

The Norwegian Coordination Reform and the Role of Electronic Collaboration

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Abstract

The Norwegian Government has identified electronic collaboration as an important tool to support an upcoming reform in Norwegian Health Care– the Coordination Reform. The goal of the reform is to prevent citizens from becoming patients and reduce the need for specialized care. The patients are also supposed to become more active in taking responsibility for their own health. The paper sums up the findings from a study that was done in order to get an overview of the status of electronic collaboration in the Norwegian health care sector today, and the challenges due to lack of such collaboration that can be seen in light of the coming reform. The work is based on the input from a reference group, meetings with potential users and national strategy documents. A situation analysis of eight trajectories that span primary and secondary care was performed. The main results from the work are summarized in a collaboration map. The map shows areas that need more focus in future development of collaborative ICT systems. The work shows that ICT-solutions supporting shared care and empowering the patient to a large extent are lacking. This is contradictory to the Coordination reform's intention of empowering the patient. The situation analysis reflects the status as of April 2010.

Keywords: *Collaboration; Health Reform; Core EHR; Standards*

1 Introduction

1.1 The Norwegian health care system

Primary care is the responsibility of the 430 municipalities. Most General Practitioners (GPs) work in private enterprises, in agreement with their local municipality. A major health care reform in 2001, led to the organization of the 81 Norwegian hospitals under 4 health authorities that are owned and supervised by the government. This means that the different actors that are supposed to participate in shared care across organizational borders, are financed by different sources.

All patients are assigned to **one** GP's patient list. All primary contacts with the health care system, except acute care, should be channelled through the GP. Most patients who are admitted to the hospital have been referred by their GP. When the patient has finished the

treatment at the hospital, the normal procedure will be to return to primary care under the GPs responsibility.

The Norwegian health care system has obvious challenges that also are visible in other European countries with a public health system: The hospital administration wants to keep the patient stays as short as possible in order to reduce hospital costs. Patients who have finished the required specialized care at the hospital and are waiting for transfer to nursing homes, or are not well enough yet to move to their own homes, are filling up hospital beds. As people live longer due to improved health care services, more and more patients will need care in their elderly days. Many people are also rescued from a sudden death as early newborns or in traffic accidents, but may need specialist care for a long period.

A coming Norwegian health reform - the Coordination reform- is being implemented in 2011/2012. The

reform has focus on how the patient can be provided with more health care services in primary care, closer to their homes, and reducing the need for expensive specialized care. Economic incentives are an integral part of the Coordination Reform. Governmental funding will to some extent be channelled from the hospitals to the municipalities. The municipalities will then have to pay the hospitals according to the number of patients they refer to specialized care, and there will also be a high cost to pay for patients who have finished their hospital treatment, but occupy hospital beds until the municipalities are ready to receive them.

One of the goals of the health reform is also that electronic collaboration shall be a preferred future means of collaboration in the health care sector. This includes:

- Electronic collaboration between service provider and patient/user: Examples of systems are: electronic booking, on-line consultations/telemedicine and access to own Electronic Health Record (EHR).
- Electronic collaboration between all groups of health workers across organizational borders.

1.2 ICT in Norwegian health care

ICT has been used as a tool to support the Norwegian clinician's work processes for more than two decades. The first Norwegian EHR systems were used by GPs as early as in 1984 [1]. 98% of the GPs have had these systems in daily use since 2001 and EHR systems are also in use in all Norwegian hospitals. These systems started as administrative tools, but have over time emerged to be systems that support the clinicians in their daily work with patients. 95% of the municipalities have installed ICT systems to support administrative patient related work in nursing homes and home care, and 75% of the municipalities also use EHR systems as a support for nurses and doctors in community care.

The number of EHR system vendors is limited to 2-4 vendors in each system group (GPs, municipalities, hospitals). In addition to the traditional EHR system, the hospitals have specialized systems that are used by the different specialists or administrative staff. The larger Norwegian hospitals will typically have 50-150 of these systems. Examples of such system are: Laboratory systems, PACS, medical charts, operation planning systems, maternity ward system and intensive care system.

The electronic collaboration between the caretakers in different organizations has so far mainly been based on electronic messaging, but web-based solutions and systems that provide access to shared core medical information are also in limited use. Deployment of elec-

tronic messaging is of high priority according to the national eHealth strategy, but has been much slower than expected. This has proven to be more related to organizational challenges than technical barriers [2], but it is also shown that the deployment processes in health care in Norway are generally slower than expected [1].

The questions that we address in this paper are: To what extent do we have ICT systems that can support national health care ambitions, with special emphasis on the challenges related to the Coordination Reform? Where do we have "white spots" and where do we need to develop new systems?

2 Methods

The work was initiated by the Norwegian Centre for Informatics in Health and Social Care (KITH) and supported by Innovation Norway. The project team included three members from KITH and the Norwegian University of Science and Technology (NTNU). The work was mainly based on available project reports and national strategy documents. The group had additional meetings with the Norwegian EHR research centre and a project manager at one of the larger Norwegian Hospitals.

The project team was supported by an external reference group with members from:

- Innovation Norway
- The Norwegian Research Council
- Trondheim Municipality
- The Norwegian EHR Research Centre
- The Directorate of Health
- The Ministry of Health
- The Norwegian Centre for Telemedicine and Collaboration

The reference group had two physical meetings, and the members also participated actively in commenting on input from the project team. Based on the input from a reference group, meetings with users and available documentation, a situation analysis of six trajectories was performed. The main results are summarized in a collaboration map that provides guidelines to which areas needs more focus for future development of collaborative systems. The study was finished in August 2009. A supplementary study on Patient Communication was finished in September 2010.

3 Results

The collaboration map (figure 1) summarizes the current status of electronic collaboration in health and social care. The y-axis shows the main actors, and the x-axis shows the trajectories that involve the different actors. A more detailed description of the actors and trajectories is provided in the discussion chapter. For each collaborating actor, a colour code and number indicate to which degree the prerequisites of ICT-supported collaboration are present. That includes both standards and ICT systems to be used for collaboration. The figure does not show to what extent the available solutions are used in practice.

The numbers are used as a support to the colour coding, and are also used to indicate an answer between two numbers.

The collaboration map shows that the possibilities for standardized electronic collaboration are very limited in relation to preventive care, shared care, acute care and in relation to casual contact between patient and GP/dentist. Preventive care, shared care and the patient possibilities for administration of own health have been focused in the upcoming health reform, and it is very concerning that these trajectories so far seem to lack electronic collaboration support.

4 Discussion

4.1 Basic requirements for electronic collaboration

Electronic collaboration can be established by means of different communication media ranging from SMS messages to video-conferencing, and the use of shared repositories. Collaboration systems can be based on tailored standalone software or more standardized solutions that are intended for national deployment. There is already a large installed base of ICT systems in use in Norwegian health care. As the number of actors and systems has grown over the years, the need for standards has become more and more evident, and they are requested by both users and vendors. The Norwegian health reform in 2001 imposed the increased standardization of ICT systems and electronic collaboration solutions within each of the four regional health authorities. Ellingsen and Monteiro [3] have studied the consequences of standardisation at a regional level, and drawbacks can certainly be seen. When standards are used, it is important to recognize the sociotechnical context that they will be used in, and that the actors that are involved in the collaboration must see benefits from use of the system in their daily work [4]. Deployment

of EHR systems has been slow in Norway [1], but a similar pattern is also seen in other countries [5], [6], [7], [8], and must also be expected for new collaborative systems. Manual procedures are also likely to be kept in parallel with electronically based procedures because not all types of collaboration are suited for ICT-support [9].

The government requests that implementations of collaboration systems that use messaging should use the Norwegian Cooperation Architecture [10]. Basic requirements in this architecture are:

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

Electronic messaging in Norway is mainly based on the use of CEN/TC251 standards for communication across organizational borders and HL7 standards for hospital internal communication. The hospitals' collaboration organization for ICT, National ICT, does also provide additional guidelines for development of systems in specialized care in their architecture document [11]. A collaboration architecture for web services is also available and should be used when feasible.

4.2 The actors that are involved in the trajectories in the study

Patients and relatives An individual can have many different patient roles from someone who visits the GP sporadically to get an immunization or preventive cancer checkup to chronically ill patients who needs access to specialized care services for long periods. A patient's relative may also be everybody from parents of children who are hospitalized to the children of elderly people in nursing homes. In Norway patients have a legal right to have access to their own health record. This right has today to be handled by requests for printouts of the EHR, as no on-line tools are available for the patient's access to the information.

Community care The municipalities have the responsibility for primary care in Norway. In line with the "Municipal Act", the municipalities should provide

| Trajectory/ Actor | Medical colla- boration | Community care | Shared care | Acute care | Service and support functions | Preventive care | Public insurane colla- boration | Casual patient contact with GP/dentist |
|--------------------------------------|----------------------------|-------------------|----------------|------------|--|--------------------|---------------------------------------|--|
| Patient | 1 | 1 | 1 | 1 | | 1 | 1-2 | 1-2 |
| Community care | 3 | 3 | 1-2 | | | | | |
| GP | 2-3 | 3 | 1-2 | 1-2 | 3 | 1-2 | 3 | 1-2 |
| Accident and emergency unit | | | | 1-2 | | | | |
| Health station | 1-2 | | | | | 1-2 | | |
| Hospital | 2 | 2 | 1-2 | 1-2 | 3 | 1-2 | 2 | |
| Private specialist | 2-3 | | 1-2 | 1-2 | 2 | 1-2 | 3 | |
| Pharmacy | 1 | 1 | | | 1 | | 2 | |
| Dentist | | | | | | | | 1 |
| Public insurance partner | | | | | | | 3 | |
| Hab/ rehab | 1-2 | 1-2 | 1 | | | | | |
| Lab/ X-ray | 3 | | | | 3 | | | |
| Ambulance (car/boat/ air) | | | | 1 | | | | |
| Employer | | | | | | | 1 | |

Figure 1: Collaboration map. The colour codes used are: Blank cells - Non relevant, 1 - Few systems with collaboration support are implemented. Standards are missing, 2 - Few systems with collaboration support implemented. Some standards are available, 3 - The most essential standards are available and several systems that can be used for collaboration are implemented, and 4 - Certified and standardized collaboration solution is commonly available.

necessary health services to all citizens who live in the municipality on a permanent or temporary basis". This includes preventive care, diagnostics, treatment, rehabilitation, care of elderly people and homecare services.

General Practitioners Since 2001, all citizens are assigned to one GP's patient list. The patient's GP is the gatekeeper to specialized care. The GP is the coordinator between the patient and the health care system, and in power of referring to special health care services on behalf of the patient.

Accidental and emergency unit Accidental and emergency units shall grant all citizens high quality out of office hours and emergency services. It is a part of primary care, hence a municipal responsibility. These units are often located close to the hospital. Several municipalities may share the responsibility for one emergency unit. Emergency units have EHR systems, but have limited possibilities for electronic collaboration with other actors.

Health stations (Maternal and child centres) Health stations are the primary mechanism for preventive care, with focus on children and pregnant women. All immunizations for children are provided by the health station. Pregnant women will also come to the health station for regular checkups during the pregnancy.

Hospitals The vast majority of the hospitals are owned by the government and are organized under 4 regional health enterprises. A few private hospitals operate in agreement with the regional health enterprises. The hospitals have the responsibility for somatic care, psychiatry and drug rehabilitation.

Private specialists Private specialists are organized as private enterprises, in agreement with the public health care regarding refunds. They offer their services in competition with the public health system and as a supplement to the services hospitals offer if the capacity in the hospitals is limited.

Pharmacies These are private sector enterprises (747), except for the ones serving the hospital sector (33). The pharmacies handled 27,9 mill. prescriptions in 2006 and the number is increasing. Most prescriptions are sent to the pharmacies from the GPs.

Dentists Public dental services are under the direction of 19 regional authorities. The services cover children, young people, and adult groups with special needs. Services are also provided by dentists in private sector. Most dentists have electronic patient record systems.

Public insurance Norway has a public insurance scheme. Most of the people who live or work in Norway are mandatory members in the National Insurance Scheme, independent of nationality. Members of the National Insurance Scheme are entitled to retirement

pension, disability pension and dependant's pension, as well as compensation for occupational injury.

Habilitation/ rehabilitation Habilitation and rehabilitation services are provided by hospitals, and by various private specialists (physio- and ergo- therapists, etc.). Rehabilitation and habilitation services may also be offered as homecare. Habilitation is a process of creating something that has not been there, rehabilitation, that of restoring something that was there and working to its formerly better functioning.

Laboratories/ X-ray These services are partly offered by hospitals, partly by private enterprises. To some extent there is a competition between private and public actors. This has led to a situation where the private actors often are market drivers in offering new services, also including electronic collaboration.

Ambulance services The ambulance services include car-, boat-, plane- or helicopter services that are part of the regional health enterprise's acute care outside of hospitals. The ambulance service needs to collaborate with several actors like police, emergency fire service, rescue groups and the emergency team at the hospital.

Employer The employer is a person or organization who hires one or more people to work for salaries. The employer should have a close collaboration with The Norwegian Labour and Welfare Service in order to adjust work conditions to prevent employees from getting sick, and to make it easier for employees with special needs to stay as a part of the workforce. The return from a sick leave period should also be adjusted to the employees needs.

4.3 The trajectories in the study

The trajectories that were regarded to be most essential for collaboration across organizational borders in health care by the reference group, are included in the analysis. These were:

1. Collaboration related to an event where the patient needs to be referred to specialized care – the medical trajectory
2. Collaboration related to the patient's use of services in community care
3. Shared care where a mix of services from specialized care and primary care are needed over time
4. Acute care
5. Collaboration regarding use of service and support functions like laboratory services
6. Collaboration in relation to preventive care

7. Interaction with the welfare system
8. Casual patient contacts with GP/dentist

The medical trajectory The standard medical trajectory includes the process from the patient contacts the GP and a need for specialized care is recognized, until the patient has finished treatment in specialized care and the responsibility for the patient is transferred back to the GP. Annually 2 million referrals are sent from GPs. 25% of the referrals are related to cases where the patient is admitted to the hospital immediately, while the remaining 75% results in a contact at a hospital's outpatient clinic or an appointment with a private specialist. The responsibility for the patient will normally be transferred back to primary care, when the patient has finished treatment in specialized care. The discharge letter will be sent to primary care from the specialist or hospital.

Status for electronic collaboration: EHR systems are available and in use both by GPs and hospitals. Standards for electronic referrals and discharge letters are specified. The required functionality for communication is specified and implemented by the vendors. Discharge letters are sent electronically by most actors, but the volume of electronic referrals is still low (less than 30%). Most systems are based on electronic messaging, but web-services are also used. It is a challenge that few hospitals can receive electronic referrals. Some nursing homes can receive discharge letters. Laboratory tests can be ordered from the GP's EHR system, and laboratory answers will be sent to the GP's EHR system both from hospital labs and private service providers. A national ePrescription system is developed and is in pilot use.

Further work: Further work should include deployment of electronic referrals between hospitals, more specialized referrals, further work with web-services and solutions for communication with patient and relatives. A public health portal should also be developed.

Community care trajectory Many patients will need services in community care after they leave the hospital. This can include home care services, a short or long stay at a nursing home or rehabilitation service. The nurses at the hospital will try to get these services organized before the patient leaves. It is important that these services are in place when the patient returns to primary care. The patient can often depend on the services for a long period. Many patients will also be readmitted to the hospital, and it will then be necessary to inform the service providers that the patient does not need services for a while. In order to avoid that patients have to be hospitalized longer than necessary, it is also

important that the booking of these services is coordinated. It does not help if 5 of 6 services are in place, if the patient has to wait to leave the hospital until the last one is available.

Status for electronic collaboration: 65% of the nursing homes used EHR in 2008. At the same time 65% of the municipalities had started to use EHR, and 34% had introduced EHR in habilitation services. 6% of the municipalities have mobile solutions for home care and most of these use PDAs although research also has indicated that it is hard to document effects of these systems [12]. 36% of the municipalities are connected to the Norwegian Health Net. A national project, named ELIN-k, has been established by the Norwegian Nursing Association, The Directorate of Health and The Norwegian Municipal Organization in order to deploy electronic collaboration within and to/from community care. Standards for communication between hospital and community care have been established and are implemented in the EHR systems by the vendors. Partial funding for this has been provided by Innovation Norway. The use of these standards is limited at the moment, but is increasing. 5% of the hospitals were communicating electronically with the community care in 2008, but a growth to 46% is expected in 2010.

Many telemedicine projects have been initiated, but few are in daily routine use. Examples of telemedicine systems are systems where home carers can send photos of leg ulcers to the GP and specialist, mobile X-ray systems for use in nursing homes and in home care, and videoconferencing between hospital and health workers in community care.

Further work: Electronic collaboration within community care and between community care and specialized care is still limited and should be prioritized in the coming years. Some projects that involve patients and relatives have been initiated, but in general more focus on these issues is needed.

Shared care An increasing number of patients suffer from chronic diseases like diabetes, cancer, COPD and chronic heart related conditions. These patients will often require services from both specialized and community care, and it is important that all actors have access to updated health care information about the patient.

Status for electronic collaboration: Few electronic solutions that support shared care are in daily use today. Patient with chronic diseases have the right to have an individual plan that is used for coordination of the different tasks and services that are provided by the health workers. A plan coordinator in the municipality is usually responsible for the plan. Electronic individual plans were in use by 9% of the municipalities in 2008, and another 8% have planned to introduce electronic

individual plan.

The deployment phase of electronic individual plan has been slow. This is partly due to legislation, and the government's resistance against sharing of information across organizational borders, despite the fact that they have put pressure on municipalities in order to use the paper based version. It is an ongoing national process in order to change the legislation to make it easier to share information when necessary, but this process is slow, and the patients consent will be required.

Pilot projects where core EHR-information can be shared across organizational borders have been requested from many actors in the Norwegian health care sector. Patient summary information with an overview of the patient's contacts with different actors is also wanted. Sweden and Denmark have already implemented similar systems. National strategy projects and some initial projects have been initiated in Norway [13].

Patients with chronic diseases are only to a limited degree involved in taking care of own health by means of electronic collaboration. They often participate in support groups on the internet or search for relevant documentation, but they lack electronic services for collaborations with nurses, GPs and specialists. Access to their personal EHR and possibilities for supplying the EHR with their own data is often very limited.

Further work: More work is needed in order to establish systems where information can be shared among actors.

Acute care Acute care comes in to effect in emergency situations, when life is threatened and/or immediate medical/ambulatory assistance is required. Ambulance services will often be used in order to bring the patient as fast as possible to a location where specialized care can be provided.

Status for electronic collaboration: Acute care is supported by dedicated systems. However, EHR information, which often is critical for decisions to be taken under severe time constraints, can to a very little extent be exchanged between the actors in acute care, and the actors do not have immediate access to vital information collected in other EHR systems (medication, allergies, ...).

Further work: A planned national Patient Summary project is foreseen to give better support to acute care, but improved solutions for electronic collaboration between the actors in acute care are also needed.

Service and support functions The responsible person for treating the patient often require supporting services, as medication supply, laboratory examination and non-medical services such as transport.

Status for electronic collaboration: If the services are offered by the unit where the person who requests

this information works, the access to relevant information is good. When the information is distributed across organizational borders, the presentation in the receiving end is often not adjusted to the receivers needs, and presentation will also be different according to which source the data is sent from. The same coding system for laboratory data is for example not always used. Laboratory answers are often sent electronically, but requisitions and referrals are still often sent by ordinary mail. Electronic requisitions are in limited use. CDs are still also commonly used to transfer X-rays. Requests for patient transportation are handled in a national ICT system. ePrescribing is not in daily use, but an ambitious project is going on, with development of standardized communication as an integral part.

Further work: Priority must be given to a standardized electronic exchange of radiology information. Deployment of the ePrescription solution will require significant efforts, but should be intensified with focus on both improvement of the technical solution and user involvement. User interfaces for handling of electronic collaboration should be improved in the EHR systems in primary care. Possibilities for tracing of requisitions and referrals should be developed.

Preventive care The Maternal and child health centres have the responsibility for health monitoring as well as immunization of the children until the age of 16. Pregnant women will also be in regular contact with these centres and the families will also have regular visits during the children school age. Pregnant women will always bring a pregnancy chart with updated information about her medical status to all appointments with the nurse at the health station, midwife, GP and the hospital ward.

Status for electronic collaboration: 50% of the Maternal and child health centres in the municipalities have EHR systems. Less than 20% of the health stations were connected to the Norwegian Health Net in 2008, and collaboration with other actors is to a very little extent handled electronically. Standards to facilitate electronic reporting of immunizations are developed, but not in use.

Further work: Maternal and child health centres should be connected to the health net, and standardized communication between the health stations and other actors like the GP, maternity ward at the hospital, school and the national registry of immunizations should be established. Maternal and child health centres must implement EHR systems. The electronic pregnancy chart should be developed and deployed. The patient should get access to quality assured information that can make it easier to manage own health and prevent from unnessesary visits to GPs.

Interaction with welfare system The GP is the gatekeeper to the welfare system and will also assist the patient with application for services. The GP's rights to recommend welfare service are linked to the National Insurance Act that provides for the central national insurance and welfare schemes in Norway.

The Norwegian Labour and Welfare Service administer a large proportion of the most important welfare benefits and social security schemes in Norwegian society. For example, these may be unemployment benefits, sickness benefit, rehabilitation allowance, disability pension, and retirement pension on reaching pensionable age.

Status for electronic collaboration: 50% of the GPs were able to communicate electronically with the National Welfare System in 2008. This includes mainly Sick Notes and Medical Certificates. The first electronic Sick Notes were sent in 2004, but still only 25% are sent electronically, and the number has been fairly stable the last three years. The deployment process has been slow, not only due to technical challenges, but also because of organizational obstacles. The benefits for the GPs have not been obvious, and requirements for electronic messaging have also been seen as a means to control the GP's work.

Further work: The GPs request systems for collaboration and not only one way reporting. The patients and users should also be provided with electronic services that make it easier to get knowledge about rights, admitted benefits and status of application processes.

Casual contact patient GP/dentist Many of the patient's with the GP or dentist do not require any referrals to specialized services. These contacts are not handled as acute, and the patient will contact GP's or dentist's practice or to get an appointment scheduled or just to get a prescription or renewed sick note.

Status for electronic collaboration: 23% of the General Practices offered electronic patient services in 2008. An additional 12% had plans for establishing new services in 2009. The number of dentists who have electronic customer services was unknown by the time of writing, but it is likely that less than 10% have such systems. The services that are offered are mainly booking of appointments, renewal of prescriptions, medical certificates and renewal of sick notes. Some GPs also communicate with the patients via a secure e-mail system. As a part of the national ePrescription system, the patients will also be offered services to keep track of their own prescription.

Further work: Patient- and Customer services need to be extended. The patient should be provided with services that can assist in choosing and booking specialized care. The patient should also have easier access to

quality assured documentation that can be used as an aid for self care.

5 Conclusion and suggestions for future work

The main findings from the work are summarized in the collaboration map. Solutions that should support shared care and empower the patient are to a large extent lacking. This is contradictory to the Cooperation reform's intention of empowering the patient, and should be focused in further development.

Suggestions for further work are:

- Development of a public health portal
- Development and deployment of telecare solutions to support independent living
- Improvement of electronic collaboration between health workers

5.1 Development of a public health portal

The public health portal should provide the citizens with quality assured documentation that can be used for self care. Information about patient rights, admitted benefits and status of application processes should be made available. Patients should be provided with services for electronic collaboration with the GP, including secure e-mail and booking of appointments. The patient should also be provided with services for choosing and booking of specialized care services.

5.2 Development and deployment of telecare solutions to support independent living

Telecare should be used in order to support the patients in the daily routines and possibly reduce the need for hospitalization.

5.3 Improvement of electronic collaboration between health workers

The national ePrescription system should be made available to all actors that need access. Standardized communication between the maternal and child health stations and other actors like the GPs, maternity wards at the hospital, schools and the national registry of immunizations should be focussed. A national pregnancy chart with core information that needs to be shared by the woman and a group of health workers should be developed. Priority must be given to improve standardized electronic exchange of radiology information. Development and deployment of services for tracing of lab

requisitions and referrals is needed. A core EHR with patient summary information and an overview of the patient's contacts with different actors is also wanted.

More effort should be put into innovative processes that support development of new collaborative systems. All actors that will be involved in collaborative processes must get some kind of benefits [14] from using new systems. If not, deployment is likely to be slow.

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