

# Electronic referrals in the Health Sector in Norway, challenges on the road from standard to high volume use

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**Abstract.** The introduction of electronic referrals in Norway started back in 1996, when the first standard was introduced. The volume of electronic referrals is still low in 2008. In 2006, the Regional Health Authorities<sup>1</sup> initiated a task to identify problems that had to be solved before the solutions could be widely used. Periodic meetings with the RHAs were held in 2006 and 2007. This paper sums up the finding from this process and points out proposed actions to help speed up the process of deploying electronic referrals. Further research is suggested in order to clarify the socio-technical obstacles and enablers for high volume use of electronic referrals. Research related to the introduction of electronic referrals can be useful both for following electronic referral projects and other projects that require cooperative work between different actors in the health sector.

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<sup>1</sup> A Regional Health Authority (RHA) (Regionalt helseforetak) is a state enterprise responsible for specialist healthcare in one of four regions of Norway.

## Background

Electronic referrals are requests for medical examination and evaluation by a specialist, outpatient clinic or a hospital. The referral can be sent from a General Practitioner (GP), specialist or from one hospital to another. The referral transfers fully or partly the responsibility for further treatment of the patient. Figure 1 illustrates the process from the patients first contact with the General Practitioner until the discharge summary with information about the patients stay is sent back to primary care.

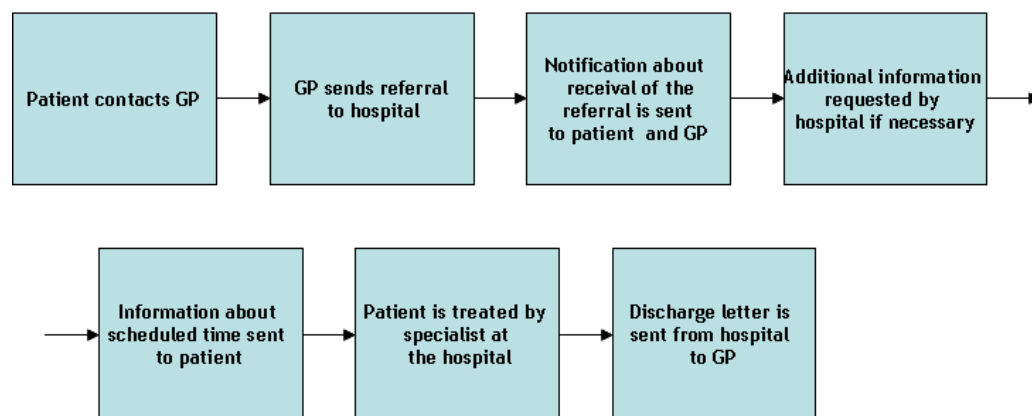


Figure 1: Communication between GP and hospital

The introduction of electronic referrals in Norway started back in 1996 (KITH 1996), when the first standard for an electronic referral was introduced. Requirement specifications for communication modules in the EHR-system were developed in 2002. Implementations of these modules in the EHR-systems have partly been funded by Innovation Norway, and the implementations have been tested by means of a National Testing and Approval service. Almost all the Norwegian EHR-vendors have implemented the recommended solutions, but the volume of electronic referrals is still low in 2008.

In Norway GPs annually send 1.9 mill referrals to specialists or hospitals. It has been calculated that this compares to 150 manyears performed by phycicians. The patient flow in Norwegian healthcare depends highly on the referrals. It is therefore important that the referrals can be written, transferred and handled effectively.

The Ministry of Health owns five Regional Health Authorities (RHAs). The RHAs get funding from the Ministry of Health according to the type of services and the volume of services they provide to the patients. Each RHA is responsible for the hospitals in their region. At the moment there are almost 80 hospitals in Norway. All the hospitals have EHR<sup>2</sup>-systems, but some of them are in a procurement process at the moment because the RHAs want to limit the number of systems within their region.

The Norwegian GPs have had access to EHR-systems for more than a decade. The EHR-systems are used as tools to support the GP's work processes. The ELIN (Electronic Information Exchange)-project was established by the Norwegian Medical Association. The main purpose of ELIN is to ensure that the GPs are provided with electronic solutions to ease shared care with other organizations. The GPs require that electronic messages must be sent via modules that are integrated with their EHR-system. They also require that national standards must be supported, and that the national cooperation architecture must be used (figure 2). Innovation Norway<sup>3</sup> has partly funded the vendors of EHR-systems work with implementing the needed standards and development of new functionality in the EHR-systems. This has been an important factor to make communication solutions from all vendors available for the GPs. The standards have been developed by the Norwegian Centre Informatics in Health and Social Care (KITH) based on the user's requirements from the ELIN-project. All the vendors have implemented modules to support exchange of electronic laboratory results, discharge summaries and referrals.

KITH has developed the national Cooperation Architecture with support from the RHAs, the Directorate of Health and Welfare and the ELIN-project.

Basic requirements for this architecture are:

- All messaging traffic should use the national broadband infrastructure, The Norwegian Health Net.
- Only standardized messages should be used.
- The vendor's message implementations should be approved by the Norwegian Testing- and Approval Service at KITH.
- ebXML framework should be used
- Application receipts should be sent for all messages.

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<sup>2</sup> EHR, Electronic Health Record is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting

<sup>3</sup> Innovation Norway, prior the Norwegian Industrial and Regional Development Fund (SND), helps to provide or arrange financing, link customer enterprises to know-how and help them build networks for their innovation projects.

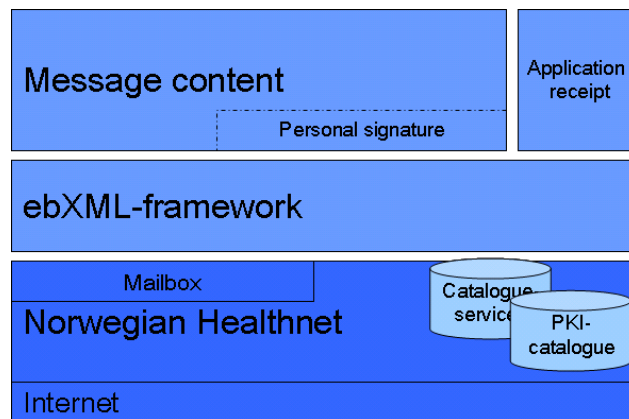


Figure 2: Cooperation architecture

The first version of the Cooperation architecture is based on messaging, but an extended version of the architecture will be used for web-services.

The needed infrastructure (The Norwegian Health Net) is also available for most hospitals and GPs, and it is already used for exchange of laboratory messages and discharge summaries.

One could expect that the ELIN-project and the efforts from the Ministry of health and the RHAs would contribute to quick deployment of electronic referrals. The fact is that in September 2007 only 8200 referrals were sent electronically and 6300 of them within the RHA of North Norway. As a comparison, during the same month, 125 000 electronic discharge summaries were sent.

Early in 2006, the ELIN-project was invited by the RHAs ICT-organization (NICT) to contact the RHAs to sort out what the main challenges for the RHAs were, and help them to develop plans for deploying electronic referrals and other messages. A series of ten meetings with the RHAs was put through. The project manager of the ELIN-project and the author of the paper participated in the meetings. A representative from the Norwegian Centre for Telemedicine in Tromsø did also participate in two of the meetings. Between 4 and 10 people from the RHAs were present at every meeting

## Findings

### Missing strategy at regional level for deploying electronic cooperation

All the RHAs seemed to be well informed about requirements from the Ministry of Health, and they had taken steps both to develop a plan for deploying the messages and communication modules. Still many of the RHAs did not have a strategy for deploying electronic cooperation in general. Even if the management level know the requirements from the Ministry of Health well, many of the people who were supposed to implement the strategy at an operational level, were not familiar with it. It seemed clear that top level commitment is necessary, but still not enough to ensure that the messages were implemented and used. Most of the RHAs also have very tight budgets, and internal activities at the hospitals are highly requested. Activities that support shared care and that do not lead to an obvious economic benefit for the hospital within a short time span, seemed to be given low priority.

### Changes in workprocesses were lacking

The introduction of electronic referrals in a large organization as a hospital can be a major challenge. The hospitals have routines to handle the referrals that are sent by paper from GPs, specialist and other hospitals. These routines are fairly good, but it will sometimes take weeks before the actor who sent the referral will get information about the patients scheduled appointment. Quite often additional information about the patient's healthstatus and previous treatments will be requested by phone or mail before a decision can be made about further treatment. Sometimes the referrals also get delayed because they are sent to the wrong address: The requested doctor could be on leave, or the GP could have misunderstood which ward the referral should be sent to.

One could expect that new electronic solutions could help to shorten the time from the referral was sent, until the patient was treated at the hospital, but this did not seem to be the case. Most hospital had not had changed their internal routines, and doctors and nurses at the hospitals also seemed to be involved in electronic referral projects to a very limited degree. Attendance from the groups who were going to handle the new electronic referrals at the hospitals was requested for the RHA-meetings, but very few were present. It is still unclear whether they did not have time to attend meeting or if they had not been involved in electronic referral projects.

The introduction of electronic referrals can either be done radically, in line with Hammers recommendations in (Hammer 1990) or as a slower process as

suggested by (Orlokowski 1996). Ongoing projects in Norway can be seen as related to both of these methods.

### **The radical reengineering approach**

Hammer claims that reengineering should be all or nothing. It is important to reorganise and break away from rules and work pattern that are outdated. He addresses the managers to move from what he sees as outdated business processes and create new processes. Top level management has to get involved, because the author means that “No one in the organization would want reengineering. Only if top-level managers back the effort and outlast the company cynics, will people take reengineering seriously”.

### **AHUS, an example of Norwegian reengineering**

One of the hospitals that has established a referral project is AHUS. They plan radical changes to both the way referrals will be handled when they arrive at the hospital, the way feedback is given to the GPs when information is lacking and the way GPs should send them their referrals. As a major outcome of the reengineering process, appointments at the hospital should be scheduled much earlier than today. The hospital is not going to be in operative use until October 2009, but planning for new ICT-solutions that support new work-processes has started early and seems to be well anchored both at a top-level and in the hospital organization.

Shared care and good solutions for exchange of information between the hospital and other health care providers is essential for AHUS. A substantial amount of funding is provided for the work with new ICT-solutions, and the hospital wants to be a lighthouse project for other hospitals. When it comes to electronic referrals, the hospital has decided to make a web-based solution where GPs can register and have access to the electronic referrals. The hospital will provide interfaces that are adapted to different needs for different specialities. This means that referrals will be built on a basis with structured elements that are common for all specialities, and then the user will be asked to input different information according to the what kind of information the hospital requests for this speciality.

Internally at the hospital, the referrals will be directed to 5 addresses according to what kind of services the referring doctor's request, eg: Births, Children with known diagnosis, Medicine, Surgery. The referring doctors are not provided with addresses to wards or doctors. This makes the addressing more robust, because GPs and specialists do not need to know anything about internal organizational changes at the hospital, and referrals will hopefully be directed to the right ward and doctor without external involvement.

## **Slow changes**

Wanda Orlikowski on the other hand questions common beliefs that organizational change must be planned, that technology is the primary cause of technology-based organizational transformation, and that radical changes always occur rapidly and discontinuously. In a study that is referred to in (Orlokowski 1996), it is described how subtle shifts in action by which organizational actors transformed their work practices and organization structures. She sees organizational change as an ongoing improvisation enacted by organizational actors trying to make sense of and act coherently in the world. Organizational transformation as situated change is grounded in assumptions of action, not stability.

## **Slow changes in Northern Norway**

As mentioned earlier, the introduction of the electronic referrals in Norway has been a long process. So far, most projects have been based on coordinated national initiatives related to standardisation, local and regional projects and experiences from “best practice”. This evolution, rather than revolution, has given the users the possibility to try out recommendations in small scale. The hospitals can build up their own internal expertise and make the electronic solution support their own organizations needs over time. This slow process has been successful at some hospitals, eg in northern Norway, where two regional projects have been run over a period of 5 years, but it is also evident that this slow process makes it difficult for the GPs to get the possibility to send electronic referrals to whichever hospital that they would like, because not all hospitals can communicate based on the same standard at the same time.

The most evident changes in work-routines are related to how the referrals are handled when they reach the hospital. Some of the hospitals now have a joint point where the referral are handled and distributed for further follow up, other hospitals provide the GPs with addresses to the wards, and GPs can then send the referrals directly to the receiving ward. The way this has been handled has depended on the feedback from the users, and changes have also been done in the process. It might be quickest to send referrals directly to the ward, if the right ward is reached, but the risk is that the referral can be sent to the wrong ward, and that the process may be delayed. The process in Northern Norway has been coordinated by the RHA, and there has been a strong emphasis on supporting the hospitals in the process installing the right products, and establishing a regional team to help both the GPs and hospital users in the introduction phase.

## Knowledge should be shared and used

During the meetings, people from the hospitals had the possibility to ask questions directly to those who had been involved in other implementation projects, contact with the vendors and testing and development of the standards. Knowledge from the resource person could be shared with those who were initiating new projects.

The Norwegian Centre for Telemedicine (NST) has had the project management for two regional electronic referral projects. They have gained valuable experience and have knowledge that should be shared with other projects. There have also been several other referral projects ongoing, and it would be useful for other projects to get to know more about their experiences. It should be considered to establish meeting arenas for ongoing and planned referral projects. Web-pages with easily reached information and communication channels to resource person should also be provided. Currently KITH has an information service available for those who implement standardized messages, and NST has also been instructed by the Ministry of Health to assist in implementation projects, but this is not sufficient.

## Differences between in use of electronic referrals should be addressed

Daniel Robey and Sundeep Sahay state in (Robey and Sahay) that interpretations help to shape the use of the technology, partly independently of the IT-solutions material properties.

The article refers to a study of two projects for implementation of GIS-systems at a county level. The same basic applications were implemented at both locations. Interviews with a large number of respondents in two organizations were conducted. Comparisons revealed differences both in interpretations about the consequences of GIS and the process in which the technology was introduced.

The fact that there have been regional differences in the use of electronic referrals in Norway, although the same messaging standards have been used as a starting point, is quite similar to what happened in the process of introducing new GIS-systems described in the Robey-case.

Within the RHA in Northern Norway the organizational changes have to some extent followed introduction of the new referrals, and the end users adoption of

the new system seems to have worked quite well, although it is still a long way to go before all referrals are sent electronically.

As a comparison, the process in Western Norway has been much slower. One explanation can be differences in the seen need for transition from old to new technology. Western Norway started to use an infrastructure for communicating laboratory results earlier than in other regions. This worked very well, but is not in line with new standards and recommendations for use of the Norwegian Health Net. Northern Norway did not use the first version of infrastructure and did not have to face the same scepticism for change in technology.

In Western Norway, the referral-project was not initiated by top level management, and did not have the same focus in the organization as in Northern Norway. Knowledge about the system was also spread by competent end-users in Northern Norway, and they had a plan for deploying the system at different locations, although this was a quite slow process that gave the user room to adapt to the system. They also had focus on education of new users.

The above mentioned factors are probably likely to contribute to the difference, but further work should be carried out in order to explain the differences better.

### The need for sharing knowledge between GPs and specialists should be addressed

A lot of knowledge is present within health organizations, but how can this knowledge be shared among health professionals that play different roles in the process of treatment of the patient? The referrals play an important role in this process, and if the information that is sent from the referring doctor does not satisfy the specialists needs, this can result in a rejection of the referral, wrong treatment or that unnecessary test have to be done. All Norwegian patients are assigned a regular GP, and he or she would often have had contact with both the patient and the patient's family over years and will have knowledge about the patient that is not necessarily easily transferable to codes in a predefined schema. For instance would the GP know if this is a patient who only seeks medical advice when in deep pain, or if it is someone who comes regularly to ask for tests and examinations because they are anxious? This can again be related to family history. The GP is also in direct contact with the patient and observes the patients behaviour, but this again is probably described differently by the GPs. The GPs will have varying expertise according to how long they have been working in

primary care and probably also other factors as nationality and prior work in other organizations.

The Norwegian message standard for electronic referrals provides a format for how the information should be transferred from actor A to actor B, but this format can be used in numerous ways depending on the health workers needs.

There were complaints in the meetings from the RHAs about referrals from the GPs that included too much information. The referrals also did not satisfy the specialist's needs at the hospital.

### **Practice consultants could be used**

Many hospitals already benefit from the use of practice consultants to improve cooperation. The practice consultants are GPs who are employed in parttime positions at the hospitals. They try to improve procedures to support the workprocesses for both GPs and specialists. A typical task would be look at the procedures for production of electronic referrals and discharge summaries, and initiate processes to come to an agreement about the structure and content of these documents. The GPs needs for information in the discharge summary would for example often differ from the hospital doctors needs, The GP needs the document to make sure that he or she can provide the patient with a proper treatment plan. The specialists at the hospital on the other hand, find the discharge summary useful as a means to get access to summarized information when the patient is readmitted to the hospital.

Automatic production of discharge summaries from existing EHR-documentation is also possible from some EHR-systems. If this is not done with care, the result can be documentation that is too voluminous for the next caretaker in the treatment chain. This can be seen as a parallel to the specialist's complaints about voluminous referrals. In both cases a common understanding of each others needs is necessary in order to agree on a recommendation for how much information should be included. .

### **Mechanisms for producing working knowledge**

Ellingsen and Monteiro refer to a study from at the University Hospital of Northern Norway (UNN) in (Ellingsen and Monteiro 2003) The study focused on the various actions taken before discharge letters were sent from four wards at the hospital to primary care.

The contents and style of discharge letter from each ward varied according to internal requirements at the ward and the needs of the various receivers. The paper concludes that the departments had not done just collection and recording

of data, but also meaning fully organised and collated information about the patient. Each doctor had added his own interpretations and considered views of other experts to make the Discharge letter meaningful. The doctors had taken into account the standards and codes followed by the probable receivers and had framed the discharge letters with the receivers' needs in mind. Work had to be done to convert data and information into knowledge.

Core activities of the rendering of making knowledge useful are only partly supported by ICT-systems. Activities such as reading, interpreting and validating of information is difficult to support, but a better overview of where more information could be found and easier access to highlighted vital information could have been useful. To do a good quality knowledge work it is important to take the socio-technical mechanisms seriously and integrate them with the information systems.

### **Referrals as parallel to discharge letters**

The discharge letters can be seen as a parallel to the referrals, but while discharge letters are sent from a complex organization to one actor, referrals are sent from one actor to a complex organization. The information sent from the GP is usually also only gathered by one single person, the GP. It is likely to assume that GPs also will do a great deal of effort to make the referrals as useful as possible for the receiving organization, but it has also been complaints about lacks in the documentation received at the hospital.. The hospital often requests more codified information than the GP can provide. The hospital sometimes also makes complaints about that the GP generates too much information automatically from the EHR-system, and that it is difficult to pick out the information that is really needed for decisions about further treatment.

The GP has probably done a lot of effort to gather knowledge, but it is not necessarily the knowledge that the next step in the treatment chain needed, and the codification was not sufficient.

## **The future of electronic referrals in Norway**

The Directorate of health and social affairs is now (February 2008) initiating a new project called "Meldingsløftet". This project will pay attention to how electronic messaging can be used as a high volume service in the health and social sector. Standardized messages and use of the cooperation architecture will be focused. Regional projects at the RHA level will be initiated in parallel with the national project.

There are different reasons why the introduction of electronic referral in Norway has taken so long, and that there still are many challenges to be solved before electronic referrals are used by all hospitals and GPs.

Meldingsløftet will mainly have focus on the technical level, and the organizational challenges must still be handled at the local level. Further research needs to be done to address the above mentioned issues.

## Research problems that need to be addressed

It would be interesting to address the introduction of electronic referrals from a socio-technical view; What are the socio-technical obstacles and enablers for high volume use of electronic referrals?

Focus can be on issues that should be solved in order to support the introduction of electronic referrals, and how this should be done within health authorities of varying size. Relevant research questions are:

- Why has electronic referrals been more challenging electronic discharge summaries?
- What kind of organizational support is needed in order to secure good cooperation between different organizations that handle the electronic referral?  
The process with the RHA-meeting has given some indications, but a more in depth cooperation with some of the projects will probably be necessary in order to give a better answer.
- How can a joint reception for electronic referrals at the hospital best be organized?

## Method for further research

### Review

It would be interesting to see how the Norwegian work with electronic referrals relates to international work, and if there is a “best practice” that can be transferred to Norwegian practice. Suggested countries for a review are in addition to the Nordic countries: England, The Netherlands, USA and Australia. See Wouter (2001), (Kaae 2000), (Gandi, Sitting, Franklin, 2000 ), (Reponen, Martilla, Paajanen, Turula 2004), (Shawn, Lindsay, de Berker, David 2007), (Bury, Humber, Fox 2001), (Westbrook, Braithwaite, Iedema, Coiera, 2004)

There are few reviews of projects that are related to electronic referrals. Most of the related reviews are cover telemedicine services in general. Examples of such

reviews are: Review of patient satisfaction (Mair and Whitten, 2000), Review of guidelines and standards for telemedicine (Loane and Wootton, 2002) and Reviews related to costs and benefits (Roine, Ohinmaa and Hailey, 2001).

Most of the research papers about referral projects describe planned or recently started projects. Many of the projects do also cover a very limited number of users or just one medical specialty. It is therefore needed to contact projects referred to in research papers, in order to find out where they ended (or hopefully continued) after the initial stages

It will be of interest to find out:

- When did the projects start?
- Has it become a success as a local project?
- Did it become a high volume service?
- How much did the volume grow after the project started and what were the success criteria for the project?
- What were the main challenges for the project?
- How were organizational challenges solved?

## Action research

According to (Braa 2004) the approach of participatory action research is through qualitative, in-depth and longitudinal studies, better understand the many facets of systems development in general and integration in particular. According to (Avison 1999), "Action research aims to combine theory and practice (and researchers and practitioners) through change and reflection in an immediate problematic situation within a mutually acceptable ethical framework". Researchers and practitioners are supposed to act together on problem diagnosis, action intervention and reflective learning. The process of transferring the user needs and understanding of the work practices from the health workers to the vendor can be seen as action research.

Two projects are proposed followed with will action research. They will be within different RHAs and also make use of different EHR-systems. The two projects will also be compared in order to try to sort out if one way to organise the introduction of electronic referrals can be recommended in favour of the other. One of the projects will have a more radical approach and the other will use more traditional messaging techniques.

## National surveys

In cooperation with the national project, Meldingsløftet, two surveys are planned: One in 2008, at the start of the project, and another one two years later. This will give the possibility to compare expected outcome from the RHAs with actual results of the project. The main focus of the surveys will be the user's expectations to use of electronic referrals.

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