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Draft paper: IT and health

Summary

The Office of the Auditor General of Norway (OAG) is currently conducting a performance audit concerning the use of electronic solutions for the storage and exchange of patient information within hospitals and between hospitals and the primary health service.

The Norwegian parliament (the Storting) has highlighted IT as a major policy instrument for achieving better use of resources and for improving collaboration in the health service. Since 1997, the government has launched three national IT plans for the health sector. Two of the most important goals of the present plan, *Teamwork 2007*, are that all the hospitals are to implement an electronic medical record (EMR) system and that case summaries are to be sent electronically from the hospital to the primary doctor.

The feasibility study indicated that even though most hospitals are in the process of introducing systems for EMR, there are large variations between the hospitals and also in the utilisation of these systems. At many places paper routines are used in parallel with the electronic solutions, which limits the benefit of the IT investments. The feasibility study also revealed that less than one third of all case summaries are sent electronically.

This audit presented three main methodological challenges: firstly, IT and health constitutes an area of high institutional, technical and economic complexity; secondly, the audit is being conducted in parallel with a national initiative in this area; and thirdly, at the time of the start-up of the audit we did not have sufficient expertise about the introduction and use of IT systems in hospitals. This paper describes these challenges and the methodological solutions we chose, as well as focusing on the following aspects of our methodological approach: a comprehensive feasibility study, a joint meeting with the players involved in the area, the selection of audit questions and audit criteria, a case study on EMR, and the use of an external consultant.

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1. Background for the audit – risk and materiality

The health sector can be described as very information-intensive. A substantial number of consultations and hospitalisations are performed each year, and each of these creates the need for the registration, storage, processing and transmission of information between healthcare workers, patients, institutions and various levels of government administration. A major goal is to make the processing of this information more efficient by means of IT.

The Norwegian parliament (the Storting) has for many years emphasised that the use of IT is intended to promote improvements in the health service: IT is to represent an instrument that will enhance the efficiency of work processes in hospitals and improve the cooperation concerning the patient between the various treatment units. Since 1997 the ministry has launched three national plans for the development of IT in the health sector. We are now approaching the end of the period for the *Teamwork* plan, which is the last of the three plans and which represents a strategy plan for the period 2004-2007. Major goals of all three plans have been to increase the use of electronic exchange of information and to improve the collaboration between the various links in the service chain in the health sector.

The collaboration between the specialist health service and the municipal primary health service does not function satisfactorily. Patients who are ready for discharge frequently remain in hospital too long, and it often takes too long to send case summaries from the hospital to the primary doctor once patients have been discharged. The need for better interaction between the specialist and the primary health services is one of the major challenges facing the Norwegian health service. Good interaction and teamwork are important to ensure that the patient receives appropriate follow-up and a cohesive treatment programme, as well as being a prerequisite for the efficient and effective utilisation of the total resources in the health service. The authorities have emphasised that the electronic exchange of information constitutes an important contribution to resolving the challenges regarding improved cooperation.

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However, electronic interaction is dependent on the parties involved cooperating across institutional borders and levels. This represents a considerable challenge in a complex health sector that encompasses many different activities, levels of government administration, managerial relationships, organisational cultures and IT solutions.

The complexity of the health sector also sets requirements for ensuring that the use of IT does in fact contribute to the better use of resources and to interaction or other relevant improvements. The efforts to realise IT benefits is a challenge in most enterprises, and in the health service this challenge is particularly great – not least with regard to implementing the changes in the organisation and work processes that are necessary to attain positive effects from IT investments. For this reason there is a risk of not achieving the goals concerning greater efficiency and effectiveness through the use of IT.

2. The Norwegian health service – organisation, objectives and use of IT

In an international context the health service in Norway is characterised by a high degree of government ownership and financing. The responsibility for the health services is divided between the municipal primary health service and the government specialist health service. The responsibilities of the latter include the hospitals, whilst among other facilities the service in the municipalities covers the general practitioner service and the nursing and care services. There are more than 400 municipalities in Norway.

The general practitioner service in the municipalities is organised as a list patient scheme in which the doctors are intended to coordinate the care services offered to patients, to refer patients to the specialist health service, and to monitor patients after treatment. A considerable proportion of the information flow in the health service therefore consists of communication between the list patient doctor and other bodies – for example hospitals.

The hospitals in Norway are owned by five regional health authorities that are responsible for specialist health services for the population in their region. The government owns the regional

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health authorities, which were established in a large-scale health reform¹ in 2002 and which constitute separate legal entities. Through the annual ordering document The Ministry of Health and Care Services sets conditions for the allocations to the regional health authorities.² Together the five regional health authorities own more than 30 subordinate health enterprises that in turn cover one or more hospitals. There are large differences between the health enterprises – in size, organisation and efficiency.

Goals for the use of IT in the health service, and requirements for those involved in electronic interaction

Putting electronic solutions to use in the processing of patient information has been a goal for many years. The requirements set have included hospitals introducing electronic patient records, and case summaries and referrals being conveyed electronically between the primary and the specialist health services.

The Directorate for Health and Social Affairs has been assigned the responsibility for coordinating and setting the terms for appropriate IT development in the health and social sector. One of the goals of the health reform in 2002 was to strengthen the cooperation between the primary and specialist health services. The regional health authorities were ascribed an important role in the development of electronic interaction and were given considerable strategic responsibility for the IT development within the hospitals and between the hospitals and the primary health service. Requirements from the Ministry of Health and Care Services have resulted in the regional health authorities establishing a forum for IT collaboration called *National ICT*. However, the use of policy instruments and the responsibility for implementation has been assigned to each regional health authority and its health enterprises.

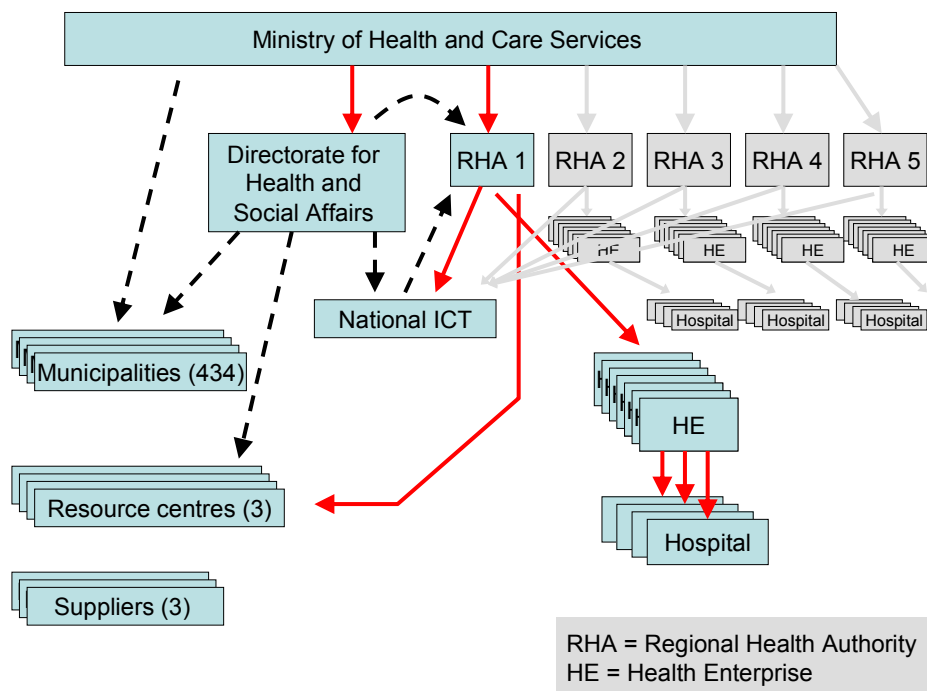
¹ The government then took over the responsibility for the specialist health service, which had previously been ascribed to the county authorities.

² The Ministry of Health and Care Services has three main policy instruments that it can implement vis-à-vis the regional health authorities: through the annual ordering document the ministry sets conditions for the allocations to these authorities; the ministry exercises ownership management through its meetings with the enterprises and exercises governmental control through legislation, regulations and statutes; the ministry also appoints the Boards of the regional health authorities.

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There are more than 400 municipalities in Norway,³ and most health enterprises have multiple municipalities with which they must cooperate. Municipal autonomy is seen as a value of some importance in the Norwegian political system, and the municipalities are given great freedom to assign priority to their various tasks and to find ways of resolving them. The municipalities are very different, and there is great variation in their technological development.

In addition to the ministry, the directorate, the regional health authorities, the health enterprises and the municipalities, there are also other players in the area, including several resource centres that are ascribed important tasks – for example related to standardisation. The three suppliers of electronic medical record systems (EMR) to the hospitals also play an important role in this field. These are commercial enterprises, and so far very few requirements have been set for them – for instance for the use of standards.



³ There are approximately 5 million inhabitants in Norway.

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Fig. no 1: The area of IT and health: Managerial relationships

Status of the use of electronic patient information in the health service

The list patient doctors have made the greatest progress in the use of electronic patient records. They show an almost 100% coverage of EMR – and they have used the system for many years. At the other end of the scale are the local authority nursing and care services, such as nursing homes and home-based care, in which IT is scarcely used. In the hospitals the situation is more complicated: although most hospitals have an EMR system in one form or another, these systems are somewhat different and there are large variations between the hospitals with regard to functionality and the utilisation of the systems. While a few hospitals can call themselves “paperless”,⁴ others are still updating both paper and electronic records.

The electronic exchange of patient information takes place via messages. Electronic solutions have been developed for several types of message, but the implementation and use vary. The most important types of message in the exchange of information between the primary and the specialist health services are referrals from the list patient doctors to hospitals and case summaries from hospitals to list patient doctors. Electronic message exchange is conditional on the use of electronic patient records and secure communication solutions.

A national health network has been set up. Owned jointly by the five regional health authorities, this is a closed network for communication between players in the health sector. Many of those involved, e.g. a considerable number of list patient doctors, are not yet connected to the network. Both the services provided by the health network and the use of the network are so far limited.

3. Methodological challenges in the audit

Methodological challenges in a performance audit concerning IT emerge in all phases of the auditing and can be related to various aspects – for example the properties of the audit objects

⁴ Papers are nonetheless produced during hospitalisations. These are scanned once the patient has been discharged.

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and the audit area, the timing of the investigation, the availability of data or expertise in the audit.

In this performance audit there are three main methodological challenges:

- Institutional, technical and economic complexity
- Timing of the audit
- Expertise

Institutional complexity

The area of IT and health is characterised by high institutional complexity. Many parties are involved, and there are many levels of government administration in the field as well as different managerial relationships between them, as can be seen from the figure on page 5. Many goals have been set for IT development in the health sector, and a substantial number of measures have been implemented. Enabling these measures to have an effect and the goals in the area to be achieved depends largely on cooperation between the various players – as the title of the national strategy plan Teamwork suggests. Those involved administrate various types of policy instruments, and goal achievement in the area is to a large extent conditional on interaction between such instruments. We can illustrate this interaction with a very simplified example:

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Goal:

More efficient and effective work process in hospitals and electronic communication with list patient doctors.

Use of policy instruments:

Stage 1: The ministry sets a requirement in the ordering document for the regional health authorities: all health enterprises must introduce EMR.

Stage 2: The regional health authority enters into an agreement with a supplier on the purchase of a system, and the system is delivered to the health enterprises as they request it.

Stage 3: The health enterprise establishes a project and introduces EMR.

Stage 4: Heads of departments allocate resources for training users and enhance the efficiency of the department's routines, and case summaries are written and sent electronically.

The example shows how goal achievement requires several players to implement policy instruments that together make it possible to attain the electronic despatch of case summaries.

The health enterprises are complex organisations that represent major players in the field. In the hospitals the work processes consist of many different links, the activities are information-intensive and the requirements for security are considerable. Some health enterprises are very large or consist of several hospitals, which increases the complexity. Like other complex organisations, the hospitals have a bureaucratic structure with many levels, a clear assignment of work, and an obvious division of activities into different departments, at the same time as there is a considerable flow of both patients and information between the departments. Particular features of hospital organisation are the extremely high degree of specialisation, sharp occupational boundaries, and professionally autonomous doctors. Hospitals represent examples of organisational configurations that have been called professional bureaucracies.⁵

The general complexity of the field and the particular complexity in hospitals constitute several challenges for the audit. The greatest challenge lies in the choice of audit questions, audit criteria and the design of the investigation. This requires good insight into work processes and information flow within and between the health institutions. It is also important

⁵ Henry Mintzberg (1983) Structures in Fives – Designing Effective Organizations. Englewood Cliffs: Prentice Hall

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to make assumptions as to why goals have not been achieved. High complexity will often result in compound causes of deficient goal achievement.

Technical complexity

IT and health is an area with high technical complexity. There is a great diversity of IT systems and solution versions and large differences in technological points of departure. Hardly one health enterprise is like another in the IT field. There are also material differences in the use of terminology: for example a key concept such as EMR can have different meanings, and it is far from clear what is meant when it is claimed that a hospital has introduced EMR. In some hospitals this means that parts of the patient's medical record are electronic, while in others it means that the paper medical record no longer exists. New technological opportunities also lead to changes in the use of terminology over time.

This technical complexity poses challenges for the audit that we must solve in the design of the investigation – for example in the development of questionnaires. Lack of clarity in important terms and great variation between the units that are to answer the questions mean that substantial preparatory work is required to compile a questionnaire that can produce valid data.

Economic complexity

There is also a high degree of economic complexity in this area. One aspect of this is that electronic interaction in many cases entails some parties making investments that lead to others gaining benefit. Another aspect is that hospitals lack an overview of IT costs and they focus only to a small extent on documenting benefits. It is also often the case that benefits from IT do not become apparent until long after the investments have been made, which makes it difficult to determine the gains enterprises have accrued from IT. There is no clear connection between goal achievement and gains, and the correlation between these is difficult to substantiate. For example the goal may be to introduce EMR, but the benefits from introducing the system do not come automatically but are dependent on changes in work processes and good system use. For the audit this entails challenges related to putting goal

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achievement into operation, measuring benefits, and showing how the gains depend on the system being utilised appropriately.

Timing of the audit

The national *Teamwork* strategy plan applies for the period 2004-2007. Our audit is thus taking place at the same time as this plan is being implemented. It is a challenge to conduct a performance audit in an area in which a national initiative is being carried out: the level of activity in the area is high, and it is difficult to keep an appropriate overview of an area in constant change. There is considerable likelihood of changes being made to the data basis while we are collecting data; this may lead to an improvement in goal achievement, but it also makes it necessary for us to handle the risk of our data becoming obsolete and the audit thus becoming irrelevant.

Expertise

Those conducting performance audits possess appropriate knowledge of the health sector in general and hospitals in particular, while in the OAG there is also good competence in IT. Nonetheless we considered that this audit would also require specific competence regarding the challenges related to the introduction of IT tools in hospitals, as well as an adequate understanding of IT systems that process patient information and of the integration between such systems. When the project started it was therefore necessary to clarify how we could procure this expertise.

4. Methodological approach to the challenges

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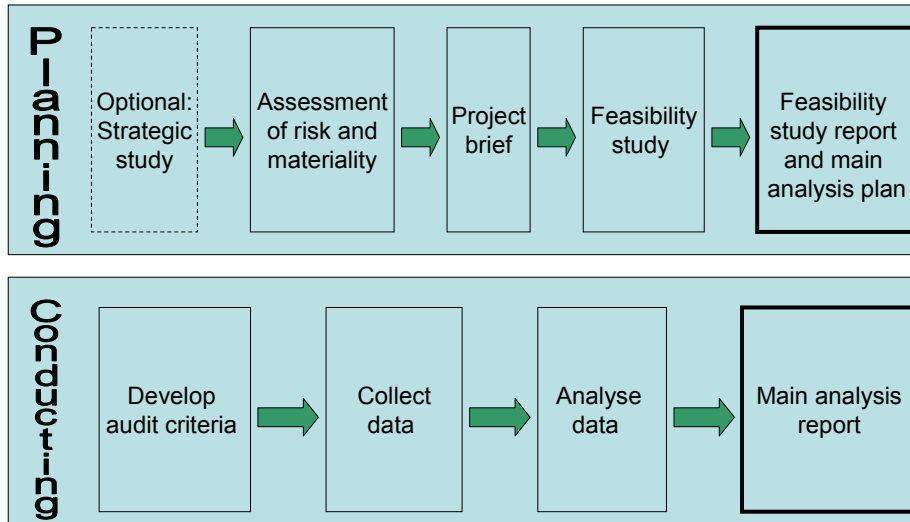


Fig. no 2: The audit process: planning and conducting

A comprehensive feasibility study

In areas of high complexity a strategic study can in some cases be a suitable approach. The purpose of a strategic study is to map the risk within a broad sector area with a view to conducting in-depth studies in the form of performance audits at a later stage.

However, we were of the view that the risk assessments in the area of IT and health were adequate and that it was undesirable to postpone the start-up of an audit. Due to the complexity of the area we decided to conduct a more comprehensive feasibility study than normal. We considered this necessary to enable us to draw up a good main analysis plan. The main analysis plan is an important tool in all audits, but when complexity increases the implementation risk in the project rises correspondingly. In projects with high complexity it is therefore particularly important for the feasibility study to provide an adequate basis for the choices that are to be made in the main analysis plan.

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The acquisition of information in the feasibility study consisted of participating in conferences, reviewing documents and reports, conducting interviews with different user groups in two hospitals and with other selected players: the ministry, the directorate, a resource centre, a regional health authority and the *National ICT* forum. This extensive acquisition of information was necessary to give us a good overview of the challenges present in the area and the players' use of policy instruments, and to identify the methods that would be relevant in the main analysis.

Our point of departure for the acquisition of information in the feasibility study was the formulation of different types of audit questions. These are given in Appendix 1. They consist of descriptive audit questions, audit questions whose purpose was to indicate non-conformance, and audit questions aimed at identifying causes. Several of the audit questions were somewhat wide in scope since the feasibility study aimed not only to find indications of non-conformance and to obtain information on existing data and relevant methods for collecting data in the main analysis, but also to build up our expertise in the field to enable us to select the most relevant audit questions in the main analysis.

Joint meeting with the players involved – "Lunch party"

To ensure that we compiled appropriate and relevant audit questions for the main analysis, towards the end of the feasibility study we invited representatives of the most important players in the area – such as the ministry, the directorate, regional health authorities, resource centres – to a large "lunch party". This represented a type of focus group but with many different players. We were inspired by the UK National Audit Office's "dinner party" approach – a technique that is used when the data collection has been completed and the report is to be compiled. We presented our preliminary findings and asked for feedback from the participants to ascertain whether these findings corresponded with their perceptions of the challenges related to electronic storage and the exchange of patient information.

In general the participants confirmed our findings and contributed to elaborating and introducing new views on some points. We then invited them to take part in a discussion on

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selected themes and presented them with a considerable number of questions that we asked them to consider. The purpose of the questions was to stimulate a discussion that could help us to clarify what would be the correct audit questions to select for the main analysis.

Examples of questions:

- Most hospitals are currently in the process of installing EMR, but there are large differences between the hospitals: some have progressed much further than others in their implementation of the EMR system. Why is this the case?
- Are the training and organisation for use of the system too poor, and will it be acceptable for doctors in particular to largely decide themselves whether or not they will use the hospital's data system?
- Is the inadequate utilisation of the Norwegian health network due to a lack of attractive services?
- Is the greatest benefit for health enterprises that they will be able to receive referrals electronically, or are there other forms of electronic interaction that are more important for the hospitals than electronic referrals?

The participants made an active contribution to an open discussion. They provided input to the themes in the audit and expressed their opinions on the importance of various obstacles for goal achievement. They also had comments on the use of the terminology and legislation in the area.

The discussion helped to increase our understanding of the complexity and challenges involved and it was of great significance for the selection of audit questions in the main analysis. A possible objection could be that the players were thus able to influence the design of the audit, but on the other hand there is a greater risk of the dialogue with the players being too restricted than of the players having the opportunity to contribute their input. Regardless of such considerations, the responsibility for the choice of audit questions remains ours. One disadvantage of arranging a meeting of this type is that the planning is extremely time-consuming.

Selection of audit questions and audit criteria

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One of the recommendations from the participants at the lunch party that we did not consider was to postpone the audit. Their argument about the timing of the audit was that since a national initiative is currently underway, which will last until 2007, the audit should wait until the results of this initiative could be seen. However, we had concluded that our investigation would have greater value for further work on IT development in the health sector if it was conducted at that particular time. When an audit is initiated, government attention towards the area in question often increases. The value of the audit would be conditional on our selecting audit questions and audit criteria that could ensure that the report would be relevant even though changes would take place in the area during the investigation.

In our selection of audit questions we therefore chose to focus equally on prerequisites for goal achievement and benefits and on how far the development had progressed in specific target areas. The following audit questions were chosen:

- How do the regional health authorities and the health enterprises ensure that the investments in electronic medical records result in better patient treatment and improved use of resources in hospitals?
- To what extent is the exchange of electronic messages used as a policy instrument for achieving better interaction in the treatment chain?
- How satisfactory is the national management and organisation of the work concerning electronic interaction in the health sector?

The answers to these audit questions were sought through several sub-questions, as can be seen from Appendix 2.

Hopefully the audit questions selected will make it possible to present a relevant audit report for the Storting regardless of any changes in goal achievement during the process. The selection of audit questions is also based on the challenge created by the economic complexity of the area. Since benefits from IT often do not become apparent until long after the

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investments have been made, we cannot at this point in time expect there to be much possibility of documenting the financial benefits. On the other hand it is possible to verify the policy instruments that are used to secure good utilisation of electronic solutions – in itself a prerequisite for attaining benefits.

The *Teamwork* strategy plan is not explicitly mentioned in the audit questions since we decided to handle the plan as a policy instrument. Neither is the plan used as an audit criterion. This is a plan that the ministry launched at the request of the Storting, but the plan has not been discussed by the parliament.

In addition to goals set by the Storting, significant audit criteria in this investigation constitute professionally recognised criteria for the good introduction and utilisation of IT tools. In national and international IT environments criteria have been laid down over time for the satisfactory application of IT.⁶ In spite of their varying perspective and scope, there is a high degree of agreement between the criteria that are listed – for example that support from both management and users is essential to achieve a good introduction, that training must be assigned priority, and that changes in work processes are necessary to realise gains. Using such criteria therefore makes it possible to introduce the subjects of best practice and of the policy instruments the hospitals make use of to ensure that IT contributes to the enterprise attaining its goals.

Case study on EMR

The audit question concerning EMR was the one that presented the greatest challenges in this audit.

We decided to conduct a case study in a selection of hospitals to help in shedding light on this audit question. There will be many questions to which a questionnaire survey will not be able to provide in-depth answers – for example how the hospitals facilitate the good utilisation of their IT systems. We were of the view that a questionnaire would not be able to encompass

⁶ For example this applies to IT member organisations and more specialised organisations such as ISACA, standardising institutions such as the IT Governance Institute and public sector organisations (ITIL).

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the complex IT situation in the hospitals, and that a case study would therefore strengthen the validity of the audit. On the basis of previous experience of case studies, we also anticipated that this approach would help us to present the findings in a reader-friendly manner in the report.

In order to obtain data from all the health enterprises, we also wanted to conduct a questionnaire survey, but the complexity in the area made it a challenging task to design such a questionnaire and to decide who should respond to it. We chose to begin the collection of data by carrying out the case study. By interviewing different groups in the hospitals we would acquire a better foundation for forming relevant questions for the questionnaire.

Prior to the case study we sent a letter to all the health enterprises and asked for information about which EPJ system their hospitals use and when this was introduced. We also asked them to send us documentation from any more recent introduction projects. In addition we asked them to provide a contact person in the health enterprise who could help us with the future collection of data.

The response to the letter revealed great differences between the hospitals. While some of them replied speedily and sent relevant documentation, others had to be reminded several times. Some did not have documentation to send, and the quality of the documentation we received varied greatly. The answers from the hospitals also showed that the technical complexity was even greater than we had visualised beforehand.

We set up a selection with eight hospitals. We gave priority to all three EMR systems being represented in the selection, to hospitals from all five regional health authorities being represented, and to the inclusion of both large and medium-sized hospitals. We decided to leave out the smaller hospitals, both because we wanted the selected hospitals to encompass a large proportion of the population⁷ and because the complexity is much lower in small hospitals. We selected some hospitals that had been using EMR for many years, some that had recently introduced EMR, and some that were in the process of planning its introduction.

⁷ The eight hospitals represent about one third of the total number of hospitalisation days in Norwegian hospitals.

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We got in touch with the contact person we had been assigned and asked for assistance to make interview appointments with:

- representatives for the management
- representatives from the IT-department and participants in any EMR projects
- a doctor with administrative responsibility for a department
- a “super user”⁸ of EMR

The reason for our choice of informants was that in a “professional bureaucracy” such as a hospital it is important to gain experience and views from different groups. Representatives from the IT department may have different perspectives from the users of IT systems, and opinions may also differ among the various user groups such as doctors, nurses⁹ and office staff.

At the time of writing this paper, November 2006, we are in the process of concluding the case study. Data collection has demanded considerable resources – particularly due to the technical complexity. For example it has been necessary to adapt the interview guide before each hospital visit since the differences between the hospitals are considerable. Even though all the hospitals can and must be asked most of the questions, it is still necessary to adapt the questions to the specific situation at the individual hospital in order to make them relevant for the respondents. If a hospital is in the process of introducing EMR, for example, it is somewhat irrelevant to ask about their user experience. Prior to each hospital visit we spent some time relating to the situation at the hospital in order to be able to ask relevant questions – and not least to be able to understand the answers given.

In several cases it has transpired that the documentation from the hospital has not provided a correct description of the process concerning the introduction of EMR, or that the hospital’s

⁸ A super user is usually a secretary who is responsible for assisting the various user groups in the department.

⁹ Interviews with nurses had been conducted in the feasibility study, but so far there are very few hospitals where nursing documentation is stored electronically and we therefore decided not to use this group in the case study.

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IT situation has not been adequately portrayed. The interviews were therefore important in order to clarify misunderstandings. At most of the hospitals we were given important supplementary documentation during our visit or afterwards.

The interviews in the case study gave us crucial information that we would not otherwise have received. It has particularly helped us to understand how EMR is used in a clinical perspective, i.e. the reasons why the possibilities provided by EMR are not utilised well enough, as well as the policy instruments that are used or that are not made use of. An example can illustrate the importance of the different use of policy instruments: in one of the hospitals we found that the doctors in one department used EMR to write out prescriptions while this EMR function was hardly used in another department. It transpired that the super user in the latter department had taken the initiative to have the prescription pad removed so that doctors no longer had the choice.

The case study also reveals that “general truths” about which hospitals have progressed farthest with their use of EMR must be adjusted. One of the hospitals we had selected had been using EMR for many years and we expected this hospital to have considerable experience that other hospitals could benefit from. However it came to light that the training at this hospital was deficient, that the users were frustrated, and that paper patient records were still used parallel with EMR. It is unlikely that we would have acquired a correct picture of the situation at the hospital if we had not conducted a case study.

The case study will be of importance in the further work of collecting data in the audit, both as a preparation for other interviews that will be held later – not least interviews with the regional health authorities – and in the work to be performed on the questionnaire survey.

The information we have obtained through the case study will also be extremely useful in the process of designing the questionnaire. We have acquired knowledge of specific policy instruments that can be utilised to secure the use of EMR, we have gained an insight into factors that may influence doctors’ assessment of the benefits of EMR in their daily work with patients, and we have seen what the differences between the various EMR systems mean in

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practice so that we can take these differences into account on the questionnaire form and can ensure that we ask relevant questions.

The case study has also revealed appreciable variations in the use of terminology. For example it will not be sufficient to ask whether the hospital has introduced EMR, but it will even be necessary to ask many questions that will jointly provide a picture of the extent to which the hospital has implemented electronic patient records. Clear and precise formulations of terms and questions will be required in both the questionnaire and the guidelines for how the questions are to be understood and answered. The findings from the case study will be vital for the work of designing the questionnaire to avoid misunderstandings and ambiguities.

The case study has also confirmed our prior assumption that there are clear boundaries between different groups in the hospitals. We will therefore send out a questionnaire that is formulated in several different parts. One possibility we must assess is whether to design the questionnaire for doctors as a user survey and to use the factor analysis to document the importance of the various factors for doctors' use of EMR systems.

The case study will also be of assistance in the analysis of the answers from the questionnaire survey. Information from the interviews will help us to interpret individual responses and the correlation between them, and findings from the case study will also enable the results from the questionnaire to be amplified when they are presented in the report. We are also of the view that the case study will increase the value of the report for the health enterprises and the regional health authorities and will enable them to learn from each other.

Assistance from an external consultant

Even before the start-up of the feasibility study it was decided that we would use external assistance to safeguard the competence in the project. A public procurement was therefore conducted. In the competition documentation we requested the bidders to provide a co-worker who was to be a member of the project group. We were of the opinion that performing the audit in close cooperation with the consultant would represent a better solution than that of using external assistance to conduct parts of the audit, which was a possible alternative. Close

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cooperation with the consultant ensures better transfer of expertise to the project group. We were also of the view that it was important to ensure that all parts of the audit were seen as a whole throughout the process.

Expertise, knowledge and experience in the field of IT and health represented one of the allocation criteria in our choice of consultant. After reviewing the incoming bids and interviewing the most relevant consultants we chose one who had experience of IT introduction projects in hospitals, good technical knowledge of IT, and specific competence concerning IT and organisation. The consultant would thus be able to supply expertise on organisational, technical and economic complexity.

In the project the consultant has contributed by:

- reviewing and organising project documentation
- helping to prepare the interviews
- participating in some interviews
- assisting in the project group's summarising and discussion of findings

We will also use the consultant in the work of developing the questionnaire and in the quality assurance of the report.

We have benefited from the consultant's competence in this performance audit. However, a public procurement is a time-consuming process and it is no simple task to choose the right person. Using a consultant can also be expensive, and it is therefore important that the consultant's assistance is utilised in an appropriate manner.

5. Preliminary findings

Since the collection of data is not complete, we must so far be satisfied with implying some preliminary findings in the investigation:

- The hospitals have little knowledge about the national strategy plan *Teamwork*

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- The utilisation of the health network is far lower than anticipated
- Only approximately 30% of the case summaries and 1-2% of referrals are sent electronically
- Even though many health enterprises have introduced EMR, much of the documentation is still on paper
- Many EMR projects have not gained a firm footing in the clinical departments
- The training of the users is often assigned low priority
- There is little focus on changing routines and work processes
- Very few health enterprises make evaluations of system use, and in many cases the doctors are free to disregard electronic solutions when paper routines are available

At the time of writing we are working on compiling the questionnaire survey that will cover all the health enterprises.

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Appendix 1

Audit questions in the feasibility study

To what extent is there an adequate and appropriate flow of information in the treatment chain that ensures good patient treatment and the efficient and effective use of resources in hospitals?

- a) What information about the patients is stored and exchanged throughout the treatment chain, and to what extent is this information transmitted electronically?
- b) To what extent is the necessary patient information stored and made available at the hospital to enable it to contribute to quality and efficiency in patient treatment?
- c) In what manner do the health enterprises utilize electronically stored information about patients for administrative purposes such as managing and reporting their activities?
- d) What factors represent obstacles to electronic information exchange in hospitals, within the special health service and between the primary health service and hospitals?
- e) What policy instruments and measures are used at national and regional levels to facilitate electronic cooperation and a good flow of information in the health sector, and to what extent are these policy instruments and measures adequate to ensure goal achievement in this area?

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Appendix 2

Audit questions in the main analysis

1. How do the regional health authorities and the health enterprises ensure that the investments in electronic medical records result in better patient treatment and improved use of resources in hospitals?

- a) To what extent is patient information stored electronically in hospitals?
- b) To what extent have the hospitals changed work processes and routines to ensure benefits from the introduction of EPJ?
- c) How do both the regional health authorities and the health enterprises secure the appropriate application of EPJ in hospitals (training, requirements for system use etc.)?
- d) How do the regional health authorities and the health enterprises ensure that the EPJ systems that are purchased are of good quality and are adapted to their needs?
- e) What gains have been documented following the introduction of EPJ?

2. To what extent is the exchange of electronic messages used as a policy instrument for achieving better interaction in the treatment chain?

- a) How extensive is electronic message exchange within hospitals, between hospitals, and between the primary and specialist health services?
- b) What are possible causes of the low extent of electronic message exchange in the interaction between the primary and specialist health services?
- c) To what extent have electronic case summaries and referrals led to improvements in both the quality of the information and the use of resources in hospitals?

3. How satisfactory in the national management and organisation of the work concerning electronic interaction in the health sector?

- a) What policy instruments does the Ministry of Health and Care Services use to achieve a greater use of electronic information exchange in the treatment chain?
- b) To what extent is there an appropriate division of responsibility and work between the various players in this area?

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- c) What does the Ministry of Health and Care Services do to promote increased use of IT and thus attain better management information?