of the changes that were noticed. Based on statistically significant findings, what can be said is that there seem to be changes in the communication and efficiency of the meeting, that might be caused by the availability of information in the meeting through the EPR. To be sure if this is in fact the case, further research must be conducted.

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Picture front: <http://www.fepi.org/imagescentre/imagesnews/e-health0620.jpg>

### Interviews:

1. Nuclear Medicine physician, 2008.
2. ENT-specialist, 2008.
3. Oral and maxillofacial surgeon, 2008.
4. Radiologist, 2008.
5. Radiotherapist, 2008.
6. Medical oncologist, 2008.
7. Pathologist, 2008.
8. Nurse oral and maxillofacial surgery, 2008.
9. Second nurse oral and maxillofacial surgery, 2008.
10. Nursing specialist head and neck oncology, 2008.
11. Secretary head and neck cooperative oncology workgroup, 2008.

## **Glossary**

### **Communication**

Communication between health care providers consists of all types of information exchange. It contains the patient-related information as well as messages and health care related remarks of concern to the treatment of the patient. Communication consists of both written information (in all forms; on paper and digitally in the EPR) and of orally provided information.

Communication in this respect means: type of information shared, the way that the information is shared, classification in time/place.

### **Cooperation**

The way multiple health care professionals work together to provide health care to the patient. Cooperation during the multidisciplinary meetings consists of communication, both sharing of information and discussion about the best possibility for treatment for the patient, and coordination of activities.

### **ENT-department**

The Ear, Nose and Throat department of the hospital.

### **EPR**

Electronic Patient Record. This electronic system can provide access to all relevant patient-related information which the operating health care professional has been authorized to see. The EPR can be accessed at any time, both before the multidisciplinary meeting and after. The health care professional can add information from his/ her own specialty.

### **Head and neck cooperative oncology workgroup**

This workgroup consists of specialists from seven different specialties who discuss patients with cancer in the head and neck area. The goal is to determine the best treatment-programme for the patient considering the personal aspects and situation of the patient.

The meetings of this workgroup are weekly on a Thursday from 11:30 till 14:00.

### **Health care professionals**

This term is used interchangeable with the term health care providers and indicates any care provider in the Dutch health care system. This can consist of specialists and nurses.

### **Health care providers**

See *health care professionals*

### **Interaction**

Interaction is the way the health care professionals act upon each other. It is the way they cooperate and communicate, but also emphasizes on which grounds they cooperate or communicate. The source of their information is also important for their interaction. Interaction therefore contains multiple aspects of the contact of health care professionals (cooperation, communication and source of information).

### **IT-applications**

Information technology applications. This consists of all sorts of different technologies which contains most of the time a computer. The EPR is such an information technology.

### **Medical oncology**

The department of a hospital which is specialised in treating patients with cancer with medication like chemotherapy.

#### **Nuclear medical science / Nuclear medicine**

This department works with nuclear materials, both for investigation and examination purposes as for therapeutic purposes.

#### **Multidisciplinary meetings**

Multidisciplinary meetings are meetings in which health care professionals (mostly specialists) share their views of the treatment of the patient. Possible ways of treatments are discussed and this derives in an advised treatment plan. Health care professionals from various specialties are involved to share their view of the situation of the patient. The meetings are organised around a certain type of illness or specialty, like the head and neck cooperative workgroup.

In this report the word "meetings" refers to the weekly meeting of the head and neck cooperative oncology workgroup.

#### **ODIS**

Oncology Data Information System, see *Oncology EPR*.

#### **Oncology EPR**

The oncology EPR is a module within the EPR which is specially build for the head and neck oncology workgroup. Similar modules will be build for other oncology workgroups. This custom made oncology part of the EPR consists of a list of patients who are to be discussed in the multidisciplinary meeting, the question that will be the reason for discussing the patient in question, the specialties who need to be involved and the processed reports of previous meetings about the patient.

#### **Oral and maxillofacial surgery (OMF)**

This department in a hospital treats patients with oral or dental problems, which cannot be treated by a dentist. This can contain of patients with cancer in or around the mouth. Also patients with cancer in the facial area can be treated at this department.

#### **Paper based chart**

Charts with information about the treatment of the patient, the condition of the patient and the current status of the patient which are only kept on paper.

#### **Paper file**

In the paper file of a patient all kind s of information is kept, among which charts, consulting forms, drawings, reports of meetings and surgeries and sometimes photographs.

#### **Pathology**

This department of the hospital focuses on analyzing biopsy and tissue of patients to determine the type of illness. In case of cancer (among others) the type, size and sort of cancer are determined. This is necessary to be able to determine the correct and best treatment programme for the patient.

#### **Physicians**

This term indicates a care provider in the Dutch health care system. It can contain doctors, general practitioners or specialists, but is not an indication for other medical staff or nurses.

#### **Specialists**

This term indicates a doctor who is specialised in a certain medical area. The specialty indicates the area or type of problems the patients visit him/ her for.

**Radiology**

This department of the hospital is responsible for creating images for examination or control purposes. The images are analyzed and reported. The examinations can contain for example MRI (Magnetic Resonance Imaging), CT scan (Computertomographic scan) or X-ray- images.

**Radiotherapy**

This department of a hospital is only concerned with patients with cancer. Treatment of the patients at this department will contain the treatment radiotherapy which consists of the control of tumours by radiation.

**RUNMC**

The Radboud University Nijmegen Medical Center, at which the research was done. The head and neck cooperative oncology workgroup is a workgroup of this research hospital.

**List of abbreviations**

EPR	Electronic Patient Record
ENT	Ear Nose and Throat
ODIS	Oncology Data Information System
OMF	Oral and maxillofacial surgery
RUNMC	Radboud University Nijmegen Medical Center

## Appendices

### Appendix 1: Interviewvragen aan specialisten

1. Hoe vaak woont u de hoofd-hals oncologiewerkgroep bij? En hoe lang al?
2. Waarvoor gebruikt u het EPD? *(Patiëntgerelateerde informatie opzoeken/ aanvullen, agenda werkgroep inzien, patiënten aanbrengen, aantekeningen/ informatie van collegae van andere specialismen inzien, aantekeningen/ informatie van collegae van eigen specialisme inzien)*
3. Op welke momenten raadpleegt u het EPD? *(voor of na werkgroep, voor, na of tijdens patient bezoek)*
4. Gebruikt u het EPD in voorbereiding op de werkgroep?  
Hoe gebruikt u het? Wat doet u ermee?
5. Kijkt u in het EPD tijdens de werkgroep?  
Hoe frequent doet u dit? Naar wat voor soort gegevens kijkt u dan voornamelijk?
6. Op welke manier wordt het EPD in de werkgroep gebruikt? *(voornamelijk als agendafunctie, als opbergplaats voor gegevens, als vervanging van een papieren dossier, als informatiebron voor patiëntgerelateerde gegevens of een combinatie hiervan?)*
7. Zijn er dingen die u mist in het EPD? Zo ja, kunt u aangeven wat u mist?

#### Multidisciplinaire meetings (hoofdhals oncologie werkgroep)

##### Oude situatie tot 01-04-07

8. Hoe bereidde u zich voor op de werkgroep?
9. Waar haalde u in voorbereiding op de werkgroep uw informatie vandaan? *(Uit eigen dossier, mondelinge/ schriftelijke informatie van collegae, herinnering)*
10. Wat was tijdens de werkgroep uw belangrijkste bron van informatie?  
*(radiologiebeelden of papieren dossiers of mondelinge informatie)*
11. Als u de communicatie in de oude werkgroep moest indelen, welke van de volgende omschrijvingen is dan van toepassing?
  - Informatie-uitwisseling over de geschiedenis van de patiënt
  - Informatie-uitwisseling over de huidige status van de patiënt
  - Discussie over betekenis/ bedoeling van opmerkingen collegae?
  - Discussie over behandeling patient (mogelijke behandelingen of aanpak/ mogelijke medicatie)

##### Nieuwe situatie, sinds 01-04-07

12. Hoe bereidt u zich voor op de werkgroep?
13. Waar haalt u in de voorbereiding op de werkgroep uw informatie vandaan? *(Uit eigen dossier, mondelinge/ schriftelijke informatie van collegae, epd)*
14. Wat is tijdens de werkgroep uw belangrijkste bron van informatie?  
*(radiologiebeelden of papieren dossiers of mondelinge informatie?)*
15. Als u de communicatie in de nieuwe werkgroep moest indelen, welke van de volgende omschrijvingen is dan van toepassing?

- Informatie-uitwisseling over de geschiedenis van de patiënt
- Informatie-uitwisseling over de huidige status van de patiënt
- Discussie over betekenis/ bedoeling van opmerkingen collegae?
- Discussie over behandeling patiënt (mogelijke behandelingen of aanpak/ mogelijke medicatie)

*Veranderingen na invoering EPD:*

16. Is de interactie<sup>1</sup> tussen specialisten in de werkgroep veranderd sinds invoering EPD?  
Zo ja: hoe is die veranderd?
17. Is deze verandering volgens u veroorzaakt door de introductie van het EPD?  
Zo ja: waarom/hoe ziet u dat?  
Zo nee: kunt u aangeven waardoor de interactie volgens u dan wel is veranderd?
18. Communiceert u nu anders met collegae van een ander specialisme dan voor 1-04-07?  
Zo ja: hoe is dat veranderd?  
*(gebeurt op een andere plaats, andere onderwerpen/ soort informatie, gebeurt op een andere wijze (via epd, mondeling individueel, mondeling in de werkgroep, schriftelijk via mail aan individu/ groep, schriftelijk via papieren notitie )*
19. Is deze verandering volgens u veroorzaakt door de introductie van het EPD?  
Zo ja: waarom/hoe ziet u dat?  
Zo nee: kunt u aangeven waardoor de communicatie volgens u dan wel is veranderd?
20. Is de samenwerking<sup>2</sup> tussen specialisten volgens u veranderd?  
Zo ja: hoe is die veranderd?
21. Is deze verandering volgens u veroorzaakt door de introductie van het EPD?  
Zo ja: waarom/hoe ziet u dat?  
Zo nee: kunt u aangeven waardoor de samenwerking volgens u dan wel is veranderd?
22. Ziet u het EPD als geïntegreerd onderdeel in de interactie tussen specialisten?
23. Merkt u verschil in de voorbereiding van anderen op de werkgroep sinds de invoering van het EPD? *(beter geïnformeerd, slechter geïnformeerd, moeten nog veel opzoeken in dossier of EPD)*
24. Wat verwacht u dat het EPD in de toekomst kan betekenen voor de samenwerking en interactie in de werkgroep?
25. Wat moet er veranderen aan het EPD om dat te behalen?
26. Is de afstemming wat betreft de zorgverlening tussen specialisten beter/ ongewijzigd/ slechter in uw optiek?
27. Waardoor komt dat?

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<sup>1</sup> Interactie is: hoe mensen met elkaar omgaan (de manier van communiceren, manier waarop men op elkaar reageert, informatie uitwisselt en discussieert).

<sup>2</sup> Samenwerking wordt gezien als de manier waarop meerdere personen samen zorg verlenen aan een patiënt. Samenwerken bestaat uit communicatie (zowel het delen van informatie als het discussiëren) én coördinatie van activiteiten.

## Appendix 2: Interviewvragen aan verpleegkundigen

### Vragen aan verpleegkundigen:

#### ***Elektronisch Patiënten Dossier***

1. Hoe vaak woont u de hoofd-hals werkgroep bij? Hoe lang al?
2. Waarvoor gebruikt u het EPD? (*Patiëntgerelateerde informatie opzoeken/ aanvullen, agenda werkgroep inzien, aantekeningen/ informatie van collegae van andere specialismen inzien, aantekeningen/ informatie van collegae van eigen specialisme inzien, afspraken maken*)
3. Is dit anders dan vòòr het EPD (dus met de papieren dossiers)?
4. Wat zijn de belangrijkste verschillen tussen het papieren dossier en het EPD als u kijkt naar het doel waarvoor u het dossier gebruikt?
5. Wanneer kijkt u voor het eerst in het EPD? (*als patiënt aangemeld wordt, voor of na werkgroep, voor, na of tijdens patiënt bezoek*)
6. Zijn er dingen die u mist in het EPD?
7. Gebruikt u het EPD in voorbereiding op de werkgroep?  
Hoe gebruikt u het? Wat doet u ermee?
8. Kijkt u in het EPD tijdens de werkgroep?  
Hoe frequent doet u dit? Naar wat voor soort gegevens kijkt u dan voornamelijk?
9. Op welke manier wordt het EPD in de werkgroep gebruikt? (*voornamelijk als agendafunctie, als opbergplaats voor gegevens, als vervanging van een papieren dossier, als informatiebron voor patiëntgerelateerde gegevens of een combinatie hiervan?*)

#### **Multidisciplinaire meetings (hoofdhals oncologie werkgroep)**

##### ***Oude situatie tot 01-04-07***

10. Hoe bereidde u zich voor op de werkgroep?
11. Waar haalde u in voorbereiding op de werkgroep uw informatie vandaan? (*Uit eigen dossier, mondelinge/ schriftelijke informatie van collegae*)
12. Wat was tijdens de werkgroep uw belangrijkste bron van informatie?  
(*radiologiebeelden of papieren dossiers of mondelinge informatie*)
13. Als u de communicatie in de oude werkgroep moest indelen, welke van de volgende omschrijvingen is dan van toepassing?
  - Informatie-uitwisseling over de geschiedenis van de patiënt
  - Informatie-uitwisseling over de huidige status van de patiënt
  - Discussie over betekenis/ bedoeling van opmerkingen collegae?
  - Discussie over behandeling patiënt (mogelijke behandelingen of aanpak/ mogelijke medicatie)
14. Wat was in de oude situatie uw rol als verpleegkundige in de informatievoorziening?

##### ***Nieuwe situatie, sinds 01-04-07***



15. Waar haalt u in de voorbereiding op de werkgroep uw informatie vandaan? (*Uit eigen dossier, mondelinge/ schriftelijke informatie van collegae, epd*)
16. Wat is tijdens de werkgroep uw belangrijkste bron van informatie? (*radiologiebeelden of papieren dossiers of mondelinge informatie?*)
17. Hoe wordt het EPD in de werkgroep gebruikt?
18. Als u de communicatie in de nieuwe werkgroep moest indelen, welke van de volgende omschrijvingen is dan van toepassing?
  - Informatie-uitwisseling over de geschiedenis van de patiënt
  - Informatie-uitwisseling over de huidige status van de patiënt
  - Discussie over betekenis/ bedoeling van opmerkingen collegae?
  - Discussie over behandeling patiënt (mogelijke behandelingen of aanpak/ mogelijke medicatie)

*Veranderingen na invoering EPD:*

19. Is de interactie<sup>3</sup> tussen specialisten in de werkgroep veranderd sinds de invoering van het EPD?  
Zo ja: hoe is die veranderd?
20. Is de interactie<sup>3</sup> tussen specialisten en verpleegkundigen in de werkgroep veranderd sinds de invoering van het EPD?  
Zo ja: hoe is die veranderd?
21. Is deze verandering volgens u veroorzaakt door de introductie van het EPD?  
Zo ja: waarom/hoe ziet u dat?  
Zo nee: kunt u aangeven waardoor de interactie volgens u dan wel is veranderd?
22. Communiceert u nu anders met collegae verpleegkundigen dan voor 1-04-07?  
(*gebeurd op een andere plaats, andere onderwerpen/ soort informatie, gebeurt op een andere wijze (via epd, mondeling individueel, mondeling in de werkgroep, schriftelijk via mail aan individu/ groep, schriftelijk via papieren notitie )*)
23. Communiceert u nu anders met specialisten dan voor 1-04-07?  
(*gebeurd op een andere plaats, andere onderwerpen/ soort informatie, gebeurt op een andere wijze (via epd, mondeling individueel, mondeling in de werkgroep, schriftelijk via mail aan individu/ groep, schriftelijk via papieren notitie )*)
24. Komt dit door het EPD?  
Zo ja: waarom/hoe ziet u dat?  
Zo nee: kunt u aangeven waardoor de communicatie volgens u dan wel is veranderd?
25. Is de samenwerking<sup>4</sup> tussen specialisten volgens u veranderd?  
Zo ja: hoe is die veranderd?
26. Is deze verandering volgens u veroorzaakt door de introductie van het EPD?  
Zo ja: waarom/hoe ziet u dat?  
Zo nee: kunt u aangeven waardoor de samenwerking volgens u dan wel is veranderd?

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<sup>3</sup> Interactie is: hoe mensen met elkaar omgaan (de manier van communiceren).

<sup>4</sup> Samenwerking wordt gezien als de manier waarop meerdere personen samen zorg verlenen aan een patiënt. Samenwerken bestaat uit communicatie (zowel het delen van informatie als het discussiëren) én coördinatie van activiteiten.

27. Ziet u het EPD als geïntegreerd onderdeel in de interactie tussen specialisten?
28. Wat verwacht u dat het EPD in de toekomst kan betekenen voor de samenwerking en interactie in de werkgroep?
29. Wat moet er veranderen aan het EPD om dat te behalen?
30. Is de afstemming wat betreft de zorgverlening tussen specialisten beter/ ongewijzigd/ slechter in uw optiek?
31. Waardoor komt dat?

Appendix 3: Observation scheme

Patient:		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Discussie	Aanpak medicatie														
	Aanpak behande ing														
	Beleid														
	Historie patiënt														
	Toestand patiënt (waartumor)														
	Betekenis toestand patiënt														
	Betekenis ingevoerde info EPD														
	Betekenis ingevoerde info Radiologiebeelden														
	Literatuur														
	Consensus														
Info Uitwisseling	Geschiedenis patiënt														
	Huidige status														
Team coördina tie	Non-team coördinatie														
	Volgde van actie/behandeling														
	Wie doet wat, wanneer en waar?														
	Bron: Papier/ Rad/ EPD														

### **Toelichting:**

Wanneer tijdens het bespreken van een patiënt één van de genoemde onderdelen aan bod komt, wordt een vinkje gezet in het betreffende vakje. Per patiënt kan een vakje slechts éénmaal geturfd worden. Het gaat hierbij niet om de lengte van de discussie of communicatie, het gaat om het aan bod komen van dat onderdeel met als doel het vaststellen van de soorten samenwerking (coördinatie en communicatie).

De onderdelen zullen hier nader worden toegelicht:

### **Discussie**

De discussie tijdens de multidisciplinaire hoofd-hals werkgroep kan over diverse onderdelen gaan. Om het tot een discussie te classificeren moeten er meerdere werkgroepleden en/of toeschouwende artsassistenten, co-assistenten en/ of verpleegkundigen hun mening ten aanzien van het onderwerp geven. Waarbij er minimaal twee verschillende opties/ meningen worden besproken, het is ook mogelijk dat één optie wordt besproken met alle voor- en nadelen.

De discussie kan zich richten op:

"Aanpak medicatie": Het gaat hier om een discussie over de aanpak omtrent de medicatie. Een dergelijk onderwerp kan betrekking hebben op welke medicatie er gebruikt moet worden, hoeveel etc.

"Aanpak behandeling": Het gaat hier over de aanpak omtrent de behandeling. Het kan gaan om een discussie of de behandeling curatief of palliatief is/ moet zijn, het kan gaan om de aard en het type van de behandeling (bijv. chemotherapie of bestraling) én het kan gaan om het bespreken van voor- én nadelen van een bepaalde behandeling.

"Beleid": Het gaat hier om een discussie over het vaststaande beleid. Bij een bepaald type tumor in een bepaald gebied kan een beleid aanwezig zijn die bepaald welke behandeling er plaats dient te vinden. De discussie hieromtrent kan gaan over of dat beleid al dan niet toegepast wordt bij de betreffende patiënt of het kan gaan over of het beleid in het algemeen al dan niet veranderd moet worden.

"Historie patiënt": De discussie in dit gebied gaat over de ziektegeschiedenis van de patiënt en over de behandelingen die de patiënt al gehad heeft. Het gaat hier met name NIET om een uitwisseling van informatie, maar om een discussie. De discussie kan bijv. betrekking hebben op onduidelijke of verkeerde informatie over behandelingen in het verleden. Het kan ook zijn dat verschillende specialisten het onderling oneens zijn over de behandelingen die een patiënt elders heeft gehad.

"Toestand patiënt (waar tumor)": Het gaat hier om een discussie over de huidige toestand van de patiënt. De discussie kan zich richten op de plek van de tumor: waar de tumor zich exact bevindt of tot waar de tumor loopt. Maar de discussie kan zich bijv. ook richten op wat er op exact op de beelden te zien is.

"Betekenis toestand patiënt": Een discussie op dit punt betreft een discussie over de betekenis van de toestand van de patiënt. Het kan hier gaan om een discussie over de betekenis van bepaalde beelden of lab-uitslagen.

"Betekenis ingevoerde info EPD": Hier gaat het om een discussie over de betekenis die bepaalde ingevoerde gegevens in het Elektronisch Patiënten Dossier heeft. Het kan gaan om een onduidelijke zin van een van de specialisten/ verpleegkundigen of om foto of beeldmateriaal in het EPD.

"Literatuur": Het gaat hier om een discussie over wat er in de literatuur vermeld staat over bijv. behandeling of het voorkomen van bepaalde tumoren.

### **Info uitwisseling**

Bij informatie uitwisseling gaat het er om dat één (of meerdere) specialisten, artsassistenten, co-assistenten en/of verpleegkundigen informatie over de patiënt

vermelden. Het kan hier gaan om het oplezen van een tekst uit het papieren dossier, het oplezen van een tekst uit het elektronisch dossier, het oplezen van een voorbereide tekst omtrent de toestand van de patiënt of het opnoemen van informatie uit het hoofd.

De informatie uitwisseling kan betrekking hebben op:

"Geschiedenis patiënt": Het gaat hier om het uitwisselen/ opnoemen van informatie over de ziektegeschiedenis en vroegere behandelingen van de patiënt. Het gaat hier om zaken die in het verleden (meer dan twee maand geleden) hebben plaatsgevonden.

"Huidige status": Het gaat hier om het uitwisselen/ opnoemen van informatie over de huidige status van de patiënt. Het gaat hier om de gezondheidstoestand van de patiënt, de staat van de tumor, de reactie die de patiënt heeft gehad op behandelingen etc. Het gaat hier om de huidige toestand en behandelingen van max. 2 maanden geleden tot aan het heden/ moment van bespreking in de werkgroep.

#### **Non-team coördinatie**

Non-team coördinatie betreft het coördineren van taken en/ of afspraken waarbij slechts één specialisme betrokken is. Het kan hier gaan om een specialist die aan een verpleegkundige vraagt een afspraak te maken met de patiënt, het kan gaan om een verpleegkundige die een afspraak bevestigt aan een specialist of het kan gaan om twee specialisten of verpleegkundigen uit één specialisme die afspraken maken, taken verdelen, volgorde van acties en behandelingen bepalen etc.

#### **Team- coördinatie**

Team- coördinatie heeft betrekking op het coördineren van taken en/ of afspraken waarbij meerdere specialismen betrokken zijn. Deze coördinatie kan betrekking hebben op:

"Volgorde van actie/ behandeling": Coördinatie onder dit onderdeel betreft het coördineren van behandelingen op volgorde. Het gaat om afspraken m.b.t. welke acties eerst moeten plaatsvinden en welke daarna. Het kan gaan om afspraken die de verschillende specialismen met de patiënt moeten maken voor observaties. Maar het kan ook gaan om de volgorde van verschillende behandelingen of het vergaren van beeldmateriaal etc.

"Wie doet wat, wanneer en waar?": Coördinatie onder dit onderdeel betreft het coördineren van behandelingen en/of te ondernemen stappen. Het gaat hier niet slechts om het coördineren van de volgorde van de te nemen stappen, maar met name over wie welke acties onderneemt (bijv. wie de patiënt uitnodigt en het behandelplan voorlegt) en wanneer en waar dat gaat plaatsvinden.

**Appendix 4: Photo of situation workgroup**



Head and neck cooperative oncology workgroup. Photo: J. van Teeffelen, Radbode April 2006.