

Country Brief: Norway

Authors: Persephone Doupi, Elina Renko, Sarah Giest

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About the eHealth Strategies study

The eHealth Strategies study analyses policy development and planning, implementation measures as well as progress achieved with respect to national and regional eHealth solutions in EU and EEA Member States, with emphasis on barriers and enablers beyond technology. The focus is on infrastructure elements and selected solutions emphasised in the European eHealth Action Plan of 2004.

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Reviewer

Kristian Skauli

Contact

For further information about this study or the *eHealth Strategies* project, please contact:

		
empirica Gesellschaft für Kommunikations- und Technologieforschung mbH Oxfordstr. 2, 53111 Bonn, Germany Fax: (49-228) 98530-12 info@empirica.com	eHealth Strategies c/o empirica GmbH Oxfordstr. 2, 53111 Bonn, Germany Fax: (49-228) 98530-12 eHStrategies@empirica.com	European Commission DG Information Society and Media, ICT for Health Unit Fax: (32-2) 02-296 01 81 eHealth@ec.europa.eu

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Executive summary

The Norwegian approach to eHealth has been structured by a number of documents including the strategy document “Teamwork 2.0”¹ (2008-2013) which defines infrastructural, legal, financial and evaluation issues. Regarding eHealth it covers a variety of issues including electronic prescription, electronic messaging services, web-based patient services and cross-institutional access to health data. It also refers to the EU eHealth Action Plan from 2004. Prior to this other documents were produced, which refer to the field of eHealth in Norway, such as the “Strategy for ICT in the Public Sector 2003-2005” and the White Paper “An Information Society for All” from 2006.

In order to consider Norway’s position regarding eHealth interoperability objectives the following eHealth applications have been examined: patient summaries and electronic health records, ePrescription, standards and telemedicine. In overview Norway’s situation is as follows:

An Electronic Health Record (EHR) system is in place in Norway for the transfer of health record information, standards and standard procedures as well as for operational use of these records. The introduction of EHR systems is nearing completion. In order to support the establishment of an EHR system the Norwegian EHR Research Centre (NSEP) was established in 2003. NSEP’s research involves problems that have their origin in health services as well as background work for a national core EHR. Further to this is the study conducted by the National ICT-unit within the specialised health services². This study focuses on the prospect of a national core EHR (patient summary). In autumn 2009, the Directorate of Health conducted several meetings and workshops with key actors and stakeholders in health-IT and in December 2009 issued a report that recommended a pilot project for a national core EHR be started as early as possible in 2010.

ePrescription in Norway entered pilot phase in May 2010, and nationwide implementation will most likely go ahead from 2011. This decision comes after the launch of the “eResept” (ePrescription) programme which started in January 2006 which aims to set up a national, fully electronic information chain for prescription drugs and medical supplies.

Regarding the specific use of standards in Norway, international classification systems are applied, throughout the country. The Directorate of Health is responsible for decisions regarding development of coding and classification systems. Furthermore, the Norwegian Centre for Informatics in Health and Social Care is concerned with the application of information technology and half of its activity is towards standardisation and coordination tasks.

The Norwegian Centre for Integrated Care and Telemedicine³ (NST) collects, produces and distributes knowledge about telemedicine services, both in Norway and internationally. For the period 2001-2003 the action-plan for IT-development in the health and social sectors, “Say @!” brought the focus of telemedicine services to social services particularly care and assistance. Further financial encouragement for telemedicine came in 1996 when Norway introduced a nationwide reimbursement scheme for telemedicine services.

¹ Helse- og omsorgsdepartementet 2008

² National ICT

³ Norwegian Centre for Integrated Care and Telemedicine

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1 Introduction to the report

1.1 Motivation of the eHealth Strategies study

Following the *Communication* of the European Commission (EC) on “eHealth – making healthcare better for European citizens: An action plan for a European eHealth Area”⁴ Member States of the European Union (EU) have committed themselves to develop and issue national roadmaps – national strategies and plans for the deployment of eHealth applications addressing policy actions identified in the European eHealth Action Plan.

The *2004 eHealth Action Plan* required the Commission to *regularly monitor* the state of the art in deployment of eHealth, the progress made in agreeing on and updating national eHealth Roadmaps, and to facilitate the exchange of good practices. Furthermore, in December 2006 the EU Competitiveness Council agreed to launch the *Lead Market Initiative*⁵ as a new policy approach aiming at the creation of markets with high economic and social value, in which European companies could develop a globally leading role. Following this impetus, the Roadmap for implementation of the “eHealth Task Force Lead Market Initiative” also identified better coordination and exchange of good practices in eHealth as a way to reduce market fragmentation and lack of interoperability.⁶

On the more specific aspects of electronic health record (EHR) systems, the recent *EC Recommendation on cross-border interoperability of electronic health record systems*⁷ notes under “Monitoring and Evaluation”, that “in order to ensure monitoring and evaluation of cross-border interoperability of electronic health record systems, Member States should: consider the possibilities for setting up a monitoring observatory for interoperability of electronic health record systems in the Community to monitor, benchmark and assess progress on technical and semantic interoperability for successful implementation of electronic health record systems.” The present study certainly is a contribution to monitoring the progress made in establishing national/regional EHR systems in Member States. It also provides analytical information and support to current efforts by the European Large Scale Pilot (LSP) on cross-border Patient Summary and ePrescription services, the epSOS - European patients Smart Open Services - project.⁸ With the involvement of almost all Member States, its goal is to define and implement a European wide standard for such applications at the interface between national health systems.

Earlier, in line with the requirement to “regularly monitor the state of the art in deployment of eHealth”, the EC already funded a first project to map national eHealth strategies – the eHealth ERA “Towards the establishment of a European eHealth Research Area” (FP6 Coordination Action)⁹ - and a project on “Good eHealth: Study on the exchange of good

⁴ European Commission 2004

⁵ European Commission 2007

⁶ European Communities 2007

⁷ European Commission 2008

⁸ European Patients Smart and Open Services (epSOS)

⁹ eHealth Priorities and Strategies in European Countries 2007

practices in eHealth"¹⁰ mapping good practices in Europe - both of which provided valuable input to the present *eHealth Strategies* work and its reports. Member States' representatives and eHealth stakeholders, e.g. in the context of the *i2010 Subgroup on eHealth* and the annual European High Level eHealth Conferences have underlined the importance of this work and the need to maintain it updated to continue to benefit from it.

This country report on Norway summarises main findings and an assessment of progress made towards realising key objectives of the eHealth Action Plan. It presents lessons learned from the national eHealth programme, planning and implementation efforts and provides an outlook on future developments.

1.2 Survey methodology

After developing an overall conceptual approach and establishing a comprehensive analytical framework, national level information was collected through a long-standing Europe-wide network of national correspondents commanding an impressive experience in such work. In addition, a handbook containing definitions of key concepts was distributed among the correspondents to guarantee a certain consistency in reporting. For Norway, the National Institute for Health and Welfare¹¹ (THL) provided information on policy contexts and situations, policies and initiatives and examples for specific applications. THL generates information and know-how in the field of welfare and health and forwards them to decision-makers and other actors in the field. The centre is overseen by the Finnish Ministry of Social Affairs and Health.

The key tool to collect this information from the correspondents was an online survey template containing six main sections:

- A. National eHealth Strategy
- B. eHealth Implementations
- C. Legal and Regulatory Facilitators
- D. Administrative and Process Support
- E. Financing and Reimbursement Issues
- F. Evaluation

Under each section, specific questions were formulated and combined with free text fields and drop-down menus. The drop-down menus were designed to capture dates and stages of development (planning/implementation/routine operation). In addition, drop-down menus were designed to limit the number of possible answering options, for example with regard to specific telemedicine services or issues included in a strategy document. The overall purpose was to assure as much consistency as reasonably possible when comparing developments in different countries, in spite of the well-know disparity of European national and regional health system structures and services.

¹⁰ European Commission; Information Society and Media Directorate-General 2009

¹¹ National Institute for Health and Welfare

Under Section B on eHealth implementation, questions regarding the following applications were formulated: existence and deployment of patient and healthcare provider identifiers, eCards, patient summary, ePrescription, standards as well as telemonitoring and telecare.

The data and information gathering followed a multi-stage approach. In order to create a *baseline* for the progress assessment, the empirica team filled in those parts of the respective questions dealing with the state of affairs about 3 to 4 years ago, thereby drawing on data from earlier eHealth ERA reports, case studies, etc. to the extent meaningfully possible. In the next step, national correspondents respectively partners from the study team filled in the template on recent developments in the healthcare sector of the corresponding country. These results were checked, further improved and validated by independent experts whenever possible.

Progress of eHealth in Norway is described in chapter 3 of this report in the respective thematic subsections. The graphical illustrations presented there deliberately focus on key items on the progress timeline and cannot reflect all activities undertaken.

This report was subjected to both an internal and an external quality review process. Nevertheless, the document may not fully reflect the real situation and the analysis may not be exhaustive due to focusing on European policy priorities as well as due to limited study resources, and the consequent need for preferentially describing certain activities over others. Also, the views of those who helped to collect, interpret and validate contents may have had an impact.

1.3 Outline

At the outset and as an introduction, the report provides in chapter 2 general background information on the Norwegian healthcare system. It is concerned with the overall system setting, such as decision making bodies, healthcare service providers and health indicator data.

Chapter 3 presents the current situation of selected key eHealth developments based on detailed analyses of available documents and other information by national correspondents and data gathered by them through a well-structured online questionnaire. It touches on issues and challenges around eHealth policy activities, administrative and organisational structure, the deployment of selected eHealth applications, technical aspects of their implementation, legal and regulatory facilitators, financing and reimbursement issues, and finally evaluation results, plans, and activities

The report finishes with a short outlook.

2 Healthcare system setting

2.1 Country introduction¹²

Norway is a monarchy with a parliamentary form of government. There are three independent government levels – the national government, the county councils and the municipalities. The Norwegian population reached 4.8 million in 2009. The life expectancy in Norway is among the highest in the world. Diseases of the circulatory system are the primary cause of mortality, with cancer being the second largest cause of death.

The organisational structure of the Norwegian healthcare system is built on the principle of equal access to services: all inhabitants should have the same opportunities to access health services, regardless of social or economic status and geographic location. To fulfil this aim, the organisational structure has three levels that mirror political tiers: the national/state level, the four health regions and the municipalities. While the role of the state is to determine national health policy, to prepare and oversee legislation and to allocate funds, the main responsibility for the provision of healthcare services lies with the five four regions for specialist healthcare and the 430 municipalities for primary healthcare (which includes nursing care), and dental care at the 19 counties¹³. At the national level, the parliament (Stortinget) serves as the political decision-making body. Overall responsibility for the healthcare sector rests at the national level, with the Ministry of Health and Care Services.

The box below summarises the key facts about the Norwegian healthcare system:

Key facts about the Norwegian healthcare system:¹⁴

Life expectancy at birth: 80.7 years

Healthcare Expenditure as % of GDP: 8.9% (OECD 2007)

WHO Ranking of Healthcare systems: rank 8

Public sector healthcare expenditure as % of total healthcare expenditure:
84.1% (OECD 2007)

2.2 Healthcare governance

Decision making bodies, responsibilities, sharing of power¹⁵

At the national level, the political decision-making body is the parliament (Stortinget). The executive body is the Ministry of Health and Care (Helse- og omsorgsdepartementet), that has overall responsibility for the healthcare sector at the national level. The duty of the national bodies is to determine policy, prepare legislation, undertake national

¹² Johnsen 2006

¹³ Kommunal- og regionaldepartementet [Ministry of Local Government and Regional Development] 2010

¹⁴ Data from World Health Organization 2000; Health Consumer Powerhouse 2008; World Health Organization 2009

¹⁵ van den Noord, Hagen et al. 1998, p.11

budgeting and planning, organise informal channels, and approve institutions and capacity expansion.¹⁶

As stated, the planning of the Norwegian health system is relatively centralised, but most provision tasks were transferred during the 1970s and early 1980s from the central to the county and municipal administrative levels, and it is the latter two administrative layers that currently account for the bulk of healthcare expenditure.

Nevertheless, both the regulation and supervision of healthcare activities have remained the responsibility of the national authorities. Their mandate is to ensure that the plans submitted by the county and municipal authorities are consistent with national objectives and targets, and to achieve a reasonable task sharing between the various administrative levels (national authorities, counties and municipalities) as well as an efficient allocation of resources overall.

The central supervisory authority, the Norwegian Board of Health Supervision, receives instructions from the Ministry of Health and Social Affairs and is assisted by medical officers (fylkeslegen) who are stationed in the counties¹⁷. The central health authorities have retained some delivery mandates as well, including the control of several national councils, research institutions, the National Hospital of Norway (Rikshospitalet), the National Cancer Hospital (Radiumhospitalet) and a few other highly specialised hospitals. The Norwegian Board of Health Supervision also has units of supervision authority at the county level.

Healthcare service providers

The Ministry has the overall responsibility for governmental policy on healthcare services in Norway, and has chief responsibility for health policy, public health, health services, municipal services for the elderly and disabled, health legislation and parts of social legislation in Norway. It is also responsible for providing good and equal healthcare services for the population of Norway. The ministry directs these services by means of a comprehensive legislation, annual budgetary allocations (approximately 130 billion NOK in 2009), and through various governmental institutions.¹⁸

The country's 430 municipalities are responsible for the provision and funding of primary healthcare including both preventive and curative treatment such as:

- Promotion of health and prevention of illness and injuries, including organisation and running school health services, health centres, child healthcare provided by health visitors, midwives and physicians. Health centres offer pregnancy check-ups and provide vaccinations according to the recommended immunisation programmes.
- Diagnosis, treatment and rehabilitation. This includes responsibility for general medical treatment (including emergency services), physiotherapy and nursing (including health visitors and midwives).

¹⁶ Johnsen 2006 ,p.3

¹⁷ Helse Tilsynet [Health Authority] 2008

¹⁸ Information from the Government and the Ministries, <http://www.regjeringen.no/en/topics/Health-and-care.html?id=917>

- Nursing care within and outside institutions. Municipalities are responsible for running nursing homes and home nursing services. The health services outside institutions are, to a varying degree, organised jointly within the same municipal department for treatment and care.

The counties' responsibilities include organising public dental care in cooperation with the municipalities. The counties also have some responsibilities with regard to general public health.

Norway's four regional health authorities are responsible for the provision of specialised care. This includes both somatic and mental health institutions, as well as other specialised medical services, such as laboratory, radiology and ambulatory services, special care for persons with drug and alcohol addictions. There are at present 27 health enterprises under the five regional health authorities¹⁹.

The Norwegian healthcare system includes both private not-for-profit and private profit-making agencies. Private sector services are in most cases fully embedded in the public system, with some exceptions. Not-for-profit agencies typically include hospitals or institutions set up as trusts that, in principle, are financed and seen as an integrated part of the public health services, i.e. the diaconal trust owned by the Norwegian church. Private healthcare providers are prominent in healthcare services provision in three areas: substance abuse treatment, rehabilitation and dental care. Some support services such as radiology and laboratory services, defined as specialist healthcare services, are dominated by private profit-making providers. Most of the pharmacy chains are privately owned.²⁰

¹⁹ Helse- og omsorgsdepartementet [Health and Care Services] 2010

²⁰ Johnsen 2006

Figure 1: Important features of primary healthcare organisation in Norway²¹

Political/administrative unit responsible for primary healthcare	Municipal responsibility.
Consumer Choice	Free choice of GP within a list of patient system; restricted number of GP changes per year.
Financing	Mainly tax-based financing.
Public or private providers	GPs in private practices; both public and privately provided long-term care.
Gatekeeping function of the GP	Patient access to specialists, physiotherapists and some other services regulated by GP referrals.
Integrating health: initiatives for coordination	Individual patient plans; state actions to strengthen collaboration between GPs and long-term care; municipal payment for long hospital stays; practice coordinators; intermediate care.

2.3 Recent reforms and priorities of health system/public health

Currently ongoing reforms in the health and social care systems²²

Healthcare reforms focused on diverse issues over the last several decades. During the 1970s the focus was on equality and increasing access to healthcare services; during the 1980s health reforms aimed at achieving cost containment and decentralising healthcare services; during the 1990s the focus was on efficiency and leadership. Since the beginning of the millennium the emphasis has been given to structural changes in the delivery and organisation of the healthcare.

The reforms and changes in the primary and specialist healthcare sectors have followed different paths. At the local level, the municipalities' responsibility and tasks have increased, following the downsizing of institutions in specialist healthcare in the 1980s and at the beginning of the 1990s. The responsibility for secondary healthcare services was shifted from the counties to the state, and a new and unique organisational model was set up. At central government level, significant reorganisation took place, especially during the 1980s, when the structure of the Directorate of Health was changed and at the beginning of the 1990s, when the National Board of Health was established. In addition, a new structure at the central level was put in place at the beginning of the millennium.

²¹ Krasnik and Paulsen 2009, p.248

²² Johnsen 2006

In 1999 four new and important acts relating to health were adopted in Norway: The Specialised Health Services Act, the Health Care Personnel Act, the Patients' Rights Act and the Mental Health Care Act. These four Acts, with 40 regulations, came into force in 2001.

The Specialist Health Care Act stipulates that the state is responsible for the provision of specialised healthcare, and that the health regions are responsible for providing specialised health services, including medical laboratory services, radiological services, emergency readiness and on-call services and ambulance services (by air, car and boat) for citizens with a permanent address or people who live in the region. The regional health authorities also have a duty to provide assistance in the case of accidents or other emergency situations that might endanger health.

The Health Care Personnel Act regulates 27 defined personnel groups, including physicians, nurses, dentists, psychologists, midwives, pharmacists and ambulance personnel. Its purpose is threefold:

- to contribute to the safety of patients,
- to contribute to the quality of health services,
- to contribute to public confidence in healthcare personnel and in healthcare services.

The act on specialised healthcare and the act relating to healthcare personnel can be characterised mainly as a modernisation of already existing regulations and concern the duties and obligations of providers and suppliers of health services.

The Patients' Rights Act is the first of its kind in Norway. It is partly a simplification and consolidation of already existing legislation, and partly an implementation of new rights. The main purpose of the act is to contribute to ensure that the population has equal access to good quality healthcare by granting patients' rights in their relations with the health service. The provisions of the act contributes to the promotion of that relationship based on trust between the patient and the health service, while at the same time having respect for the individual patient's life, integrity and human worth.

In summary, the Patients' Rights Act gives the patient the following:

- the right to necessary healthcare (including the right to evaluation within 30 days, re-evaluation and the right to choose a hospital);
- the right to participation and information;
- the right to consent to healthcare;
- the right to access to medical records;
- special rights relating to children;
- the right to complain;
- the right to file a request for consideration of the case from the Patients' Ombudsman.

The Mental Health Care Act integrates the Patients' Rights Act, regulating procedures and conditions with regard to the establishment and implementation of voluntary and compulsory treatment for mentally-ill patients. It also sets out rules concerning inspection and reconsideration of administrative decisions made by mental health services.

2.4 eHealth setting in the country

This section provides a brief overview of relevant ICT related infrastructure and services data. It draws on earlier studies commissioned by the EC, notably the Indicators eHealth Study . Although the results of this study date from 2007 and may therefore not reflect latest changes, a more recent pan-European survey is not available²³.

In terms of infrastructure, 98% of the Norwegian GP practices use a computer and 87% of practices dispose of an Internet connection. In Norway, broadband represents the usual form of access to the Internet with 74% of GP practices resorting to broadband connections.

The storage of electronic patient data is common practice in Norway. Nearly all the GP practices store at least one type of individual patient data.

A computer is available in the consultation room in 98% of the Norwegian GP practices. It is actually used for consultation purposes with the patients by already 93% of GPs. Decision Support Systems are also used in 93% of the Norwegian GP practices.

In Norway the electronic exchange of patient data is common practice. In Norway 35% of practices exchange medical data with other care providers or professionals and 88% of GP practices in Norway receive laboratory results in digital form.

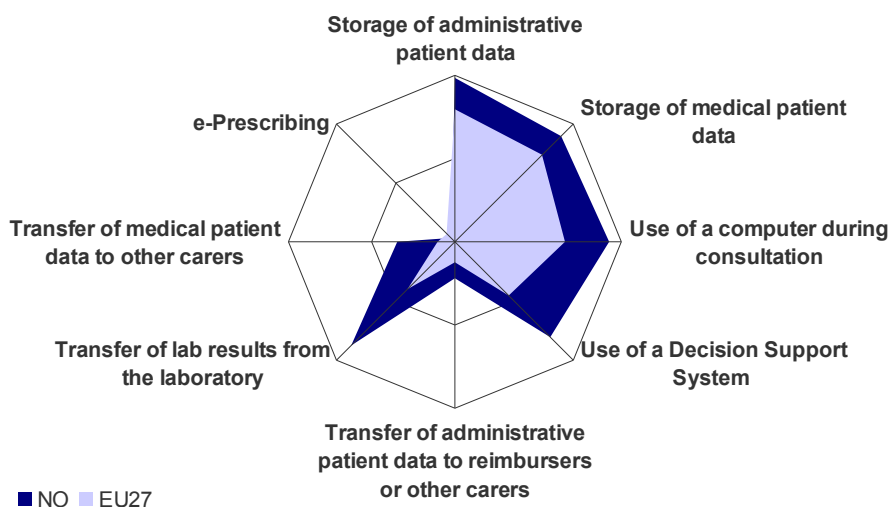
25% of the Norwegian GPs exchange administrative data with other care providers.

In Norway 19% of GP practices exchange administrative data with reimbursing entities. This number is drastically increasing due to the legislation entering into force on 1st January 2010 which obliges GPs to file for reimbursements electronically.

Electronic exchange of prescriptions, commonly referred to as ePrescribing, has been in pilot phase during 2010 and will be ready for national implementation from 2011 and onwards.

The high degree of eHealth use in Norway can be attributed to a longstanding eHealth policy that has been implemented since 1997 already. A project aiming for the establishment of ePrescribing has now reached the stage where ePrescriptions are being tested in different municipalities.

²³ ICT and eHealth use among General Practitioners in Europe 2007

Figure 2²⁴: eHealth use by GPs in Norway

Indicators: Compound indicators of eHealth use (cf. annex for more information), % values. Source: empirica, Pilot on eHealth Indicators, 2007.

3 eHealth strategies survey results

The following sections present the results of the eHealth strategies country survey. In a first section, the eHealth policy actions undertaken in Norway are presented. This is followed by a presentation of administrative and organisational measures taken. Section 3.3 presents results on key eHealth applications. Section 3.4 focuses on the technical side of eHealth, namely the role of patient and healthcare provider identifiers and the role of eCards. Legal and regulatory facilitators as well as financing and reimbursement issues are presented in the following chapters, 3.5 and 3.6. The report concludes with evaluation activities (3.7) in the country and an outlook (4.).

3.1 eHealth policy action

The eHealth strategies of EU and EEA countries are not always labelled as such. Some countries may indeed publish a policy document which refers to the ICT strategy in the healthcare sector. Other countries such as France and Germany have enshrined the central eHealth activities in legislation governing the healthcare sector. In Germany, the relevant law is the law on the modernisation of healthcare; in France the introduction of an electronic medical record is included in a law concerning social security.

²⁴ The notion of „compound indicator“ designates an indicator build from a set of other indicators/survey questions regarding the same topic. The compound indicator reflects an average calculated from different values. (see Annex) The final results of the study on eHealth Indicators is available at www.ehealth-indicators.eu.

Sometimes, also documents from domains such as eGovernment or Information Society strategies may contain provisions which concern eHealth. In cases where the healthcare system is decentralised, i.e. where power is delegated to the regional level, there may even be strategy documents regarding eHealth from regional authorities.

3.1.1 Current strategy/roadmap

Fourth Norwegian roadmap on (e)Health: "Teamwork 2.0"

The Norwegian strategy document "Teamwork 2.0"²⁵ (2008-2013) defines – among others – infrastructural, legal, financial and evaluation issues of the healthcare and eHealth sector. It is the fourth roadmap so far and declares the vision of continuity of care for patients and clients. In general, the strategy has 11 main priority areas with dedicated goals and it is issued by the Ministry of Health and Care Services.

Concerning eHealth it covers specific issues, such as:

- Consolidation and dissemination of existing messaging services;
- Electronic prescription: establishing the whole value chain, from the drug registry, through prescriptions and delivery, to reimbursement and patient access;
- Supporting municipal healthcare services with electronic messaging services and enabling collaboration.

The strategy also emphasises the importance of web-based patient services and more secure cross-institutional access to health data (patient summary). Furthermore, it refers to the EU eHealth Action Plan from 2004 by covering most fields that have been addressed in the strategy, such as patient identifiers, eCards and interoperability of electronic health records.

"More health for each bit" from 1997 was the first Norwegian action plan for IT development in the health and social sectors. It was followed by a second plan, called "Say @h!", in 2001 and "Te@work 2007", the eHealth roadmap, which was published by the Directorate of Health and Social Affairs in 2004.

The latter, "Te@work 2007"²⁶, prioritised the improvement of information flow in healthcare, involving a technical infrastructure, as well as information security and structure, EHRs and electronic messaging and the inclusion of new actors in electronic interaction, which covers patient access to information, as well as the inclusion of service agencies such as pharmacies, municipal health and social services. Overall, the strategy is aiming for continuity of care in Norway.²⁷

Other documents, which refer to the field of eHealth in Norway, are the "Strategy for ICT in the Public Sector 2003-2005" and the White Paper "An Information Society for All" from 2006. The strategy document was published by the Ministry of Labour and Government Administration and highlights the way in which ICT could contribute to meeting the objectives of the modernisation programme of the Norwegian Public Sector, such as increased user orientation, improved efficiency and enabled simplification through delegation and decentralisation. The mentioned White Paper on ICT policy is concerned

²⁵ Helse- og omsorgsdepartementet 2008

²⁶ Norwegian Ministry of Social Affairs 2007

²⁷ European Commission 2007

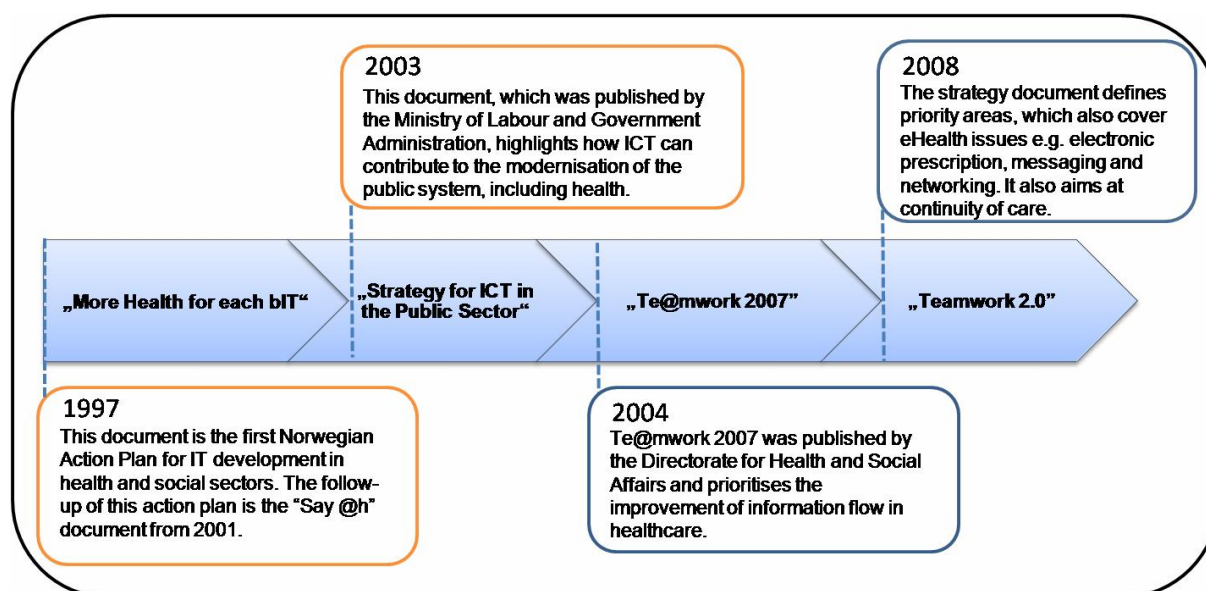
Participation in Baltic eHealth project

with actions and goals of the former eNorway-initiatives and at the same time highlights digital inclusion and round-the-clock electronic public administration services.²⁸

On a regional basis, Norway cooperated with Denmark, Sweden, Estonia and Lithuania in the Baltic eHealth project²⁹ (2004-2007). The project focused on the establishment of networks between existing national and regional healthcare data and aimed to carry out full-scale eHealth trials within the field of radiology and ultrasound. The participating Norwegian partners were the “Centre for Health Informatics” (KITH), the Central Regional Health Authority and the Norwegian Centre for Telemedicine (later on renamed to Centre for Integrated Care and Telemedicine).

Between 2004 and 2007 the project partners worked together on matters of eCardiology, eRadiology, exchange of patient information and implemented or tested eHealth applications in these fields. On the final conference of the project in Stockholm, Norwegian representatives from the Centre for Telemedicine presented papers concerned with 1) the benefits of eHealth in rural areas³⁰ and 2) organisational challenges in eHealth services³¹.

Figure 3: Norwegian Policy documents related to eHealth



© empirica 2009

²⁸ ePractice.eu 2007 (edited 2009)

²⁹ Baltic eHealth

³⁰ Myrvang 2007

³¹ Linstad 2007

3.2 Administrative and organisational structure³²

For eHealth-related policy, two ministries are relevant in Norway: first and foremost the Ministry of Health and Care Services, which defines strategies and provides the necessary funding for implementation and second, the Ministry of Government Administration, Reform and Church Affairs, since it is in charge of strategy setting for ICT with regard to the whole public sector.

Ministry of Health and Care Services and the Ministry of Government Administration and Reform

Other bodies on a lower organisational level, which hold an important role for the implementation and deployment of eHealth applications, are: the Norwegian Directorate of Health and the National Insurance Administration. The latter has a certain role concerning information flow regarding administrative data in the sector and the Directorate of Health is responsible for national ICT strategies and the follow-up of these plans. In some cases, for instance ePrescription, the Directorate of Health is given a leading responsibility in developing and implementing solutions. Furthermore, the Norwegian Medicines Agency has a central role related to electronic prescriptions and appropriate use of medicinal products.

On a regional level, the main actors are the Norwegian Association of Local and Regional Authorities (KS, formerly Kommunenes Sentralforbund), as well as the four Regional Health Enterprises, which utilise the 'National ICT' meeting point for exchanging experiences regarding ICT-related issues. Also, Innovation Norway (As of 1 January 2004 the new state owned company Innovation Norway has replaced the following four organisations: The Norwegian Tourist Board, The Norwegian Trade Council, The Norwegian Industrial and Regional Development Fund, SND and The Government Consultative Office for Inventors, SVO³³) helps to provide or arrange financing, link customer enterprises to know-how and help them build networks for their innovation projects.

Stakeholders, who also contribute to the development of health informatics and telemedical applications, are:

- The Norwegian Centre for Informatics in Health and Social Care, which is mentioned above (3.1.1) as one partner of the Baltic eHealth project. It is a limited company owned by the Ministry of Health and Care Services, the Ministry of Labour and the Norwegian Association of Local and Regional Authorities, which develops and contributes to the implementation of standardised terminology and coding systems, secure information exchange and standards for EHR and PACS systems (see also 3.3.3).
- The Centre for Integrated Care and Telemedicine (NST) provides, as part of the University Hospital in Tromsø, research, development and consulting in telemedicine and promotes the introduction of telemedicine services in practice (see also 3.3.4).
- The objective of the KoKom centre is to act as advisor to government, both centrally and locally (counties and municipalities) on the running of dispatch centres in healthcare services.

³² Bergstrøm and Heimly 2004; Doupi 2007

³³ Innovasjon Norge [Innovation Norway]

- The EHR Research Centre (NSEP) was established at the Norwegian University of Science and Technology (NTNU) in Trondheim, with funding from the Research Council of Norway and the university itself.

As challenging aspects, coordination issues within the healthcare service system have been recognised. Therefore, a “Coordination Reform”³⁴ is underway, which addresses primary challenges and recommends future steps to face them. The recommendations formulated, include:

- Consideration of setting deadlines in order to reach certain development goals for electronic coordination within the healthcare sector;
- Discussion on a national core EHR by the Ministry, and then bringing the matter to the Storting (supreme legislature of Norway) for final decision.

In this reform process, the Norwegian Health Network, operated by the Norwegian Healthnet SF, has already been established on July 1st, 2009. Norwegian Healthnet SF was founded in 2004 but became a publicly owned company on 30.10.09.

3.3 Deployment of eHealth applications

3.3.1 Patient summary and electronic health record (EHR)

In this study, the epSOS project's definition³⁵ of a patient summary was used as a general guideline. There a patient summary is defined as a minimum set of a patient's data which would provide a health professional with essential information needed in case of unexpected or unscheduled care (e.g. emergency, accident), but also in case of planned care (e.g. after a relocation, cross-organisational care path).

Lacking a standard definition, a patient's electronic health record (EHR) is here understood as an integrated or also interlinked (virtual) record of ALL his/her health-related data independent of when, where and by whom the data were recorded. In other words, it is an account of his diverse encounters with the health system as recorded in patient or medical records (EPR or EMR) maintained by various providers like GP, specialists, hospitals, laboratories, pharmacies etc. Such records may contain a patient summary as a subset. As of yet, fully-fledged EHR systems rarely exist, e.g. in regional health systems like Andalusia in Spain or Kronoberg in Sweden, or in HMOs (health maintenance organisations) like Kaiser Permanente in the USA.

It should be noted that in most policy documents reference is made simply to an “EHR” without any explanation of what is meant by it, thereby in reality even a single, basic electronic clinical record of a few recent health data may qualify. As a consequence, this section can only report on national activities connected to this wide variety of health-related records without being able to clearly pinpoint what (final) development stage is actually aimed for or has been reached so far.

In Norway, an EHR system is mainly in place regarding the transfer of health record information, standards and standard procedures as well as the operational use of these

³⁴ Norwegian Ministry of Health and Care Services 2008

³⁵ European Patients Smart Open Services,
[http://www.epsos.eu/glossary.html?tx_a21glossaryadvancedoutput_pi1\[char\]=p&cHash=df930cccbd](http://www.epsos.eu/glossary.html?tx_a21glossaryadvancedoutput_pi1[char]=p&cHash=df930cccbd)

records. The introduction of EHR systems is nearing completion in specialised healthcare. Similarly, 98% of general practitioners offices have introduced an EHR, while the proportion among the municipalities is 83%. Within the municipalities there are also large variations between different services. For example, 82% of municipalities have implemented EHRs in nursing homes, while the corresponding figure for rehabilitation services is at best 34%. It is essentially the smallest municipalities (under 2.500 population) who are lagging behind with the introduction of the EHR.

For further knowledge about development and deployment of the EHR system, the Norwegian EHR Research Centre (NSEP) was established in 2003. The main activity at the Research Centre is research and knowledge development in support of EHR deployment in the health services. The research is based on problems that have their origin in health services, but it also has a long-term perspective for creating new basic and generic knowledge, and thus has a potential for industrial realisation. The background to the development work for a national core EHR is the need to increase patient safety with access to vital information about the patient, regardless of geographical location and position in the processing chain.

**EHR Watch,
supported by
the
Directorate
of Health and
implemented
by NSEP**

EHR Watch (EMR Monitor in Norwegian) is a research project supported by the Directorate of Health and implemented by NSEP. EMR Monitor conducts an annual survey of the status of the application, distribution and gains achieved through the use of electronic medical records at different levels in healthcare. This is done through the development of a standardised questionnaire with selected parameters and indicators. In addition, the project is coordinating a network of all involved in the implementation of EHRs in Norway. The analysis and overview provided by the project is expected to offer a better knowledge-base in EHR-work and serve as the reference point for strategic choices in the field. In 2009 and 2010 a follow-up of the data from 2008 is being conducted.

EHR Watch's annual report for 2008 is the first national survey with regard to the direction and status of electronic medical records in the Norwegian healthcare sector. Before that, only single studies and surveys on various testing projects were available, while a comprehensive overview was missing. The 2008 report shows that development has progressed slowly in some areas, and that some goals have been only partially achieved. Although much work still remains to be done, many of the most important prerequisites are in place and the report highlights that the development is pointing in a positive direction.

In 2008, the project focused on the following groups / levels of healthcare services:

- Health authorities' services (hospitals)
- General practitioners
- Municipal Health Services with an emphasis on nursing and health

Further reports include the study conducted by the National ICT-unit within the specialised health services ³⁶. This study focused on the prospect of a national core EHR (patient summary) with emphasis on the needs of specialised healthcare services and

³⁶ National ICT

ultimately led to a planned pilot project in 2010 and state budget proposals for the coming years for a core EHR.

Engaged in this reviewing and planning were the Ministry of Health and Care Services, the Directorate of Health and stakeholders in the form of a workshop held by the Directorate. After the Ministry of Health and Care Services forwarded the National ICT report to the Directorate of Health with the recommendation of further research on economic, legal and technical requirements, the Directorate issued an intermediate report in 2009³⁷.

Generally, the Directorate of Health recommended a clearer definition of what the core EHR should be, and its respective purposes of use. The Directorate's report emphasised, among other things:

Recommendations by the Directorate of Health for core EHR:

Purpose: The purpose must be specific and rooted in the needs of healthcare, as well as related to health policy goals. Based on existing documentation and studies the primary objective should be increased patient safety in drug use, with particular focus on the elderly and chronically ill, and the treatment of patients in acute situations.

Phased introduction: Both international experience and feedback from various environments in the health sector seem to support an incremental approach where distinct solutions with real benefits are developed and implemented. The Directorate of Health recommended that the first step should be the updated list of the patient's medications.

Further steps: The Directorate of Health recommended initiation of a pilot project as early as possible in 2010. The purpose of the pilot project would be closer investigation and planning of a core EHR solution. The project should have a good and broad participation, and be organised in a manner that would ensure quality, policy anchoring and legitimacy of the solutions described.

During autumn 2009, the Directorate of Health conducted several meetings and workshops with key actors and stakeholders in health-IT. In addition, similar projects and solutions abroad were studied. In December 2009, the Directorate of Health issued its final report and assessment of the proposal of National ICT for the establishment of a national core EHR. They recommended the continuation of work on a national core EHR, based on the needs of healthcare services and a step by step introduction of distinct solutions with real utility. A pilot project was recommended to start as early as possible in 2010. In addition, the Directorate prepared a draft project plan for the pilot project, as well as investment proposals to the state budget of 2011 for the establishment of the core EHR.

Earlier work, which has been done in order to establish a national core EHR, includes the Lighthouse Projects (also referred to as SUMO-projects), the ELIN (National solutions for

³⁷ The intermediate report has the title: "how should further work with the establishment of national core EHR be focused? - Preliminary input, 15.10.09". In that report the Directorate emphasised that a national core EHR must be considered from the perspective of both primary care and specialised healthcare needs. As an example of the needs of local health services, the Health Directorate considered the experiences from Trondheim Municipality's "Lighthouse Project" (also referred to as SUMO-project).

Lighthouse projects for the reduction of drug-related unintended incidents

Electronic interchange of health Information) and the ELIN-C Projects (Electronic interchange of health Information in Community care).

The Lighthouse Project was part of the “Teamwork Strategy 2007”, which was published in 2003. A group of projects was initiated and provided with limited funding from the government. In order to reduce the number of drug-related unintended incidents, the lighthouse project of the municipality of Trondheim focused on this area.

The project focused on a group of mostly elderly people (age 80+) living at home but with an extensive need for healthcare services. The core EHR of the lighthouse project was to be updated automatically when pharmacists, hospitals and other healthcare providers send information to the GP. The patient's GP was assigned to be responsible for the core EHR and to check all information received from other healthcare providers in order to detect any medication inconsistencies.

Other municipalities in Norway also took up projects related to the core-EHR, but from different starting points than Trondheim. Stavanger municipality was using regular messaging between the actors to keep the patients' drug information updated, and the Norwegian Centre for Telemedicine in Tromsø had also initiated a medical card project together with Tromsø municipality based on the use of web-services. It became apparent that development and implementation of common standards for all EHR-vendors would be highly advisable. Thus the three projects decided to cooperate, and they all proceeded to use the same set of standards. To comply with Norwegian legislation, the core-EHR is updated by messaging. Access to the core-EHR can also be provided through web-services but subject to legal constraints.

An application for funding the EHR-system vendors' development of the necessary client modules for their EHR-systems was sent to Innovation Norway and was approved late 2006. A project to coordinate the vendors' work, called SUMO, was established in early 2007.

Messaging standards for administration of the core-EHR, and exchange of EHR-information, have been developed by Norwegian Centre for Informatics in Health and Social Care (KITH) based on requirements from users and vendors in the SUMO-project. The new messaging standard for the EHR is based on reusable components. Requirement specifications for the client-modules in the vendors EHR-systems have also been developed and the vendors have been implementing the standards and the client-modules in the EHR systems.

Cooperation with ELIN-k project for ePrescription

The project works closely with the ELIN-C project (see below), the national ePrescription project run by the Directorate of Health, and the Norwegian pharmacies organisation. It is crucial for the vendors that larger national projects are coordinated and that the same set of standards can be shared and reused across projects. As an example the structure of the medication in the SUMO-project is the same as defined in the ePrescription project.

Core-EHR solutions need to be useful for more purposes than drug information. Examples are: shared individual plans to support continuity of care, summary of the patient's contacts with health providers in different organisations, and core-EHR information as important diagnoses, allergies and contact information. The core-EHR and the model from the SUMO-project can provide a good basis for a more general Norwegian core-EHR. The Regional Health Authorities' ICT-organisation, NIKT (National

IT), initiated a national project to evaluate how a core-EHR can be realised in the coming years. The solution suggested for SUMO is a candidate model for future work in this field in Norway.

The Norwegian Medical Association was responsible for the project ELIN that run in 2004-2006. The ELIN-project built on the Innovation Norway's so-called BIT-projects³⁸ to develop new solutions for electronic information exchange for medical practices (GPs and specialists).

**ELIN-project
aiming for
new
solutions for
electronic
information
exchange**

The aim of the main project was to help establish a market offering of nationally approved solutions that effectively meet the individual medical business requirements for electronic collaboration with other provider organizations in the social and health sectors. The vision of the project was a seamless, efficient interaction underpinning the overall patient care process, with correct and approved information available in the right place at the right time

The ELIN project built on a philosophy of establishing requirements that are easy to transfer to the test protocols in order to follow up and test the proposed solutions against the functional requirements and standards. At the beginning of the project extensive work was carried out to arrive at functional and non-functional requirements for suppliers of systems for practitioners. The work was based on so-called expert groups, that is, working groups of representative users each of whom identified the requirements for specific functional areas. The requirements from the different groups were then harmonised to a comprehensive requirements document with a general section and five specific parts. The requirements document was then quality assured with respect to verifiability, coverage and consistency, and presented to the pilot users and suppliers. NTNU and KITH participated in quality assurance.

**ELIN-C
project for
health
information
systems in
community
care**

The purpose of the ELIN-C³⁹ (Electronic interchange of health Information in Community care) projects was the development of systems for interoperability that enables electronic communication, more specifically the seamless transmission of health information between home care/community care, hospitals and GP. The project was initiated by NNO - the Norwegian Nurses Association and owned by NNO and KS (The Association of Local and Regional Authorities). Funding was provided by NNO, KS, Innovation Norway, the Directorate of Health and National IT. Vendors needed to contribute 50% of the development costs but they will be the future owners of the proposed IT solutions. The evaluation of the project indicated improvements in healthcare quality (improved availability and content of documentation, reduced risk of errors), efficiency (improved workflow and less telephone requests), improved legal protection through written communication and continuity of care.

**Challenging
aspects of a
national core
EHR in
Norway**

According to the results of the EHR Watch 2008 survey (as mentioned above), when it comes to challenges related to the introduction of the EHR, high costs rank at the top for all three target groups. Other issues identified were insufficient system capabilities, poor integration between the EHR and other ICT systems, as well as the fact that suppliers of

³⁸ BIT: Industry-oriented IT projects for efficient business operations, a program developed by the Norwegian Industrial and Regional Development Fund (SND) - currently Innovation Norway.

³⁹ Lyngstad, Skarsgaard et al. 2008

ICT systems and services do not live up to their promises. It is nevertheless important to point out that there is considerable variation within groups. Moreover, there is still a general optimism with regard to the realisation of benefits as a result of EHR-introduction, in terms of efficiency of services and economic gain.

Other challenging aspects, which are connected to the EHR system, can be found in the areas of 1) data access; 2) the parallelism between electronic and paper-based records and 3) interoperability issues:

First, the lack of access to updated medication information is an obstacle for healthcare providers in Norway. Drugs are prescribed from different sources such as the patient's GP, private specialists, emergency care, hospitals and doctors in the patient's family. In order to provide healthcare providers with access to the updated and complete patient's medication information, a project for consent-based access to a core-EHR has been established (SUMO, see above). In this project it is assumed that a considerable number of the medication-related errors are caused by a lack of information. All major EHR-system vendors in Norway participate in the project that is funded by national health authorities, "Innovation Norway" and the municipalities. The proposed core-EHR provides a generic basis that can be used as a pilot for a national patient summary.

In the project description it states that Norwegian legislation does not allow shared data repositories containing health information. The Norwegian health register act § 13 states that it is only allowed for the controller, the processor, or anybody working under their instructions (which has been given a strict interpretation as only being employees) to log on directly into a database containing health information. This makes it illegal for different organizations to share a database or to log on to each others databases. To improve the situation, 3 changes in the Health register act was passed in 2009:

1. The law opened up for the government to pass a regulation which allows for direct access to other organizations EHRs in specific situations. A suggestion for such a regulation is currently out on a hearing.
2. The law was changed so that the government can pass a regulation to allow core-EHR on a regional level. The ministry is currently working on such a regulation for core-EHR, hence planning on removing legal obstacles for regionals core-EHR.
3. A new provision states that the government can pass a regulation making it legal for health personnel that works together to have one EHR-system together even though they work in different companies. (Since GPs often work independently but share offices and patients, this change is welcomed). The ministry is working on this regulation.

According to information published by the Directorate of Health at the end of 2009, the implementation of the project in Trondheim has been marked by challenges related to vendor interaction, difficulties in getting adequate attention in competition with large national projects, and delays due to dependencies to other projects and vendors. How lessons learned from the implementation will be handled has become a major issue and it has been proposed that the project is either rounded up or joined with the national core-EHR project.^{40 41 42}

⁴⁰ Heimly 2008

⁴¹ Norwegian Centre for Informatics in Health and Social Care 2006

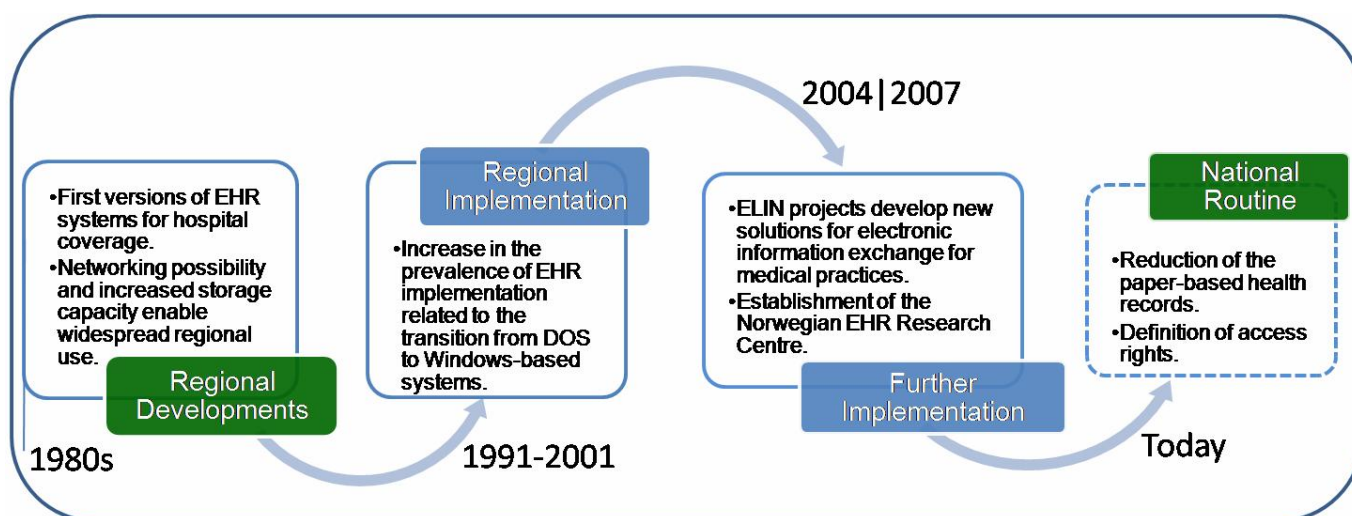
Parallelism of paper-based and electronic health records

The second challenge, which affects the development of an EHR system, is the fact that paper records are still in use country-wide: In a survey conducted in 2007 by Riksrevisjonen⁴³, 12 out of 42 public hospitals in total reported that the paper record was the main record system, and that they still updated it with printouts from the EPR system. Another 18 hospitals considered the EPR as the main system, but also used the paper record as a supplement, and the last 12 hospitals claimed that they were "paper-free" hospitals, i.e. the EPR system was fully used and the necessary paper documents were scanned and made available within the EPR system.⁴⁴

Different ways of data exchange

The last obstacle is the rather low degree of interoperability in Norwegian public hospitals, as it is stated that the exchange of complete records is rare and that the ways of communication vary: Between actors in the healthcare sector message-based exchange is the dominant mode of communication (e.g. lab orders and results, discharge reports and referral letters). The standard messages are exchanged digitally to varying degrees across the country, however still mainly as paper documents. Furthermore, Norway has implemented a shared broadband healthcare network (in Norwegian called Norsk Helsenett SF), but does not have any centralised large-scale web-based information access solution, neither for healthcare personnel nor for patients; however, several pilot projects are underway.⁴⁵

Figure 4: EHR in Norway



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⁴² Helsedirektoratet 13.11.2009

⁴³ The Office of the Auditor General shall ensure that the community's resources and assets are used and administered in keeping with the Storting's decisions. This is done through auditing, monitoring and guidance.

⁴⁴ Aanestad, Jensen et al. 2009

⁴⁵ Aanestad, Jensen et al. 2009

3.3.2 ePrescription

In the framework of this study and following work in epSOS, ePrescription is understood as the process of the electronic transfer of a prescription by a healthcare provider to a pharmacy for retrieval of the drug by the patient. In this strict sense, only few European countries can claim to have implemented a fully operational ePrescription service.

In January 2005 the “eResept” (ePrescription) programme started in Norway, which is aiming to establish a national, fully electronic information chain for prescription drugs and medical supplies. It is monitored by the Norwegian Directorate of Health and owned by the Ministry of Health and Care Services.

By encompassing the Norwegian Medicines Agency, doctors, pharmacies and the NAV (the Norwegian Labour and Welfare Organisation), the project is aiming to:

- improve the quality of the prescription chain and the prescription itself;
- reduce the error rate;
- improve the availability of prescription drugs.

**“eResept”
programme
for a national,
fully
electronic
information
chain**

These goals are planned to bring further improvement for the health system as a whole. Another important goal is to provide NAV with electronic documentation as a base for the payment of refunds to pharmacies in connection with reimbursable prescriptions.

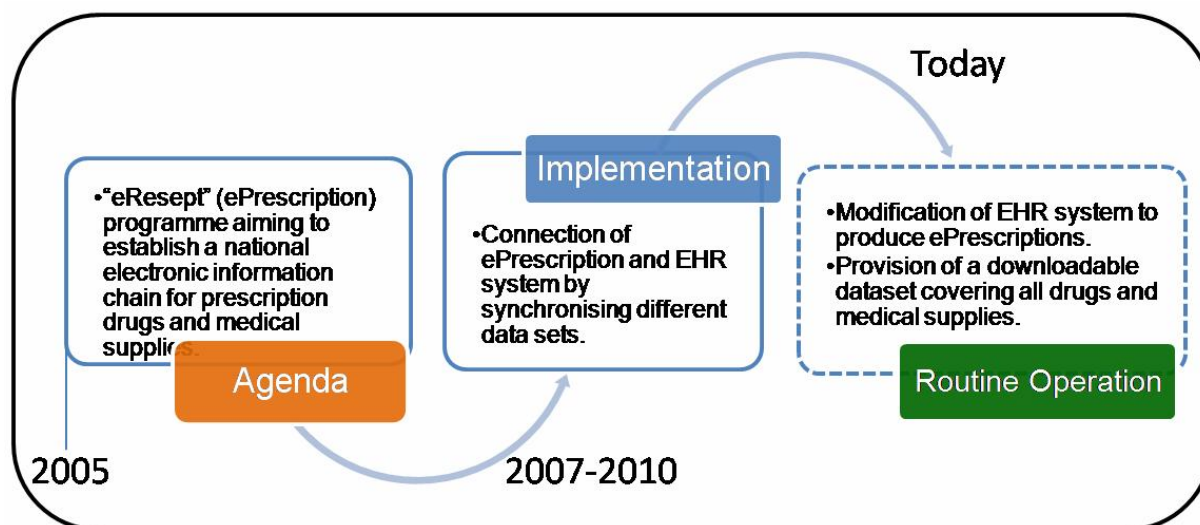
In order to connect the ePrescription with the EPR-systems, data will be synchronised in different ways: On the one hand, the health record system of GPs and hospitals will be modified to produce electronic prescriptions and on the other hand, the Norwegian Medicines Agency will provide a downloadable dataset covering all drugs and medical supplies that the doctor can prescribe – “Prescription and Dispensing Support”.

These prescriptions are XML-documents which are digitally signed by the doctor using a PKI-based smart card. This dataset will be integrated directly into the EPR, and is synchronised with the data used by the pharmacies in their computer systems. Using a single source of information ensures uniform data quality on all prescriptions, and also ensures that the ePrescriptions are correctly interpreted by pharmacies. The Prescription and Dispensing Support contains data about all marketed drugs, their forms and strengths, packet sizes etc., and also contains up-to-date information about the rules that govern prescribing reimbursable drugs. The plans include a web site which allows citizens to get an overview of all prescriptions made out to them, as a link to the Prescription Broker (Reseptformidler).⁴⁶

ePrescription entered pilot phase May 2010, and will probably be decided for nationwide implementation from 2011.

⁴⁶ Norwegian Directorate of Health 2007

Figure 5: ePrescription progress in Norway



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3.3.3 Standards⁴⁷

Standards are not only crucial to enable interoperable exchange of meaningful information in the healthcare system; they also ensure secure access to patient records by healthcare providers and citizens. This study aims to identify, among other usage, standards related to the domain of health informatics, such as the SNOMED Clinical Terms or the LOINC terminology.

In Norway, the Directorate of Health is responsible for decisions regarding development of coding and classification systems. Furthermore, the Norwegian Centre for Informatics in Health and Social Care is concerned with the application of information technology.

Related to the deployment of standards, the Directorate of Health is mainly concerned with administrative tasks, such as the coordination of various professions and cross-sectoral work, as well as of external and internal forces. In this way standards play an important role regarding communication and the development of IT strategies in health. Thereby, the National strategy for quality improvement in social and health services (2005–2015) forms the basis for the work in all of the directorate's areas of activity

The Norwegian Centre for Informatics in Health and Social Care, KITH, has five focus areas:

⁴⁷ Spronk 2008; Nystadnes 2009

Five focus areas of KITH:

- 1) Codes and terminology
- 2) Electronic information exchange
- 3) Information security
- 4) Electronic Health Record System
- 5) Digital imaging systems/radiology

KITH, as a limited company owned by the Ministry of Health and Care Services (70%), Ministry of Labour (10.5%) and the Association of Local and Regional Authorities (19.5%), has been formed to contribute to coordinated and cost-efficient application of information technology in the Health and Social Care sector. Thereby, half of its activity is contributed towards standardisation and coordination tasks related to the areas defined in the text box.

Regarding the specific use of standards in Norway, international classification systems are applied, e.g. ICD 10, ICF, ATC, ICPC-2 or Snomed CT throughout the country. Standards such as DICOM and HL7 version 2.x messages are to some extent used for communication between the different systems used within a hospital, while standards from IEEE and others are used for communication with medical devices. In 2009, a couple of services based on HL7 v3 RIM have been developed and implemented in a few hospitals. More of such services are expected to be developed within the specialised healthcare in the near future.

The XML syntax, used as a national eHealth message standard, has been developed in order to create an internal communication system and also to realise cross-border interoperability, as it is compatible with EN 13606. Cross-border cooperation will also be possible through new standards approved by CEN, ISO and HL7 in the last few years. There are also two partly overlapping alternative standards that both may be used to help achieve cooperation and interoperability: ISO EN 13606 Health Informatics - Electronic Health Record Communication and HL7 v3 RIM and CDA (Clinical Document Architecture).

ebXML is used throughout the sector for secure messaging.

Challenges concerning the use of standards are connected to the deployment policy and implementation procedure:

The current deployment policy of standards is rather risky for healthcare organisations and their vendors, as the cost for the development and implementation of eHealth standards are high, but throughout this process they remain dependent from imperative policy. This means that mainly European or international standards are adopted and national standards have to be developed from scratch if given regulations do not cover the requirements. To replace an already implemented standard with a new European or international standard is a great challenge and will normally take considerable time. Whether the standard will be replaced by a nationally developed standard or e.g. a CEN pre-standard, is of minor importance. If the new standard doesn't provide sufficient benefits for the users compared to the already implemented standard, the willingness to

**XML syntax
as national
eHealth
message
standard**

invest in the new standard will be negligible. In order to ease that problem, a long period of overlapping is required when replacing one generation of standards with a new.

3.3.4 Telemedicine

The use of telemedicine applications is recognised as beneficial to enable access to care from a distance and to reduce the number of GP visits or even inpatient admissions. Commission services define telemedicine as “the delivery of healthcare services through the use of Information and Communication Technologies (ICT) in a situation where the actors are not at the same location”⁴⁸. In its recent communication on telemedicine for the benefit of patients, healthcare systems and society, the Commission re-emphasises the value of this technology for health system efficiency and the improvement of healthcare delivery⁴⁹.

Norwegian Centre for Integrated Care and Telemedicine

Today, the Norwegian Centre for Integrated Care and Telemedicine⁵⁰ (NST) is a centre of research and expertise that gathers, produces and disseminates knowledge about telemedicine services, both in Norway and internationally. The definition of telemedicine, which is given by the dedicated institution, is as follows: “Telemedicine is a set of applications which make it possible to utilise medical resources in a new and better way. Telemedicine is used to move information rather than moving the patient”.

Use of e.g. teleradiology, tele- dermatology or telehomecare

As one eHealth application, telemedicine is part of the overall goal to provide equal health services for all patients in the country – especially for those with long travelling distances to the nearest hospital or a medical expert. Application, which are in place at that time include for example teleradiology, for consulting in emergencies, for second opinions and for consultations between the hospital and the primary healthcare sectors or videoconferencing for psychiatry and cancer care. In some places, telemedicine is also linked to radiology and dialysis, so that patients do not have long travels for consultation and assessment.

The exchange of monitoring information from teledialysis of patients with kidney failure has contributed to a higher level of care quality. Teleradiology and fundus photography of patients with diabetes contributes to less travelling for patients. For teledermatology, an enhanced level of expertise and a better selection procedure for patients requiring hospital treatment has been documented. In emergency medicine, the solution for acute heart problems saves time and the benefits increase in step with the travelling time to hospital.⁵¹ In addition, applications for home-based care have emerged, such as for wound treatment and for training and follow-up of patients with diabetes and COPD, as well as self-help services over the Internet (e.g. in psychiatry)⁵².

In sum, telemedicine applications in use are the following:

⁴⁸ Europe's Information Society

⁴⁹ European Commission 2008

⁵⁰ Norwegian Centre for Integrated Care and Telemedicine

⁵¹ Johnsen, Breivik et al. 2006

⁵² Myrvang and Rosenlund 2007

Telemedicine applications in Norway:

Teleradiology

Teleconsultation/ videoconferences

Teledialysis

Teledermatology

Telehomecare

Self-help services over the Internet

**Development
deployment
of
telemedicine
since 1980**

In recent years there have been two major changes in the financing arrangements for telemedicine related to reimbursement and cooperation between specialists and municipal health service: First, regional health authorities are now responsible for the financial support of the patients cost for transportation to the hospital and second, in 2003 the reimbursement scheme was opened towards telemedical activities outside of hospitals.

The Norwegian use of telemedicine started in 1980⁵³ by the University Hospital of Tromsø. Since then, the deployment steadily increased, as already in 1995, the statistics of the University Hospital of Tromsø showed that 700 videoconferencing sessions and 200 sessions involving patients for remote consultation in the northern fifth region were conducted.

In 1996, Norway became the first country to implement a nationwide telemedicine reimbursement schedule for telemedicine services (450 NOK for experts and 150 NOK for remote practitioners).

**Progress
assessment
and new
Action Plan
for IT**

Together with four other hospitals in the northern region, eleven primary care institutions and a specialist's home office, the department of telemedicine at the University Hospital of Tromsø began implementation of the northernmost parts at the end of 1997. A radiology network consisting of 7 more hospitals would soon be integrated. Medical departments are responsible for the content of their own web pages. By 1999, the services available to the users were telemedicine activities, including traditional diagnostic activity and services like email, email lists for the distribution of medical newsletters and web access. All institutions required authorization before connection to ensure data protection and privacy. In 1999, a working party assessed and evaluated the progress achieved thus far⁵⁴⁵⁵.

⁵³ Berikou 2004

⁵⁴ Ministry of Health and Care Services 1998

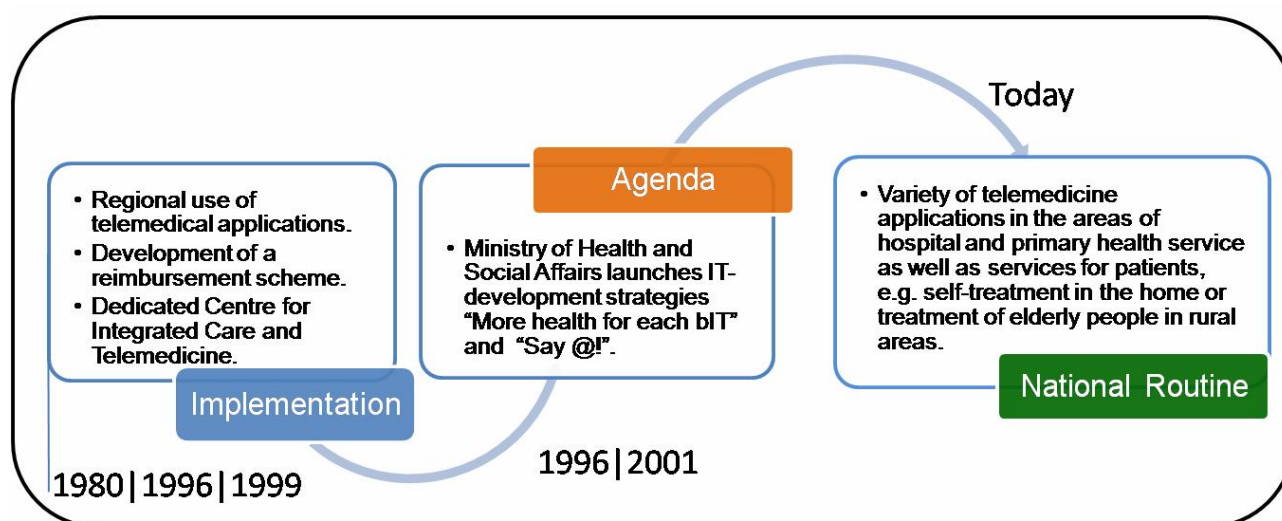
⁵⁵ Some of the concluding remarks were the following: (1) Telemedicine represents a means of organising and developing the health sector. The Ministry will seek advice from Telemedicine Department in University Hospital of Tromsø on technical questions relating to telemedicine. (2) Telemedicine Department of Tromsø is an appropriate independent advisory body with regard to the implementation of major development projects; the department in Tromsø will be oriented towards development and have an academic base; (3) Region 5 (the northern region) must create conditions that permit extensive use of telemedicine and function as a showcase for telemedical services; (6) The relationship to the Ministry's standardisation programme and KITH must be expressly stated and binding. In sum, the working party recommended that teleradiology, telecardiology, telepsychiatry and teledermatology be put into regular operations.

Norway as first country with telemedicine re-imbursement scheme

After the report and appropriate action, in 2002 the World Health Organization (WHO) designated the Norwegian Department of Telemedicine in the University Hospital of Tromsø as its first Collaborating Centre for Telemedicine. At that time, Tromsø was the appropriate window on emerging or rapidly advancing fields of science and technology.

The Ministry of Health and Social Affairs launched a new action-plan for IT-development in the health and social sectors, “Say @!” for the period 2001-2003. The main focus of this plan was to achieve widespread use of electronic interaction in the health and social services sector. New in this plan, in contrast to its predecessor, was a stronger focus on the care and assistance sector and other social services.

Figure 6: Telemedicine services in Norway



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3.4 Technical aspects of implementation

A key prerequisite for the establishment of an eHealth infrastructure is the ability to uniquely identify citizens/patients and healthcare professionals. This part of the survey deals with identifiers and how they are stored. This section does not deal with the tokens through which identification can or will take place. One such possibility would be via an eCard. This topic is dealt with in the following section. The current section focuses solely on whether or not unique identifiers are in place in Norway and for which purpose.

3.4.1 Unique identification of patients

In Norway, an eleven digit number is assigned to every citizen at birth. It contains the date of birth, a three digit individual number and two check digits. The individual number and the check digits are collectively known as the personal number. The number is provided by the National Register of inhabitants in Norway⁵⁶, which stores this data in a central way. Unique personal identity numbers are assigned to all inhabitants – not only citizens – of Norway. It is this identification number that public authorities use to identify the person they are communicating with.

Personal number by the National Population Register

⁵⁶ Norwegian Agency for Public Management and e-Government

**Creation of
MinID
through
using PIN-
codes from
the
Norwegian
Tax Admin**

In December 2005, the Ministry of Government Administration and Reform undertook a mapping of 15 public authorities that provide web-based services to private persons residing in Norway, as well as to businesses. PIN-codes and passwords were the prevailing eID solutions used by these authorities. There is, however, a shift to a growing use of MyID (MinID in Norwegian), which is the government's answer to the problem of fragmentation of eID management in public administration⁵⁷. MinID⁵⁸ is a personalised log-in system for accessing online public services from the Norwegian public sector. MinID uses PIN-codes and a password for identification of users.

Everyone registered in the National Population Register over the age of 13 years can create a public ID with MinID, through using PIN-codes provided by the Norwegian Tax Administration. As of October 2009, more than 1.5 million people living in Norway have created user accounts with MinID. MinID can be used to access more than 50 online services from various Norwegian public agencies, including the Norwegian Labour and Welfare Administration, the Directorate of Taxes and the State Educational Loan. It is also the log-in mechanism for accessing MyPage (Minside in Norwegian). MyID is not based on PKI-technology and does not fulfil the requirements for qualified certificates, nor the national requirements set in the Requirement Specifications for PKI for the public sector (No. Kravspesifikasjon for PKI i offentlig sektor).

The public service "MyPage" brings public service offerings together in a web portal and allows Norwegian citizens to:

- use online public services;
- submit public service application forms and data;
- access personal data stored in public registers
- order a Health Insurance Card.

MyPage only stores data needed for a personal profile but does not save or store any information.

3.4.2 Unique identification of healthcare professionals

For professionals, the Norwegian Registration for Health Personnel⁵⁹ (SAFH) is responsible. By law, it grants licenses for the following professions:

Professions with granted license:

Audiologist, Auxiliary Nurse, Cardiovascular Perfusionist, Care Worker, Chiropodist, Chiropractor, Clinical Nutritionist, Dental Hygienist, Dental Health Secretary, Dental Technician, Dentist, Emergency Medical Technician, General Nurse, Medical Laboratory Technologist, Medical Practitioner, Medical Secretary, Midwife, Occupational Therapist, Optometrist, Orthoptist, Pharmacist, Pharmacy Technician, Physiotherapist, Prescriptionist, Prosthetist, Psychologist, Radiographer, Social Educator.

⁵⁷ Graux, Inte et al. 2009

⁵⁸ Agency for Public Management and eGovernment

⁵⁹ Norwegian Registry Authority for Health Personnel

3.4.3 The role of eCards^{45, 60}

Several eID solutions managed by private companies

At present there is no national (governmental) health-specific or general eID card. There are, however, eID solutions managed by private companies, mainly Norwegian-based⁴⁵. The largest of the private eID solutions are BankID⁶¹ (the Norwegian Banking Sector's common digital authentication and online signing solution, first eBanking activities already in 1996) and Buypass⁶² (jointly owned by Norway Post and Norwegian Lottery; fully operational since 2002), both of which offer the highest assurance level used in eGovernment services, Person-High certificates. BankID is actually 3 different solutions; one option is to use your credit card to generate a pin-code for singular use, a piece of paper with pin-codes, another option is to use a small electronic device which, upon entering your personal pin-code, provides you with a pin-code for singular use. (You receive a new pin-code every time you enter your personal code). Buypass on the other hand, only uses chip-cards with a reader you connect to your computer. Buypass can be used for all kinds of electronic signature. BankID can only be used for signing a document you can see online (not when signing a document you have saved on your computer). Another difference between these solutions, is that only Buypass can be used to encrypt e.g. documents and messages.

In the past, the Norwegian Government has tried several times to set up a working national eID interoperability hub, but due to various reasons had not succeeded in achieving this aim.

Still, the Norwegian government has identified a need to coordinate eGovernmental services (White Paper on ICT-policy from 2006)⁶³. Also the need for coordination regarding the use of digital signatures (PKI) was identified, and in July 2005 a security portal was conceived as a joint login and signature solution for public websites. However, the services of the portal were not adequately used and the agreement with the commercial supplier providing the portal was terminated a year later, in July 2006. In the fall of 2006, the Ministry of Government Administration and Reform began working on a new strategy for eID and e-signatures for the public sector. The essence of this strategy focuses primarily on:

- The use of a national ID-card (with an eID) as the highest assurance level for eGovernmental services.
- The establishment of a national eID interoperability hub for the entire public sector (including Altinn and MyPage, and including municipalities) where the eID in the National ID-card and "accepted" private solutions can be verified.

In 2007, a cross-departmental working group, which was chaired by the Ministry of Justice, drafted a report on a national ID-card. The working group proposed that the government should issue a national ID-card (on a voluntary basis) to all natural persons living in Norway. For Norwegian citizens the national ID-card shall contain information on citizenship, to be used as a travelling document within the Schengen-area. The national ID-card shall also hold an eID fulfilling the requirements of Person-High pursuant to the

Plans for a national ID card holding an eID

⁶⁰ Norwegian Agency for Public Management and e-Government; ePractice.eu 2007 (edited 2009); Ministry of Government Administration 2008

⁶¹ Sørensen 2008

⁶² Müller 2008.

⁶³ Norwegian Ministry of Government Administration and Reform 2006

"Requirement Specifications for PKI for the public sector". This would be the first publicly issued and managed eID solution that fulfils the requirements of the highest level of security used by public electronic government solutions. This National ID-card will have its legal basis in a new act drafted by the Ministry of Justice. After a public hearing the Government decided to follow the working group's proposal.

In 2008, the Norwegian Ministry for Government Administration and Reform announced plans to introduce a common hub for electronic identification (eID) which would allow the use of a single eID to access the eServices of different public-service providers. This new initiative is aimed at simplifying access to online public services by providing a common eID interoperability hub. The task of establishing this hub has been entrusted to the Agency for Public Management and eGovernment⁶⁴ (DIFI). The government also issued common guidelines for the use of eID and electronic signature, published and distributed to all public agencies. This common framework is expected to contribute to a coordination of requirements and avoid the multiplication of agency-specific eIDs.

Catalogue of measures for an ID-card with eID:

Establishment of a common hub for electronic identification (eID)

Creation of a legal basis for the National ID-card

Specification of PKI for the public sector

Simplification of access to online public services

Agency for Public Management and eGovernment (DIFI) is responsible for technical specification and distribution

By July 2009 the Ministry of Justice was in the process of drafting the new act, with the assistance of the Ministry of Trade and Industry and the Ministry of Government Administration, Reform and Church affairs. In parallel there was an on-going process of a public procurement for the production of the eID part of the National ID-card, where the technical specification was drafted by the Agency for Public Management and eGovernment (DIFI).

The Agency for Public Management and eGovernment (DIFI) has the goal to facilitate the distribution and use of public services online⁶⁵. An ID Port (formerly known as the roaming hub) is the brains of the infrastructure for the use of electronic ID. It will allow users to choose between different eID's that meet public safety requirements to verify who they are. Then, the ID port will provide a confirmation of the identity of the user on to the service owners, such as the Tax Directorate or the Norwegian State Educational Loan Fund (public funding for students). Eventually, the ID port will also provide signing and encryption. For the user, the ID port will only appear as a login window that is common regardless of the services accessed.

DIFI launched new version of MinID

In November 2009, DIFI launched the new version of MinID (3.0) - the first electronic ID (eID) that makes use of ID port - the new, common platform for eID in the public sector⁶⁶.

⁶⁴ Agency for Public Management and eGovernment

⁶⁵ Direktoratet for forvaltning og IKT 15.10.2009

⁶⁶ Direktoratet for forvaltning og IKT 26.11.2009

An important next step in establishing a common platform for the use of eID in the public sector was thus reached. For end users, it should mean reduced risk of ID theft, and eventually more and more advanced person-sensitive public services, such as related to health information. The ID port is now part of the ePrescription pilot, whereas citizens in the pilot districts can log on, with a personal smart card and a card reader, and view active ePrescriptions in the Prescription Broker.

Card launch expected for 2011

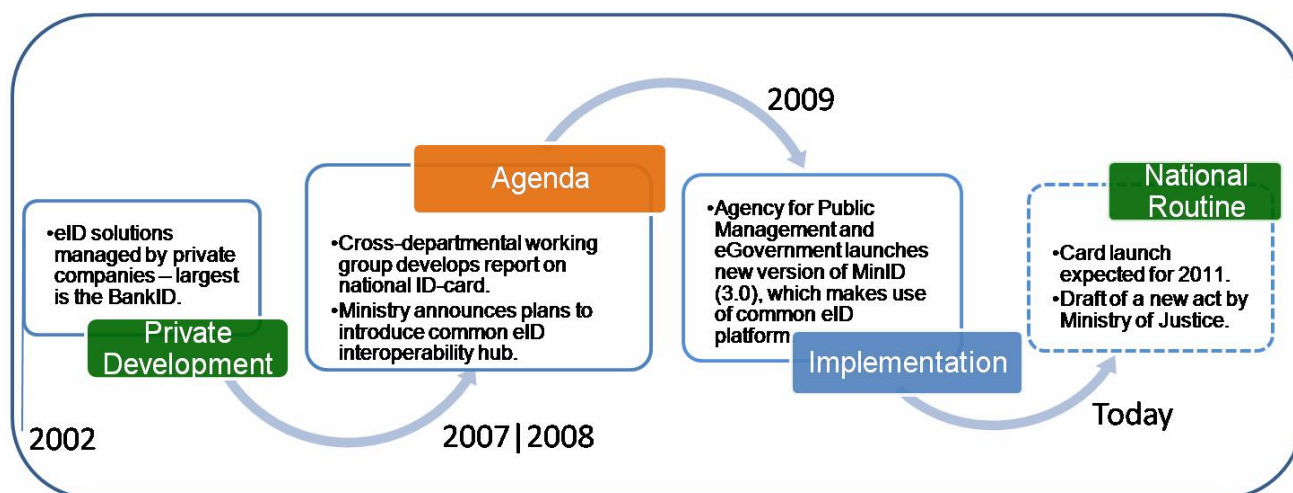
DIFI works in parallel with the development of a national ID card in cooperation with the Police and the Ministry of Justice. The card, expected to launch in 2011, will be a travel document within the Schengen area and will have biometric chips and a public security issued eID.

Challenges, such as the acceptance of the national ID-card

Challenging aspects remain, as it is not sure how the upcoming National ID-card with an eID will be received. It will probably depend on how much it will cost. It will be issued by the police, under the same procedures as for issuing passports. It is hard to predict whether people will be interested in having a “light” passport with a publicly issued eID on assurance level 4. As long as private solutions are accepted in electronic communication with the government, municipalities etc., the need for a national eID might be limited, unless there are other positive features with it (real or perceived). It could be a question of (real or perceived) security and tracing. This may lead to a situation where people are more inclined to have more than one eID on the highest assurance level (Person High), just like they usually have more than one bank/credit card.

Other than patients, professionals or rather GPs use PKI-based smart cards, which contain personal qualified certificates used for digital signature.

Figure 7: eCards in Norway



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3.5 Legal and regulatory facilitators

Legal and regulatory issues are among the most challenging aspects of eHealth: privacy and confidentiality, liability and data-protection all need to be addressed in order to make eHealth applications possible. Rarely does a country have a coherent set of laws specifically designed to address eHealth. Instead, the eHealth phenomenon has to be addressed within the existing laws on professional liability, data protection etc.

Introducing legal and regulatory facilitators in Norway, the following legislations are of importance for health data storage and patient rights:

Important legislative acts in Norway:

Data Registers Act of 1978 – Replaced in 2000 by the Data Protection Act

Patients' Rights Act 1999 – updated in 2006

Personal Health Data Filing System Act (Health Register Act) 2001⁶⁷

Health Care Personnel Act 1999: regulates the right to obtain information for health care personnel.

Electronic Communication Act (Telemedicine) 2003⁶⁸

Regulation on Electronic Communication with and within the Public Administration 2004⁶⁹

The Data Protection Regulation 2000⁷⁰

The **Data Registers Act** in 1978 was the first piece of data protection legislation in Norway. At that time, it was considered as one of the most restrictive privacy acts in Europe. In 1995, the Norwegian Ministry of Justice brought this act in line with the European Directive 95/46/EC⁷¹, which resulted in the replacement of the act by the new Data Protection Act from 2000. The Act is EC-compatible, and in many respects it goes beyond the Directive, offering an even greater level of protection.

In addition there is the **Personal Health Data Filing System Act** or Health Register Act, from 2001. The purpose of this act is to restrict access to the health information which the healthcare providers (HCP) are obliged to hold. The act prevents general access to health information registered by other HCP-organisations, allowing only dedicated access to specific health information. The HCP must (manually/specifically) ensure that the person who demands access rights is part of the treatment chain for the patient.

The Health Care Personnel Act from 1999 shall ensure patient safety, qualified healthcare and trust towards the health personnel and the health service in general. The act includes provisions regulating the health personnel right to obtain information.

The **Electronic Communications Act** was proclaimed on 4 July 2003⁷². The Act aims to ensure good, reasonably priced and future-oriented electronic communications services for the users throughout the country through efficient use of the society's resources by

⁶⁷ Ministry of Health and Social Affairs 2001

⁶⁸ Ministry of Transport and Communications 2003

⁶⁹ Ministry of Administration, Reform and Church Affairs 2004

⁷⁰ Ministry of Administration, Reform and Church Affairs 2000

⁷¹ European Communities 1995

⁷² ePractice.eu 2007 (edited 2009)

facilitating sustainable competition, as well as stimulating industrial development and innovation. The act regulates the transmission of electronic communications as well as the associated infrastructure, services, equipment and installations. It also covers the management of the electromagnetic frequency spectrum and that of numbers, names and addresses.

The government bill "**Regulation on Electronic Communication with and within the Public Administration**" prepared by the Ministry of Labour and Government Administration, was ratified on the 25. June 2004. The regulation created the legal framework for a secure and effective use of electronic communication with and within the public sector.

In 2006, different legislative acts concerning data and registries were reviewed in terms of hindering eHealth development in Norway. This process led to new proposals in order to define how different healthcare organisations should treat patient and health information and to comply with European Data Protection.

**Rule of one
health record
for each
patient**

Regarding the legislative framework for health records, Norway follows the procedure that every health institution (e.g. hospital) should keep one (!) health record for each patient that has received healthcare. This applies to any necessary information about the patient and regardless of whether the information is on paper or in digital form and in which file or database the information may be stored. Health information, which is considered to be not necessary, neither as documentation of healthcare provided nor for providing safe healthcare in the future, has to be deleted.⁷³

The Data Protection Regulation came into force in 2000. The regulation entails detailed rules concerning data protection, especially regarding information security.

3.5.1 Patient rights⁷⁴

There are different provisions for professionals and patients, when dealing with electronic health records: In general, the health record, including the EHR, is kept by the health institution until ten years after the last entry in the EHR. Thereafter it is transferred to the National Archives. When it comes to accessing the EHR, the general rule that follows by law is that a healthcare professional participating in a specific episode of care should be given the information needed to provide safe healthcare to the patient in relationship with that particular episode. For this purpose health data can be used, but no additional information is accessible. In practice, this rule is difficult to apply, as a traditional role-based access control isn't sufficient apart from in certain situations such as according to the organisation of, for example, a hospital. It has to be supplemented with a component that dynamically modifies the access rights according to the decisions taken regarding the treatment of the individual patient.

Furthermore, the patient has a general right to refuse any healthcare professional, except the one responsible for the patient's health record, access to the whole or a part of the health record. Such blockings may however be overruled in situations where the information is deemed to be essential for the healthcare to be provided. This and other

⁷³ Nystadnes 2009

⁷⁴ see above

provisions related e.g. to the editing, correction or deletion of information in the EHR, makes the development of EHR systems particularly challenging.

3.6 Financing and reimbursement issues

In the Norway, the financing of the two past eHealth strategy frameworks was done by central financing: For the “Say @h” plan, the government contributed 222 million NOK within a period of three years. Additionally, participating partners (e.g. hospitals) exceeded this amount. The Norwegian health net and electronic communications were prioritised during this period and therefore accounted 38-39% of the total financing. Telemedicine received about 6% and public services 4%.⁷⁵

The following strategy, “Te@work 2007”, had more limited funding – about 140 million NOK over a period of four years. Here, HPO provided large parts of the financing: Health Enterprises spend approximately 2 Billion NOK on IT (total IT-budget, not only strategy related). Municipalities, GPs, pharmacies and private laboratories and hospitals also spend a similar, but unknown budget on IT.⁷⁶

Reimbursement schemes for e.g. eConsultation eRadiology or eUltrasound

Reimbursement schemes are available in Norway for different eHealth consultations within the public health service: if a consultation is performed by a specialist at the hospital and the patient is not present, the provided procedure or consultation in question is normally reimbursed. Both eRadiology and eUltrasound consultations in prenatal care are reimbursed within these regulations. The reimbursement for eHealth services was originally not applicable for specialists who practiced at private hospitals or practices, but that was changed as of 2003⁷⁷.

A second opinion on these consultations is not reimbursed. If the patient requests another evaluation by a specialist, a second consultation is scheduled, which is then reimbursed through the usual scheme.⁷⁸

3.7 Evaluation results/plans/activities

From a public policy perspective, evaluation is a key activity in the policy-cycle. It provides insights into the success or failure of a policy or project and leads to new policy goals and new methods of implementation. The need for evaluation of eHealth policies and projects has been stressed time and again by the EC, not least in order to further the spread of eHealth in the process of healthcare delivery.

The most recent evaluation regarding the status of EHR implementation across the healthcare sector was the EHR Watch survey of 2008. The project “EPR Watch” has been established at the Norwegian Centre for Electronic Patient Records (NSEP) in order to obtain better documentation and overview of the expansion and degree of usage of EPR in healthcare. The Norwegian Directorate of Health is supporting the project financially.

⁷⁵ Roald Bergstrøm and Heimly 2004

⁷⁶ Doupi 2007

⁷⁷ Helse- og omsorgsdepartementet 08.02.2001

⁷⁸ Norwegian Government 1999

A year earlier (2007) the Office of the Auditor General in Norway had conducted the survey "Office of the Auditor General's report on ICT in hospitals and electronic collaboration in the healthcare sector". Here, 12 out of 42 public hospitals reported about their use of paper-based and electronic health records. The result was that mostly paper records were used and the EPR system still updated with printouts (see also 3.3.1).⁷⁹

Other evaluations were also concerned with the EHR system and telemedicine, and there has been also a cost-effectiveness study regarding message exchange.

In 2004, the KITH published an evaluation on the EPR vendors' compliance, which asked all vendors about their system's adherence to standards. The survey concluded that in most ways the three existing hospital EPR systems conformed to the given standards.

The Norwegian Centre for Integrated Care and Telemedicine has furthermore conducted evaluation studies in the field of Telemedicine.⁸⁰

4 Outlook

At present, Norway has – compared to other EU countries – a very developed eHealth structure, which results from continuous action plan development and the setting of objectives as well as the creation of dedicated institutions for specific areas, such as the Norwegian Centre for Informatics in Health and Social Care, the Norwegian Centre for Integrated Care and Telemedicine or the Research Centre for EHR Systems.

The Norwegian projects in the field of eHealth mostly not only aim at the connection of rural areas to a working health system, but also try to cooperate on the cross-sectoral and cross-border level by developing European standards and synchronising different systems within the country.

Thereby, the far-reaching deployment of eHealth applications in different fields and on different levels also poses obstacles for the development of a coherent electronic system in Norway. Challenging aspects are the way in which hospitals communicate with each other or with specialists as well as how patient data is synchronised or stored in different areas. Furthermore, the digitalisation of prescription and health records is planned to be combined, for which regional systems and especially paper-based information have to be collected and made available for the citizen via an eID.

Especially the current developments in legislation and data access connected to EHRs, shed light on future obstacles in Norway: the synchronisation of different electronic systems in eGovernance and eHealth bring forward data access questions and the renewal of the legislative framework connected to it. As Norway is one of the frontrunners, this apparent development could be of high interest for other countries, which are still at the start-up phase of such systems.

⁷⁹ Aanestad, Jensen et al. 2009

⁸⁰ Norwegian Centre for Integrated Care and Telemedicine

5 List of abbreviations

DRG	Diagnosis Related Group
EC	European Commission
EEA	European Economic Area
EHR	Electronic Health Record
EMR	Electronic Medical Record
EPR	Electronic Patient Record
epSOS	European patients Smart Open Services
ERA	European Research Area
EU	European Union
GDP	Gross Domestic Product
GP	General Practitioner
HCP	Healthcare Provider
HL7	Health Level Seven International (authority on standards for interoperability)
HMO	Health Maintenance Organisation
HPC	Health Professional Card
ICT	Information and Communication Technology
ID	Identification (e.g. number, card or code)
IHTSDO	International Health Terminology Standards Development Organisation
IT	Information Technology
KITH	Centre for Health Informatics
KS	Kommunenenes Sentralforbund [Norwegian Association of Local and Regional Authorities]
LSP	Large Scale Pilot
NSEP	Norwegian HER Centre
NST	Norwegian Centre for Integrated Care and Telemedicine
NTNU	Norwegian University of Science and Technology
OECD	Organisation for Economic Co-operation and Development
PHS	Personal Health System
R&D	Research and Development
SND	Norwegian Industrial and Regional Development Fund
SNOMED	Systematized Nomenclature of Medicine-Clinical Terms

SVO	The Government Consultative Office for Inventors
WHO	World Health Organization

6 Annex

6.1.1 Annex 1: Compound indicators of eHealth use by GPs

Compound indicator name	Component indicators	Computation
Overall eHealth use	Electronic storage of individual medical patient data Electronic storage of individual administrative patient data Use of a computer during consultation with the patient Use of a Decision Support System (DSS) Transfer of lab results from the laboratory Transfer of administrative patient data to reimbursers or other care providers Transfer of medical patient data to other care providers or professionals ePrescribing (transfer of prescription to pharmacy)	Average of component indicators
Electronic storage of individual medical patient data	A2a - Symptoms or the reasons for encounter A2c - Medical history A2c - Basic medical parameters such as allergies A2d - Vital signs measurement A2e - Diagnoses A2f - Medications A2g - Laboratory results A2h - Ordered examinations and results A2i - Radiological images A2j - Treatment outcomes	Average of component indicators
Electronic storage of individual administrative patient data	A1 - electronic storage of individual administrative patient	A1 value
Use of a computer during consultation with the patient	B2 - Computer use during consultation	B2 value
Use of a Decision Support System (DSS)	B3a - Availability of DSS for diagnosis B3b - Availability of DSS for prescribing	Average of component indicators
Transfer of lab results from the laboratory	D1e - Using electronic networks to transfer prescriptions electronically to dispensing pharmacists?	D1e value
Transfer of administrative patient data to reimbursers or other care providers	D1a - Using electronic networks to exchange of administrative data with other health care providers D1b - Using electronic networks to exchange of administrative data with reimbursing organisations	Average of component indicators
Transfer of medical patient data to other care providers or professionals	D1c - Using electronic networks to exchange medical data with other health care providers and professionals	D1c value
ePrescribing (transfer of prescription to pharmacy)	D1d - Using electronic networks to transfer prescriptions electronically to dispensing pharmacist	D1d value

Dobrev, Haesner et al. 2008

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