





# Health and Social Sectors with an “e”

A study of the Nordic countries

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### **Nordic Council of Ministers**

Store Strandstræde 18  
DK-1255 Copenhagen K  
Phone (+45) 3396 0200  
Fax (+45) 3396 0202

### **Nordic Council**

Store Strandstræde 18  
DK-1255 Copenhagen K  
Phone (+45) 3396 0400  
Fax (+45) 3311 1870

[www.norden.org](http://www.norden.org)

## **Nordic co-operation**

Nordic co-operation, one of the oldest and most wide-ranging regional partnerships in the world, involves Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland and Åland. Co-operation reinforces the sense of Nordic community while respecting national differences and similarities, makes it possible to uphold Nordic interests in the world at large and promotes positive relations between neighbouring peoples.

Co-operation was formalised in 1952 when *the Nordic Council* was set up as a forum for parliamentarians and governments. The Helsinki Treaty of 1962 has formed the framework for Nordic partnership ever since. The *Nordic Council of Ministers* was set up in 1971 as the formal forum for co-operation between the governments of the Nordic countries and the political leadership of the autonomous areas, i.e. the Faroe Islands, Greenland and Åland.

# Preface

Three years ago, national organisations for *IT in health care* in the Nordic countries initiated a collaborative network. The partners are MedCom<sup>1</sup>, KITH<sup>2</sup>, STAKES<sup>3</sup>, Ministry of Health (Iceland), and Carelink<sup>4</sup>. In addition to a constructive exchange of experiences, this network has planned and implemented several joint activities. The network also initiated two working groups to address issues related to national communication networks, information security, and electronic directories.

When the Nordic Council of Health and Social Ministers met in Karlskrona, Sweden in August 2003, one of the conclusions was to conduct a survey on the use of IT support in the health care and social sectors in the Nordic countries. The purpose was to identify areas where the Nordic countries can exchange experiences and co-operate. The study was co-ordinated by Carelink and carried out between March and July 2004 by the Nordic network in collaboration with consultant Helene Norberg<sup>5</sup>.

The Nordic countries are similar in many ways – culture, politics, welfare systems, etc – yet we choose somewhat different approaches when it comes to developing IT in the health care and social sectors. Although we share many common challenges and goals, we may have different strategies, priorities, and ways of developing and implementing IT applications. What can we learn from each other? How can we co-operate to reach our goals?

The intention of the new Action Plan for eHealth<sup>6</sup> issued by the European Commission in April 2004, has much in common with the ongoing and planned development in the Nordic countries – strategies for interoperability, infrastructure, legislation, and online services, e.g. teleconsulting, second medical opinions, e-prescriptions, and e-referrals. The Nordic countries are at the forefront in many of these areas. To assess the full potential of eHealth, we need to develop and strengthen our common approach with increased co-operation and benchmarking.

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<sup>1</sup> Danish Centre for Health Telematics

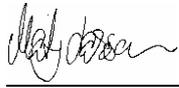
<sup>2</sup> Norwegian Centre for Health Informatics

<sup>3</sup> National Research and Development Centre for Welfare and Health, Finland

<sup>4</sup> Swedish Network for Communication in Health Care

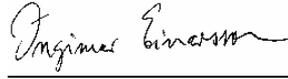
<sup>5</sup> Helene Norberg Konsult & Analys, Sweden

<sup>6</sup> eHealth – Making Health Care Better for European Citizens: An Action Plan for a European eHealth Area, 2004-04-30



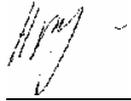
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Mats Larson, Carelink, Sweden



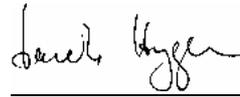
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Ingimar Einarsson, Ministry of Health, Iceland



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Henrik Bjerregaard Jensen, MedCom, Denmark



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Jacob Hygen, KITH, Norway



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Olli Nylander, STAKES, Finland

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# Summary

This report studies the use of IT in the public sector, with an emphasis on health care and social services. The purpose of the study is to enhance the opportunities for the Nordic countries to learn from each other and to co-operate. The countries studied are Denmark, Finland, Sweden, Iceland, and Norway.

## IT in the Nordic Countries

From an international perspective, the Nordic countries are at the forefront regarding the use of IT and the Internet. The Internet is used more for information and communication than for interacting with public authorities. This suggests that there is an unexploited potential to improve electronic services for a population that is well versed in electronic communication and information.

The Nordic countries face several common challenges, of which the “digital divide” is one of the most important. This gap is especially noticeable as regards age and education in the Nordic populations.

The relatively high utilisation of IT has been enabled and driven by a strong political will, at both the European and national levels. The Nordic countries have extensive and multidimensional strategies for developing information societies. They should be viewed in the light of EU strategies in eEurope 2005, which focus on the security of networks and information, eGovernment, eLearning, eHealth, and eBusiness.

General but crucial tasks that the strategic plans focus on include:

- security, standardisation, and regulatory frameworks
- availability, e.g. subsidising broadband and schemes for home PCs
- development of IT in the public sector
- IT skills and IT in learning
- e-commerce and a functioning market.

## eGovernment

The work of developing eGovernment in the Nordic countries involves activities in several different fields, e.g. technology, legislation, organisation, and the marketplace. When studying eGovernment in the Nordic countries, it might be more appropriate to use the expression *public sector* instead of the term *government* since local authorities are independent

and distinct from the state authorities. However, to be consistent with the terminology in the international literature this report uses the term *eGovernment*.

eGovernment is intended to provide better service, delivered more efficiently, for the benefit of citizens, businesses, and the public sector. It is more about government than about “e”, and focuses on a range of issues such as how to collaborate more effectively across agencies to address complex, shared problems; how to enhance customer focus; and how to build relationships with private sector partners. eGovernment *is not* simply about transforming manual procedures into IT systems.

All of the countries studied have ambitious aims for eGovernment. Surveys show that progress has been made, but there are common obstacles to overcome, e.g. the lack of collaboration between agencies, insufficient knowledge about citizen’s needs and demands, “sow–harvest” problems where those who “sow” the investment are not the ones to “harvest” the economic benefits, excessive focus on technology, and inadequate management, commitment, and skill. In short, the public is ready, but the organisations are not.

An important finding in this report is that the decentralised public sectors in these countries increase the sow–harvest problems. One way to reduce this problem is to increase funding for eGovernment activities across ministries, agencies, and local authorities.

Another finding is that activities connected to the marketplace, e.g. development of digital services based on citizen demands and needs, seem to be lagging behind. One possible explanation for this may be the bureaucratic nature of participating organisations. These characteristics may reduce the capacity for innovation, but also place an administrative focus on the process and its goals. The “e” is not an end in itself. Simply making current administration and services electronically available is not enough.

## IT in Health Care and Social Services

IT in the health and social sectors has the potential to improve welfare while simultaneously improving the efficiency of systems. Budgets are becoming increasingly strained, the population is ageing, working time is becoming more expensive, and people are demanding individualised and seamless care. The availability and quality of services need to improve, as does the attractiveness of the sector for personnel. The health sector has advanced rapidly in recent years, and international comparison shows the Nordic countries to be well ahead in this field.

There are, however, as in eGovernment, challenges to overcome before we can reap the benefits of recent advancements. One of the greatest challenges concerns decentralised systems and the major effort required

to co-ordinate future development. In some cases, inadequate management has also been a barrier to change. Other barriers include a health and social sector bureaucracy that may not offer the most innovative environment, laws and regulations that are slow to adjust, and costs and benefits from investments that may not fall within the same organisation. While technical problems have decreased in past years, the organisational problems in this process appear to be far from solved.

### *IT strategies for health and social care*

Strategic plans and proposed activities for IT development in the Nordic health sectors have many components in common. Increasing shared information is an overall goal, which implies activities related to electronic patient records (EPR)/electronic health records (EHR), security, telemedical consultations, classification and standardisation, regulation, and web-based services.

Strategies at the national level are developed and implemented in different contexts within the Nordic countries since the countries differ in terms of their responsibilities at the state, regional, and local levels. In general, the health sector is decentralised in the Nordic countries. The state level is mainly responsible for the regulatory framework. Agencies are responsible for control and surveillance, while regional and local units are important providers.

In Finland the municipalities are responsible for primary care and are joined together in larger units for hospital care. In Norway the municipalities are responsible for primary care, but the state plays a more extensive role, and since 2002 it has been responsible for hospital care through five regional authorities. Also in Iceland the state has a relatively large impact, which has increased due to requirements on specialisation and the need to centralise. In Sweden, on the other hand, the counties have a dominant position in both primary care and specialised care. However, during the 1990s, Swedish municipalities were given a larger role in providing health services relating to domestic care of elderly and disabled people. Even in Denmark, much of the health care sector has traditionally been a responsibility of the counties, although it has been said that the state level has more impact than in Sweden. However, a new structure is currently being discussed with five large regions responsible for health care.

**Sweden** cannot be said to have a fully developed IT strategy for the health sector. However, since the counties are relatively independent, they have developed strategies for their IT work and co-operate on a voluntary basis. The counties, municipalities and the private caregivers also co-operate on a voluntary basis through Carelink, a national network organisation established to develop the use of IT in health care. Activities within this co-operation are for example further development of Sjunet,

the national communication network for health care, and development of common IT solutions. Focus in the counties is also the development and use of telemedicine<sup>7</sup>.

In **Denmark**, MedCom was initiated in 1994 by the Ministry of Health to increase electronic communication. In 2003, the current strategy was launched, i.e. “National Strategy for Information Technology in the Health Care System 2003–2007”. The overriding aim of this strategy is to assure that shared information becomes the foundation for seamless care and patient involvement. A Basic EHR structure has been agreed upon as the common national information structure for all future IT systems holding clinical data in the Danish healthcare sector. Major initiatives for the next years include a national terminology server and organisation, further development of the Public Health Portal, and a registry based on ‘Clinical Process’ and continuity of care.

In **Iceland**, the strategy for developing an information society (2004–2007) includes goals for the health sector. One goal is to establish a health net that will link all institutions within the sector by the end of 2006. Action shall be taken to introduce electronic patient records for all healthcare services, to an equal extent in hospitals, health care centres, and among independent healthcare operators. Another goal is to enable electronic transactions between the State Social Security Institute and healthcare workers and the public.

**Norway** is now in its third national plan for eHealth. The previous plan, Si@!, focused on electronic communication within the health and social sectors, telemedicine, national health net, and public information. The plan for 2004–2007, i.e. Te@mwork 2007 (S@mspill 2007), has a dual focus. The first focus is to further improve information flow between parties who have already started with electronic co-operation. This includes efforts to ensure the operation of the Norwegian Health Net, further efforts in terminology, coding, and classification and implementation of digital signature/PKI (public key infrastructure), and more extensive implementation of EHR systems.

The second focus of the plan concerns the inclusion of new parties in electronic co-operation. New groups shall be introduced to and motivated for electronic co-operation. The inclusion of new parties is governed by the ambition to establish seamless care processes, including the above parties, but also institutions in the municipalities with care responsibility, e.g. rehabilitation units and institutions for elderly or disabled people.

In **Finland** the Government recently initiated four cross-ministry programmes, one of which is a programme for the information society. Communication technology in the health sector is a major task for the programme. The strategy covers plans for seamless social welfare and

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<sup>7</sup> Telemedicine: “The practice of health care using interactive audio, visual and data communications. This includes Health care delivery, diagnosis, consultation and treatment as well as education and transfer of medical data.” (WHO)

health care services and the introduction and establishment of an electronic regional information system, which have all been main components of the Ministry’s strategy in recent years. In addition, IT will be used for seamless care, home care, and developing a health portal.

The work at the national level is complemented by work at the **European** level. The eEurope 2005 Action Plan sets out several policies and targets concerning the use of IT in the health sector, within fields such as electronic health cards, online services, and health information networks. In April 2004, the Commission presented an Action Plan for eHealth within Europe. The tasks in this plan are also the focus of the national strategies for eHealth in the Nordic countries.

This report shows that some of the countries have come farther than others. Sweden, Denmark and Norway have focused on building a national net in earlier strategies, and now pay more attention to the activities needed to increase communication on the net, e.g. security, regulation, standardisation, and applications. Involving more actors and increasing collaboration and communication flow are also important ambitions at this stage. Iceland is working on developing a health net and, at the same time, finding ways to increase shared information through linking actors to the net and activities for EHR (Electronic Health Records) and telemedicine. In Finland, the national policy focuses on regional development for electronic communication including seamless care, portals, and home care. This strategy may have the advantage that it could lead to a less complex development process within the region. However, it might also lead to major differences between the regions and limit the possibilities for collaboration among them.

Financing and the structure of the system are important aspects for the impact of the strategies. Sweden has relatively independent counties, which have their own strategies for these matters. Proposed actions at the national level have received no financing, and the Government has not decided on the proposals. It is not comparable to have separate strategies at the county level, since development needs to be co-ordinated. Both Denmark and Norway, on the other hand, have relatively extensive policies at the national level and also financial e-enablers connected to the strategic ambitions. Also, the five regional health authorities in Norway are explicitly instructed to co-operate. A strategic focus connected to financial enablers is essential for stimulating the development of electronic communication and to avoid sub-optimisation and inefficiencies.

#### *Co-ordination within and between health care and social services*

Lack of co-ordination is a barrier for IT, and all Nordic countries have organisations established for the purpose of co-ordinating and promoting the use of IT in health care. Several initiatives have been undertaken in the Nordic countries aimed at co-ordination not only between various

organisations within the healthcare sector in each country, but also between sectors.

In **Sweden** the need for a co-ordinating authority is clear, since the different counties have major responsibilities for their own health systems. Carelink was established in 2000 for the purpose of advancing the use of IT in health care. Carelink runs several projects, including projects on a uniform electronic directory, a common infrastructure, facilitating communication among systems, creating a virtual medication list, and establishing common terminology and common standards. However, Carelink has no formal authority in relation to the counties and other caregivers.

In **Iceland**, the Ministry has taken the initiative to define standards for the entire sector and to act as the co-ordinator for projects in the health net programme.

In **Finland**, the Ministry has led the strategic development of IT within the public sector. However, it is a local responsibility to carry out IT programmes. Nearly all communications in health care in Finland are regional, with only a small share crossing regional borders. The Ministry has been given a larger role to co-ordinate the work involving common definitions and standards. Although there are ambitions to improve cooperation and compatibility, there is no intention to centralise the IT system within the social and health sectors.

In **Norway**, the current strategy Te@mwork (S@mspill) advocates co-ordinating the development of IT, and involving pharmacies and municipalities to a greater extent. A programme for the municipalities is proposed to increase collaboration between health care and social services. Another important area for collaboration concerns codes, classifications, and terminology. This is the responsibility of the Social and Health Directorate and KITH (the Norwegian Centre for Informatics in Health and Social Care) a co-ordinating body established in 1990.

In **Denmark** several bodies participate on a national scale to build IT communication in health care. One co-ordinating body is the National Board of Health (SST, Sundhedsstyrelsen) which is responsible for classifications, the structure of electronic health records, and partners of the national health net. Another is the Danish Centre for Health Telematics, which was established in 1994. The Centre provides advice and project support to national authorities, county councils, municipalities, general practitioners (GPs), hospitals, IT service providers, etc in the field of health telematics. Several activities are carried out within the national network MedCom, which became a permanent organisation in 1999. Under the present strategy for IT in health services, most central initiatives are concerned with co-ordinating efforts, e.g. co-ordinating implementation of EHRs, a national terminology server and organisation, collaboration among counties on integration engines, integration of quality databases, access to pooled data from EHRs, connection between municipal

care systems and EHRs, and creating a central body to oversee IT strategic progress. Furthermore, the eGovernment project includes a task force to improve digital communication between the municipalities and hospitals, called MedCom “Municipality Project”.

A conclusion of this report is that co-ordination between actors is needed to ensure seamless care, efficiency gains, and other benefits from technological advancements. Programmes and projects are launched to address the necessary ingredients in this process; co-ordination of terminology, standardisation, technological co-ordination to enable the system to communicate, directories and registers, etc. Centralisation and co-ordination are needed for these services. Too little co-ordination and centralisation widens the gap between units, municipalities, and counties, and diminishes the potential to achieve the benefits of communication.

In the health sector it is important to focus on the communication flows that are most critical for co-ordination and centralisation. This is also an important task for other sectors working to develop the use of IT.

#### *Examples of IT collaboration*

The work with eGovernment has shown that one of the greatest challenges facing the countries is collaboration among agencies and other actors. This is necessary to reap the benefits offered by advancements in technology. Examples of collaboration in the Nordic countries provide useful lessons.

In **Norway**, the SATS project aims at improving social and labour market policy by increasing the co-ordination between the labour market and social security systems. The Government in **Iceland** is planning for electronic communication between the State Social Security Institute and the healthcare sector. In **Sweden**, the Swedish National Tax Board, the National Board of Health and Welfare, Carelink, and the National Social Insurance Board are jointly discussing the possibilities to transmit documents electronically between the healthcare sector and these agencies, for the purpose of saving money and shortening the processing time. In **Denmark** the eGovernment project covers many of the aspects needed to implement inter-agency collaboration. For example, a mutual, cross-public initiative has been launched to ensure the use of mutual data and standards, to secure interoperability, and to facilitate communication between authorities. In **Finland**, a large, multidimensional programme has been initiated for social services. One project – where IT within social services is a main ingredient – is the eConsultation project. This project works according to the same principles as telemedicine in health services, but for social services. It is implemented in close co-operation with nine regional centres of excellence in social welfare and provides access to professional consultation and other expert services.

The Norwegian reform is an example of IT-based development where digitalisation of information is part of a large institutional reform aimed at improving efficiency in organisations and services for vulnerable groups. The talks on digitalisation of specific information flows in Sweden are an example of using discussions as a means to cope with traditional “sow-harvest” problems by bringing them to the table by a co-ordinating body. The Finnish example shows how IT-based services – familiar in the health sector – can be useful even in the social sector.

### *IT for specific groups*

IT can benefit citizens with specific needs. Examples of where these needs have been the starting point for reforming work processes and developing new, IT-based services are: IT to enable care in the home, IT to improve services for children and adolescents at risk, and IT to improve e-inclusion of socially excluded groups.

Home care for the elderly and other target groups is undergoing further development in all Nordic countries, and IT plays an important role. In **Denmark**, the CareMobil project is aimed at supporting this development by creating new concepts and demonstrating the use and potential of IT in caring for the elderly. In **Finland**, the ITSE project aims to improve independent living and communication among the elderly and disabled by utilising assistive technology. Projects in **Norway** deal with similar issues. For example, the goal of the “GRO Comfort Zone for Elderly” is to create a complete service package for senior citizens in their own homes. The project “Smart Home Technology in Norwegian Home-based Health and Social Services” studies processes in introducing this technology in municipalities to show other municipalities how to achieve success and what bottlenecks to avoid when introducing such technology. In **Sweden**, home care for the elderly and others dependent on care in the home is an important field that receives growing attention. Several projects have been initiated in recent years aimed at developing models and work processes for elderly care, where securing seamless care and co-ordination between organisations are essential. The ACTION project is an example of a project that focuses on support for patients’ families.

Dementia represents an area where collaboration throughout the continuum of care is essential. This disorder requires collaboration between regional and local health services and the services provided by municipalities. A model for collaboration has been developed, based on a project from Fredriksborg. The model presents a structure for responsibilities and collaboration between regions, municipalities, and physicians. Based on the experiences from the project, areas are identified within which aims and action plans should be developed.

Children and adolescents at risk are the focus of an eGovernment project in Denmark. The background is that expenses for prevention and the

placing of children have increased substantially in recent years. However, there is insufficient information about causes and about the results of interventions. The aim is to improve management and case processing via, e.g. more systematic processing routines, better matching between the needs of the children and the interventions used, a better management information system, and easier inter-agency co-operation among public authorities.

The work with young people at risk is a good example of where a group for which services were perceived to be unsatisfactory was the starting point for an effort to integrate the use of IT with the goals of a policy area. It illustrates a case where digitalisation is not the end in itself, but a means for improving services.

The *information society* promises new opportunities for social inclusion and has the potential to overcome traditional barriers to mobility, distance, and knowledge resources. These opportunities can generate new services for disadvantaged people, for people seeking employment, or those at risk in the labour market. On the other hand, IT also presents new risks for exclusion that need to be prevented. The Nordic countries are concerned with the *digital divide* and have taken various initiatives to diminish it. Broadband to remote areas, home PCs, initiatives for the disabled and elderly are all examples of activities for e-inclusion. These measures are necessary to prevent e-exclusion in general and to create the prerequisites for new services that benefit these groups and increase efficiency within the social sector.

#### *Infrastructure for IT-based health services*

Denmark, Sweden, and Norway all have a national health net. In Sweden, this is a broadband separate from the Internet, while the Danish net migrated to Internet technology in 2002. The Swedish net evolved from a project consisting of seven counties in 1998, while in Denmark the development of a health net was already a joint national project in 1992. In Norway, the regional nets were connected in the summer of 2003, and Iceland is planning to have a net by 2006. In Finland the infrastructure is on a regional basis.

In **Sweden**, Sjunet includes all counties, hospitals, and primary care units in the country. Sjunet is based on VLAN and offers secure communication, distribution of images, medical applications, and other services for which Internet is considered to be unsecure.

In **Denmark**, the MedCom project is developing a nation-wide healthcare network connecting the various actors in the healthcare sector. Ten municipalities and all hospitals, laboratories, pharmacies, and GP practices were using the healthcare network on a daily basis by the end of 2003. Around 60 percent of cross-sectorial communications are exchanged electronically. A series of Internet-based projects between the

healthcare actors has been launched since MedCom migrated to Internet technology in 2002.

The national health net in **Norway** was one of the focus areas in the previous strategic plan, Si@! The net was established to connect the regional nets. The use of the net varies between regions, but is increasing within all of them. The health nets in region North, and in region Mid-Norway have had a substantial traffic load for 2 to 3 years, but development in the other regions has been slower.

It can be concluded that in all Nordic countries, connecting services to the national net requires substantial technical work to enable the existing technologies to communicate. The countries vary in how far they have advanced and in the strategies that they have chosen. Development in Denmark has been driven by several large projects, while development in Norway has been more centralised, but based on projects in the 5 health regions. Development of the net in Sweden has been based on a project in co-operation between independent counties.

#### *Security in health and social services*

Some key aspects that need to be included in a secure system are: information should not be available to unauthorised individuals, integrity needs to be high to prevent false prescriptions, and any attempts need to be traceable. Also, it should be possible to identify the user afterwards. Relevant legislation concerns the laws regulating registers, personal information, patient’s rights, and employee’s rights and obligations. The use of e-mail and health-related matters on Internet also need to be regulated.

Security aspects are presently in focus. In Denmark, security aspects are currently a priority, and in Sweden the counties have agreed on a security framework. In Norway, important reforms have been undertaken in legislation to assure that the regulatory framework keeps pace with development, while in Sweden the regulatory framework is said to be a crucial development problem.

#### *IT for communication in health an social care*

IT supported applications and information flows, can be characterized into:

- Administrative support and Electronic Health Records/ Electronic Patient Records
- Telemedicine, such as consultations and clinical rounds
- E-messaging, such as e-prescriptions and e-referrals
- Web-based health information
- E-education
- Knowledge databases such as quality- and outcome registers

The Nordic countries are at the forefront in eHealth applications. The share of general practitioners using EHR is among the highest in Europe, and applications are generally well above the European average.

In **Sweden**, Sjunet is used for healthcare communication across organisational boundaries, for example between counties or between different caregivers within a county – such as between a hospital and a municipality or between a caregiver and a pharmacy. Most of these organisations have separate intranets, but through Sjunet they can communicate across administrative borders. Services can be found within the field of telemedicine, including the secure transmission of patient information, clinical rounds and collaboration between hospitals. Many prescriptions are being transmitted electronically to pharmacies, through Sjunet. Many projects and applications are local and use local networks.

In Sweden the share of e-prescriptions of first-time prescriptions was 27 percent in May 2004, but there are large regional differences. Some counties report only a few percent while others report over 90 percent. In addition, Sjunet is also used for IP telephony, file and media transmissions, and access to knowledge databases. These services are possible because Sjunet is based on IP technology. Another application involves quality registers, for example, RIKS-HIA (Register of Information and Knowledge about Swedish Heart Intensive care Admissions), a register that includes data on patients in cardiac intensive care. The purpose of such registers is to increase knowledge about the process of care and ultimately improve outcomes.

**Denmark** is at the forefront of many applications, and e-prescriptions and communication between municipalities and countries in the healthcare process are common. Around 90 percent of the physicians in Denmark use electronic health records, and the use of e-prescriptions is well established. Nearly all hospitals use the national health data net, and four counties use web-based x-rays in communication between general practitioners and specialists. Six counties have teleconsultations between general practitioners and specialists in dermatology. A national web-based service has been established where general practitioners can order test results from laboratories throughout the country.

Four project areas are further developed under MedCom IV:

- The Internet Strategy, the purpose of which is to introduce a nation-wide, Internet-based health care data network and achieve large-scale use of web lookup, telemedicine, and other Internet-based forms of communication in the health care sector.
- The Local-Authority project, the purpose of which is to achieve large-scale use of MedCom’s standards for communication between hospitals and home care provided by local authorities.
- The XML-EPR Communication project, the purpose of which is to achieve large-scale, nation-wide use of all relevant MedCom messages for communication internally in hospitals and between hospitals.
- MedCom’s SUP project, the purpose of which is to achieve Internet access to Patient Administrative Systems (PAS) and EPR patient records both within a county and across county boundaries.

In **Iceland**, the plan is to routinely include telemedicine in ordinary healthcare services. Presently, only radiological services are provided on a routine basis, but other telemedicine projects include ultrasound examinations in obstetrics, psychiatric consultations, emergency medicine for seafarers, and pathology. There is also an IT-based system for pharmacies that includes ordering on the web and electronic prescriptions for hospital pharmacies. Electronic health record systems have been introduced, and the Ministry of Health and Social Security has taken the initiative to define standards for EHR.

In **Finland**, a decision was made in 2002 that electronic health records should be used throughout the country by 2007, through compatibility among existing systems. Most Finnish hospitals have limited functionality in EHR. Based on the results of a pilot project, the use of electronic prescriptions should be extended to other regions. Teleconsultation is widely used between hospitals and healthcare centres in the regions. Many applications are in use (e.g. teleradiology, telepsychiatry, teledermatology, teleophthalmology). A new application is the consultative and interactive referral between GPs and specialists.

Nearly all primary care physicians in **Norway** use electronic health records. Initially, they were used as stand-alone systems, but increasingly they are used in communication with, e.g. hospitals, laboratories, pharmacies, and health care authorities. Only two out of eighty hospitals do not have EHR. At a regional level most of the hospitals use the same systems, which improves the opportunities for communication. A national EHR standard was released in 2001, and a new version of the EHR standard will be available in 2005. The regional health authorities will also develop a national requirement specification for EHR in hospitals. Initiatives on referrals and discharge summaries have yielded results.

Electronic referrals are increasing, but this is not established as a regular activity in all regions. All regions have pilot projects on referrals. Also in Norway videoconferencing is used as a tool to co-operate for seamless care, and NST runs several telemedicine projects.

It can be concluded that some countries, e.g. Denmark, use the net on a large scale for certain services. In general, however, many applications remain at the project stage and have yet to be used on a large scale.

The potential exists to diffuse good examples between countries and to exchange experiences with counterparts. Networking actors in each country play an important role in disseminating information and exchanging ideas. This is a continuing process since this field is advancing rapidly.

*Web-based health information* has increased significantly in recent years. Many counties in **Sweden**, e.g. Stockholm and Östergötland, provide web-based information, and this area is developing rapidly. Through these websites, patients can contact health care providers, e.g. to renew prescriptions and make appointments. Another example of a website for health information is “Infomedica.se”, which is not driven by commercial interests, but by the county councils’ responsibility to provide citizens with reliable information about health and medical services.

In **Denmark**, “Sundhedsportalen” was launched in 2003 as a collaborative project between the Danish Regions (Association of County Councils in Denmark), the Ministry of the Interior and Health, the City of Copenhagen, the Municipality of Frederiksberg, the Copenhagen Hospital Co-operation, and the Danish National Association of Local Authorities. Information on the portal is available to citizens and health personnel. It also provides guidance and information about pharmaceuticals. In the future, it is expected that patients will be able to view their electronic health record.

Net services for social services offered by the municipalities in **Finland** are fairly sophisticated, include substantial information, and are often interactive. Services at the regional level include telemedicine applications and continuing education for personnel. The Finnish Medical Science Association (Duodecim) has a portal for health professionals. This portal allows health professionals to access both national and international knowledge bases.

In **Norway**, work is under way to provide web-based health information for citizens and personnel in the health sector. In its initial phase, the Norwegian Health Library will give users access to medical knowledge databases and medical publications. Practice-related Electronic Knowledge (PEK) is a subproject of the National Health Library and focuses on providing easy access to clinical guidelines for nurses and clinicians.

*Nordic co-operation in health care services*

The level of co-operation in the Nordic countries is important to the development of health care services in these countries, and they benefit from collaboration and the exchange of experiences. One example worth mentioning is a project where KITH, MedCom and Carelink work on connecting the three national networks and thereby create a Nordic Healthcare Net (NHN). An important step was taken in May 2004 when a test connection was established between the Danish and Swedish networks. Norway will also be connected in the autumn of 2004.

Other examples of co-operation include: the *Nordic Centre for Classifications in Health Care* which was established by the Nordic Council of Ministers, and is responsible for collaboration between the Nordic countries and international representation of these countries in the field of healthcare classifications; the *Harmonisation of EHR Architecture (HC Interest)* which develops the basis for a common Electronic Health Care Record in the Nordic countries; and the *Collaborative Network of Nordic eHealth Competence Centres* with participation from Carelink (S), MedCom (DK), KITH (N), STAKES (SF) and Ministry of Health/University Hospital of Reykjavik (ISL) which meets twice per year to exchange lessons and experiences within this field. Other initiatives are the *University Summer Course in Health Informatics (SUMIT)*, the *Nordic Telemedicine Association (NTA)*, the *Scandinavian eHealth conference*, the *Nordic Medico-statistical Committee*, and the *Nordic Social Statistics Committee*.

In addition, two relatively large projects are under way. One has received Interreg funding, and the other is evaluated by the EU eTen programme. The first, the *Baltic eHealth project* will connect national and regional health nets in the Baltic Region to the Nordic Healthcare Net, and will demonstrate clinical electronic co-operation in radiology and ultrasound services. The second, the *NorMa project* has the vision of creating a Nordic (and later European) market for eHealth services supported by the Nordic Healthcare Network (NHN).

*Conclusions:* Several potentially major benefits are associated with developing services on a Nordic Health net, one being the benefit derived from a larger market. The national markets for these services are small, and buying power remains in only a few hands. A larger Nordic market could increase efficiency. This, along with the similarities among Nordic countries, speaks in favour of opening the Nordic market by increasing co-operation in standardisation, concept development, and related issues. In many respects, the Nordic nations are front runners in health informatics. A functioning Nordic market could also form a home market for an export-oriented industry in Nordic health informatics systems.

## Concluding Remarks and Recommendations

Levels of activity and political interest are high within the sphere studied by this report. Strong political determination has contributed to the leading international position enjoyed by the Nordic countries. The Nordic countries have more similarities than differences as regards culture, traditions, and the organisation of health services. However, the countries differ in how far they have progressed with the various applications of IT in the health sector, and there are opportunities for learning from each other.

To fully exploit this learning potential, indicators should be developed that make it possible to assess and evaluate progress in the countries in a compatible way. This would yield useful information about one’s own achievements and show where useful lessons can be learnt.

Activities and initiatives for developing IT applications in the health sector are well established, and the field is advancing. However, progress has been slower in other social services. Hence, the social service sector could benefit from the lessons found in the health sector, e.g. the need to solve “sow-harvest” problems, the benefits of breaking down traditional boundaries and collaborating, the need for a co-ordinating body or a structural framework to overcome these obstacles, the importance of focusing on the real goal and not view digitalisation as an end in itself, and the importance of focusing initially on the need to improve services.

Co-ordination of actors is essential in the decentralised environment of the Nordic countries. The benefits from investing in communication are realised when development is co-ordinated. A more centralised process does not, however, necessarily imply that all communication should be co-ordinated. An important task is to identify the crucial information flows that need to be communicated between actors. Large-scale use of applications – and the organisational change this implies – requires co-ordinated programmes covering technical, economic, and organisational issues.

The Nordic countries can learn from each other when developing initiatives for IT in the health care sector. The social sector can learn both from the experiences in other Nordic countries and from the health care sector. There is a need to exchange lessons, experiences, ideas, and applications within the social sector. Co-ordinating bodies such as NOPUS (Nordiska Utbildningprogrammet för Utveckling av Social Service) could play an important role in the development of IT in the social sector. Within the health sector the Collaborative Network of Nordic eHealth Competence Centres is a group that has taken a multidimensional approach towards exchanging information about applications, barriers, and solutions.

Nordic co-operation can be expected to increase in the future as regards IT in health services. The Nordic countries have reached a stage

where the national level of development in this field has extended to a Nordic level. The Nordic health care network opens new opportunities for a Nordic market of health services, which will further enhance the need for Nordic collaboration. A Nordic market will benefit citizens and will enable a more efficient market structure for these services. To reap the benefits of this development, a suitable organisational structure with the appropriate resources, legal foundation, skills, and capacity is needed.

# Sammendrag

Denne rapport er resultatet af en undersøgelse, der på foranledning af Nordisk Råds sundheds- og socialministre blev gennemført af partnerne i Samarbejdsnetværket af Nordiske Kompetencecentre inden for eSundhed (MedCom/Danmark, KITH/Norge, STAKES/Finland, Sundhedsministeriet/Island og Carelink/Sverige). Rapporten beskriver brugen af IT i sundhedsplejen og den sociale sektor i de nordiske lande. Formålet med undersøgelsen er at forøge de nordiske landes muligheder for at lære af hinanden og samarbejde i større omfang.

IT indenfor sundheds- og socialektoren rummer muligheder for at opnå øget velfærd samtidig med en forbedring af systemernes effektivitet. Budgetterne bliver strammere og strammere, befolkningen ældre og ældre, arbejdstiden bliver dyrere, og folk kræver individuel tilpasset og sømløs pleje. Tilgængeligheden og kvaliteten af tjenesterne skal forbedres, og sektoren skal gøres mere attraktiv for fremtidigt personale.

eSundhed og eForvaltning er de definitioner, der bruges i litteraturen til at betegne IT inden for sundhedspleje og sociale serviceydelser. eForvaltning omfatter hele den offentlige sektor og dermed også de lokale myndigheders aktiviteter. Hensigten er at yde en bedre service, der leveres mere effektivt, alt sammen til gavn for borgerne, virksomhederne og den offentlige sektor. Det handler mere om forvaltning end om "e", og der fokuseres på en lang række spørgsmål, som f.eks. hvordan man kan samarbejde mere effektivt på tværs af organer og institutioner for at klare komplekse, fælles problemer, hvordan man kan øge kundefokus, og hvordan man kan opbygge samarbejdsrelationer til partnere i den private sektor. eForvaltning drejer sig ikke blot om at omdanne manuelle procedurer til IT-systemer.

Vi skal overvinde mange udfordringer, før vi kan høste fordelene af de seneste fremskridt. En af de største udfordringer handler om decentraliserede systemer og den store indsats, der kræves for at koordinere udviklingen. Omkostningerne ved og nytteværdien af investeringerne falder måske ikke inden for samme organisation, hvilket reducerer incitamentet. Desuden har dårlig ledelse i nogle tilfælde også forhindret ændringer, og det samme har love og regulativer. De tekniske problemer er reduceret i de senere år, men de organisatoriske problemer i denne proces bør ikke undervurderes. En anden vigtig opdagelse er, at aktiviteter baseret på markeds kræfterne, f.eks. udviklingen af digitale tjenester baseret på borgernes efterspørgsel og behov, synes at halte bagefter. "e" er ikke et mål i sig selv. Det er ikke nok blot at gøre nuværende administration og tjenester elektronisk tilgængelige.

## IT for sundhedspleje og sociale serviceydelser

Strategiske planer og foreslåede aktiviteter for IT-udvikling i sundhedssektoren i de nordiske lande fokuserer på de samme komponenter. At dele informationer er et overordnet mål, hvilket involverer aktiviteter i forbindelse med elektroniske patientjournaler (EPJ) /elektroniske sundhedsjournaler (ESJ), sikkerhed, telekonsultationer, klassifikation og standardisering, regulering og webbaserede tjenester. Men det er finansieringen og systemets struktur, der definerer sammenhængen og udfordringerne.

**Sverige** har ikke en fuldt udviklet IT-strategi på nationalt niveau for sundhedssektoren. En strategigruppe, der blev nedsat i 2003 arbejder dog på udviklingen af IT-strategier. Gruppen dækker flere sektorer af samfundet, herunder sundhedssektoren. De svenske amtsråd er relativt uafhængige, og de har deres egne strategier for IT-udvikling og samarbejder på frivillig basis. Det nationale sundhedsnet, Sjunet, blev indført i 1998-2000. Siden 2003 har teknologien været baseret på VLAN, som er adskilt fra internettet. I **Danmark** er det nationale net blevet udviklet fra regionale net og pilotprojekter over hele landet i midten af 1990'erne. Nettet blev overført til internettet i 2002. Den nuværende strategi blev lanceret i 2003, dvs. "National strategi for indførelse af informationsteknologi i sundhedssektoren 2003-2007". Det altoverskyggende formål med denne strategi er at sikre, at fælles informationer danner grundlaget for sømløs pleje og patientengagement. **Norge** er nu i gang med sin tredje nationale plan for eSundhed. Den foregående plan, Si@!, fokuserede på elektronisk kommunikation inden for sundhedssektoren og den sociale sektor, telemedicin, nationalt sundhedsnet og offentlig information. Det nationale sundhedsnet blev indført på basis af regionale net i 2003. Planen for 2004-2007, dvs. Te@mwork 2007 (S@mspill 2007), har to fokuspunkter. Det første fokuspunkt er at forbedre informationsstrømmen yderligere mellem de parter, som allerede er begyndt at samarbejde elektronisk. Planens andet fokuspunkt vedrører tilføjelsen af nye parter, som f.eks. kommunerne. På **Island** omfatter strategien for udviklingen af et informationssamfund (2004-2007) også målsætninger for sundhedssektoren. Et vigtigt mål er at etablere et sundhedsnet, som skal sammenkoble alle institutioner inden for sundhedssektoren inden udgangen af 2006. I **Finland** har regeringen for nylig taget initiativ til fire programmer, hvoraf ét er et program for informationssamfundet. Kommunikationsteknologi i sundhedssektoren er en vigtig bestanddel af dette program. Strategien dækker planer for sømløs social velfærd og sundhedspleje og et elektronisk regionalt informationssystem. Strategierne på nationalt niveau suppleres af strategier på **europæisk** niveau. Handlingsplanen eEurope 2005 opstiller flere politikker og målsætninger vedrørende brugen af IT i sundhedssektoren inden for områder som elektroniske sygesikringskort, online-tjenester og sund-

hedsinformationsnet. I april 2004 præsenterede Kommissionen en handlingsplan for eSundhed i Europa. Hensigten med denne plan er den samme som i de nationale strategier for eSundhed i de nordiske lande.

Denne rapport viser, at nogle af landene er kommet længere end andre, hvad angår eSundhed. Sverige, Danmark og Norge har nationale net og er nu mere opmærksomme på de aktiviteter, der er nødvendige for at øge kommunikationen på disse net, f.eks. sikkerhed, regler, standardisering og applikationer. At involvere flere aktører og øge samarbejdet og kommunikationsstrømmen er også vigtige ambitioner på dette stadium. Manglende koordination er en barriere for IT, og alle nordiske lande har oprettet organisationer med det formål at koordinere og fremme brugen af IT i sundhedsplejen. Der er taget flere initiativer, der sigter mod koordination, ikke kun mellem de forskellige organisationer i sundhedssektoren i hvert enkelt land, men også mellem de enkelte sektorer.

## Eksempler på IT-samarbejde og serviceudvikling

Erfaringerne fra eForvaltning og eSundhed har vist, at en af de største udfordringer, landene står over for, er samarbejde mellem organer, kommuner og andre aktører om at høste fordelene ved de teknologiske fremskridt. En anden udfordring er at fokusere på effektivitet og udvikling af tjenester i henhold til borgernes behov og ikke på digitaliseringen i sig selv.

SATS-projektet i Norge, med det formål at øge koordinationen mellem arbejdsmarkedet og de sociale sikringssystemer, er et eksempel på IT-baseret udvikling, hvor digitalisering af informationer er en del af en stor institutionel reform, der sigter mod at forbedre effektiviteten i organisationer og tjenester for sårbare grupper. Også andre nordiske lande planlægger elektronisk kommunikation mellem det sociale sikringssystem og sundhedssektoren. I Sverige drøfter de svenske skattemyndigheder (Skatteverket), socialstyrelsen, Carelink og den svenske socialforsikringsstyrelse (Riksförsäkringsverket) i fællesskab mulighederne for at overføre dokumenter elektronisk mellem sundhedssektoren og disse organer med det formål at spare penge og reducere behandlingstiden. I Danmark dækker eForvaltningsprojektet mange af de aspekter, der kræves for at realisere et samarbejde mellem organerne, og der er iværksat et gensidigt, tværgående initiativ til fremme af interoperabilitet og kommunikation mellem myndigheder. En del af eForvaltningsprojektet i Danmark fokuserer på udsatte børn og unge. Målet er at bruge IT til at opnå forbedrede rutiner, bedre overensstemmelse mellem behov og indgreb, bedre styring af informationssystemet og nemmere internt samarbejde mellem offentlige myndigheder. Dette er et eksempel, hvor digitalisering ikke er målet i sig selv, men et middel til forbedret service. Regionalt samarbejde kan også forbedre servicen. I Finland er

den specielle socialforsorg delt mellem ni samarbejdende regionale ekspertcentre inden for socialforsorg under projektet eKonsultation.

Hjemmeplejen for ældre og andre målgrupper er i øjeblikket inde i en rivende udvikling i alle de nordiske lande, og IT spiller her en vigtig rolle. Nye koncepter og nye applikationer udvikles for at forbedre de ældres og de handicappedes muligheder for et selvstændigt liv gennem teknologiske hjælpemidler. At sikre sømløs pleje og koordination mellem organisationerne er af afgørende betydning i denne udvikling.

Applikationerne inden for eSundhed kan kategoriseres inden for administrativ support (som f.eks. ESJ), telemedicin, e-meddelelser (som f.eks. e-recepter og e-henvisninger), webbaserede sundhedsoplysninger, e-uddannelse og vidensdatabaser (som f.eks. kvalitets- og resultatregistre).

Mange applikationer er stadig på projektstadiet og er endnu ikke udbredt i større omfang. Aktivitetsniveauet er højt, og set fra et europæisk perspektiv er de nordiske lande på forkant med brugen af IT i tjenester inden for sundhed og socialforsorg.

Der er gode muligheder for at udveksle gode eksempler mellem landene og udveksle erfaringer med modparter. Fordelene ved det nordiske samarbejde udspringer også af, at de nationale markeder for disse tjenester er små. Et større nordisk marked kunne understøtte øgede markedsmekanismer. I dag er de tre nationale net i Sverige, Norge og Danmark forbundet teknisk i et nordisk sundhedsnet (NSN).

## Afsluttende bemærkninger og anbefalinger

For fuldt ud at udnytte de muligheder for at lære, der findes i og mellem landene, skal der udvikles indikatorer, der gør det muligt at vurdere fremskridtet i landene på en sammenlignelig måde. Dette ville give nyttige oplysninger om ens egne præstationer og vise, hvor man kan lære noget nyttigt.

Aktiviteterne til udvikling af IT-applikationer i sundhedssektoren er forøget, men fremskridtet har være langsommere inden for andre sociale serviceydelser. Den sociale servicesektor kunne drage fordel af det, man har lært inden for sundhedssektoren, f.eks. behovet for at løse "så-høste"-problemer, fordelene ved at nedbryde traditionelle barrierer og samarbejde, behovet for et samarbejdsorgan og vigtigheden af at fokusere på behovet for at forbedre tjenesterne.

De nordiske lande har nået et stadium, hvor det nationale udviklingsniveau på dette område er udstrakt til også at gælde på et nordisk plan. Dette er til dels et resultat af Samarbejdsnetværket af Nordiske Kompetencecentre inden for eSundhed, en frivillig gruppe til erfaringsudveksling og fælles aktiviteter vedrørende ICT i sundhedsplejen. Men dette nordiske samarbejde skal styrkes og struktureres yderligere ved hjælp af

passende ressourcer, lovgrundlag, kompetencer og kapacitet, så man kan udvikle og udnytte fælles løsninger yderligere. Det nordiske sundhedsnetværk, som forbinder de nationale sundhedsnetværk i Danmark, Norge og Sverige, åbner ny muligheder for et nordisk marked for sundhedstjenester. Dette giver øgede muligheder for serviceudvikling og forbedret effektivitet.



# Introduction

Governments are under pressure to deliver more value for taxpayers' money. Administrations have to deliver more and better services with equal or fewer resources. The challenge is to achieve productivity growth in the public sector to create more opportunity for service improvement without increasing the cost. Moreover, as the population becomes older, public administrations will have to manage with fewer employees and fewer working taxpayers, while having to provide largely the same number of services at a higher level of quality. Civil servants demand more interesting jobs, with more opportunity for self-development and personal interaction.

IT is not a universal solution for all challenges, but it may reduce the stress on the public sector and create new opportunities. IT in public services can enable improvement and more efficiency in administration. IT can improve the development and implementation of public policies and help the public sector cope with the conflicting demands of delivering more and better services with fewer resources.

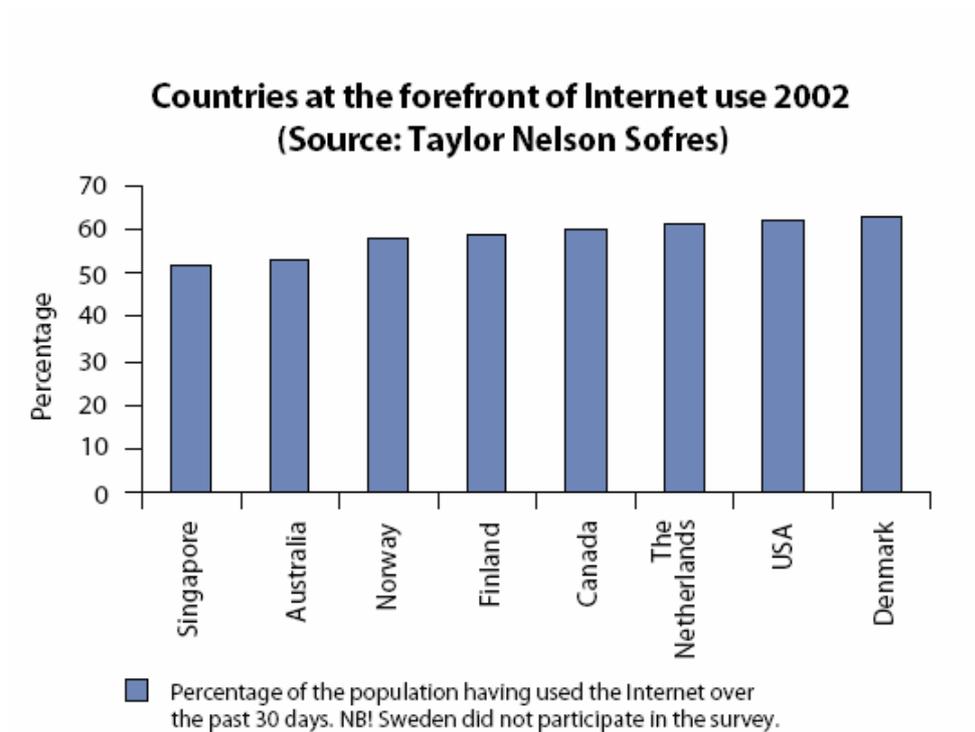
This report studies the use of IT in the health and social sectors in the Nordic countries. The purpose of the study is to contribute to the possibilities for the Nordic countries to learn from each other and co-operate. The countries studied are Denmark, Finland, Sweden, Iceland, and Norway.

The study consists of two parts. To provide a framework for IT in the health and social sectors, *Part A* describes IT in society at large, followed by a study of "eGovernment" in the Nordic countries. *Part B* of the report focuses on the use of IT in the health and social sectors. Key aspects of these sectors are studied, e.g. strategy, infrastructure, applications, collaboration, and services for specific groups.



# Part A – Use of IT in the Nordic Countries

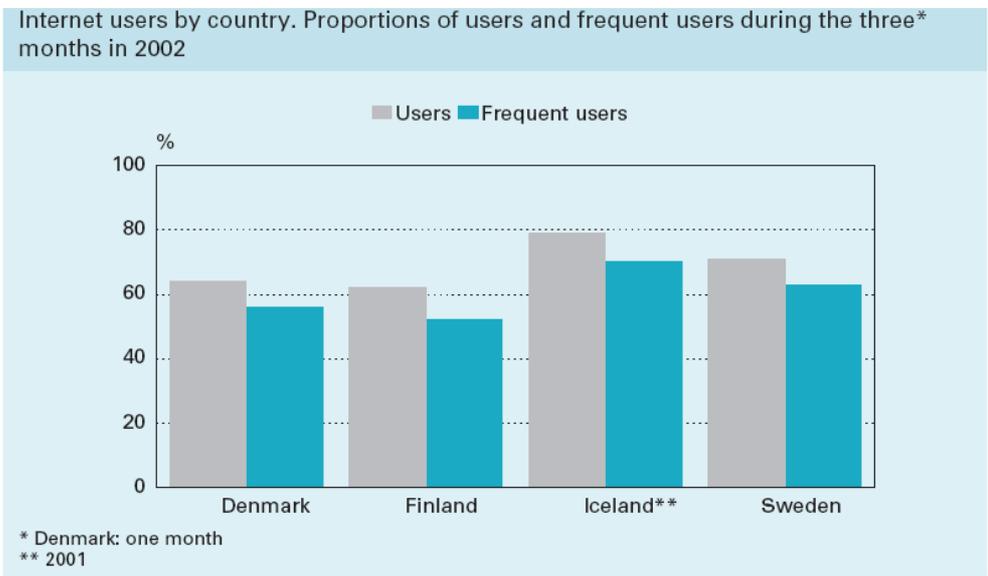
This section briefly describes the use of IT as measured by selected indicators. The overall development of IT provides a framework for the development of IT within health and social services.



The figure above shows that the Nordic countries have a relatively high degree of Internet use. Another study, which includes Sweden and Iceland but excludes Norway, shows differences between the Nordic countries. Sweden and Iceland had the highest percentage of both of Internet users and frequent users<sup>8</sup> (see figure below).

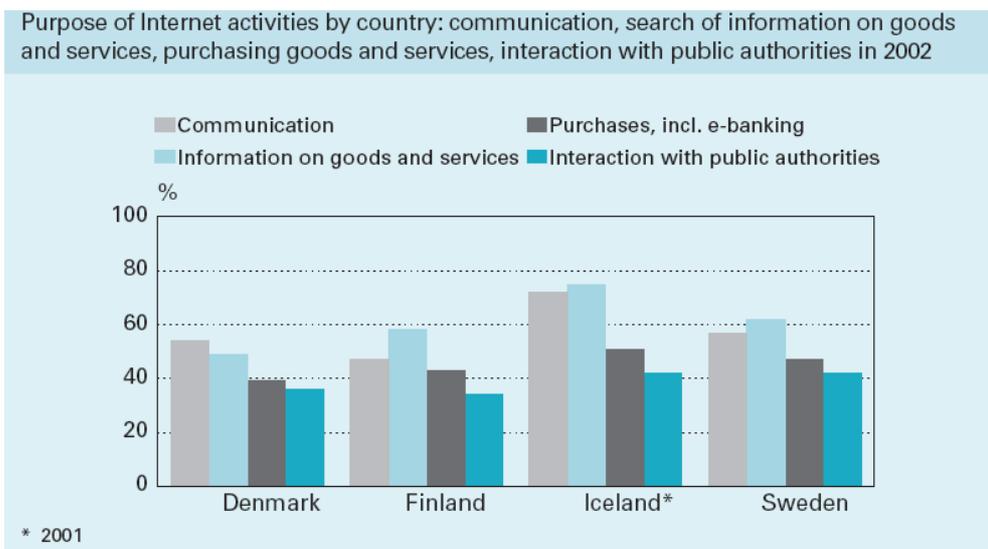
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<sup>8</sup> Weekly users



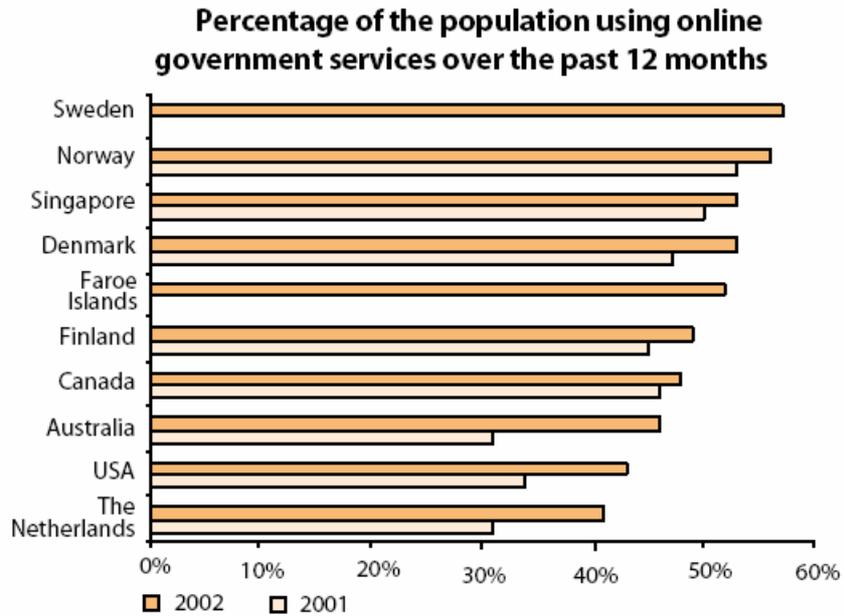
Source: Nordic Information Society Statistics 2002

Individuals in the Nordic countries mainly use the Internet to communicate and to search for information. Icelanders score the highest rates in information searches (75 percent) and communication (72 percent). Interaction with public authorities is a relatively less frequent use of the Internet, while communication (i.e. e-mail) is generally the most common activity. Over half of the adult population (and over 80 percent of Internet users) in Sweden and Denmark use e-mail in regular communication. The Finnish net users are relatively more engaged in information searches. Internet, as a tool for interaction with public authorities, is most frequently used in Sweden and Iceland.



Source: Nordic Information Society Statistics 2002

International comparisons show that Scandinavians are among the most active when it comes to contacting the public sector via the Internet<sup>9</sup>.



Source: e-Norway Status report January 2003

About 90 percent of the computer users (65 percent–70 percent of the total population) use a computer at least weekly, the proportion of the daily users being 45 percent to 62 percent in the total population. Most computer users are not dependent on the equipment offered by their place of employment. People in Sweden use a computer at the workplace more often than people in Denmark or Finland, but only 7 percent to 11 percent of the computer users had used a computer only at work. The proportion of computer users who use it only at home varies from between 16 percent to 20 percent in Finland and Sweden to 35 percent in Denmark.

The digital divide is clear. Internet users can be divided according to gender, age, education, and region. Men are slightly more active than women in using the Internet. The gender difference in Finland, Iceland, and Sweden is only 2 to 5 percentage points, but in Denmark 69 percent of men versus 60 percent of women had used the Internet during the past three months.

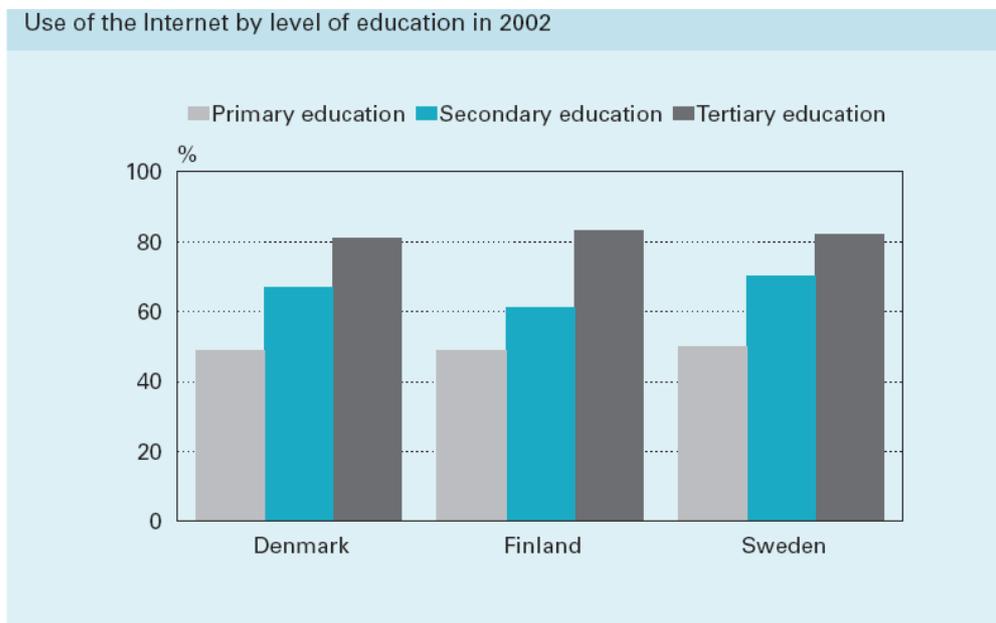
In the Nordic countries about 74 percent to 88 percent of people aged 16 to 49 years have access to a home computer, but after the age of 50, the access rate declines somewhat. Home computers are not very common among the oldest age group. People aged 60 years and older have by far the lowest rate of access to IT appliances at home.

<sup>9</sup> Norwegian Ministry of Trade and Industry, “e-Norway, Status Report January 2003”

Access to computer at home by age and country in 2002				
Age	Denmark %	Finland %	Norway* %	Sweden %
<b>All</b>	<b>77</b>	<b>63</b>	<b>76</b>	<b>75</b>
16–29	87	76	83	83
30–49	86	74	86	88
50–59	76	60	75	75
60–74	47	28	38	44
* 2001				

Source: Nordic Information Society Statistics 2002

All Nordic countries clearly show a *digital divide* by level of education. Half of the population with basic education are Internet users while 80 percent to 90 percent of the highly educated visit the web at least once every three months. Between countries there is some difference in the secondary education group, with 73 percent of Internet users in Sweden, followed by 67 percent in Denmark and 61 percent in Finland.



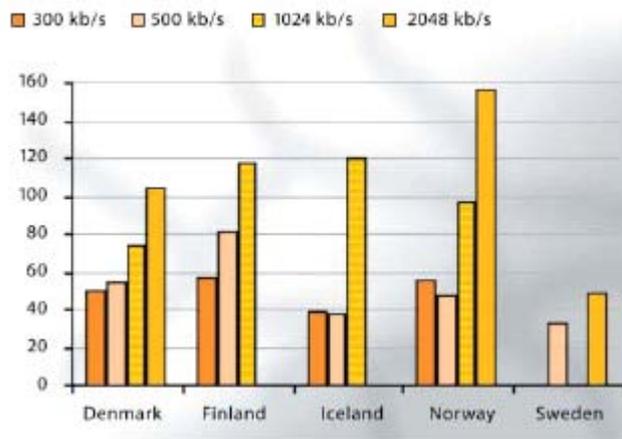
Source: Nordic Information Society Statistics 2002

Geographic location is another explanatory factor in the use of IT. In the Nordic countries as a whole, however, geography (i.e. population centres vs. other areas) has a weaker impact than age and education. Concerning Internet access at home, there is a fairly evident difference in Finland between the Helsinki metropolitan area (62 percent with an Internet connection at home) versus the rest of the country (51 percent). In Denmark and Norway the difference is 6 to 8 percentage points. In Sweden, hardly

any distinction can be found between greater Stockholm and the rest of the country.

Comparing prices in the Nordic countries reveals substantial differences. Sweden has the lowest price levels and Norway the highest.

**Price comparison of broadband<sup>10</sup>.  
Private market.**



Source: Norsk Telecom AS

## Conclusions

The data presented in this section show that from an international perspective the Nordic countries are at the forefront, but there are also other countries where the citizens use the Internet at the same level or more. Some differences were identified between the countries, but above all there are challenges that the Nordic countries clearly have in common.

The digital divide is a common challenge shared by the Nordic countries. Age and level of education are the most apparent factors dividing the population. This fact is important given the focus on IT as an enabler for public services, for health services, and care for elderly.

Use of the Internet to interact with public authorities is lower compared to its use for information searches and communication. A possible conclusion here is that a large potential exists for the public sector to improve electronic services for populations that are already familiar with electronic communication and information in other sectors.

<sup>10</sup> Norwegian Telecom AS has obtained prices from broadband providers across the Nordic market. The currency is the Euro and prices are for monthly subscription fees with no additional connection charges, etc.



# IT Strategies

This section presents the IT strategies used in the Nordic countries. The aim is to describe the main strategic goals and priorities stated by the governments in this political area, and how they address the challenge to enhance the use of IT for all groups in society. The results of political action plans are described when available. However, we focus on the plans that are most relevant for our purposes, i.e. topics that concern IT in the public sector. The challenges and advantages that can be observed at the overall level are relevant for outcomes in the sectors we focus on.

## European Level

The national IT strategies should be viewed in light of the EU strategies in eEurope 2005. eEurope is part of the Lisbon strategy aiming to make the European Union the most competitive and dynamic knowledge-based economy, with improved employment and social cohesion by 2010. This action plan will succeed the eEurope 2002 action plan from June 2000.

eEurope 2005 aims to stimulate secure services, applications, and content based on a widely available broadband infrastructure. It focuses on the security of networks and information, eGovernment, eLearning, eHealth, and eBusiness. It recognises that services depend on the availability of broadband, while funding broadband infrastructure depends on the availability of new services to use it. Hence, it applies measures to address both sides of the equation. On the demand side, actions on eGovernment, eHealth, eLearning, and eBusiness are designed to foster the development of new services. On the supply side, actions on broadband and security should advance the roll-out of infrastructure.

The goals of eEurope 2005 are that by 2005 Europe should have:

- modern online public services such as eGovernment, e-learning services, and e-health services
- a dynamic e-business environment
- widespread availability of broadband access at competitive prices
- a secure information infrastructure

Four categories of tools are used to reach the goals, namely policy measures, good practices, benchmarking, and co-ordination of existing policies. Firstly, policy measures imply reviewing and adapting legislation at the national and European levels. Key targets are:

- Connect public administrations, schools, and health services to broadband
- Interactive public services, accessible for all, and offered on multiple platforms
- Provide online health services
- Remove obstacles to the deployment of broadband networks
- Review legislation affecting e-business
- Create a Cyber Security Task Force

Secondly, eEurope has the ambition to facilitate the exchange of experience, of good practices, and demonstration projects, and to share the lessons from failures. Thirdly, policy measures will be monitored by benchmarking the progress made in achieving the objectives. Fourthly, an overall co-ordination of existing policies will bring out synergies among proposed actions. A steering group will provide a better overview of policy developments and ensure good information exchange between national and European policy makers and the private sector.

In September 2003, the Commission adopted a special communication on the role of eGovernment in Europe. The communication signalled the importance of eGovernment for public administration in Europe. The Commission has called upon Member States to express their political commitment to co-operation at a European level and to accelerate the development of eGovernment.

The background for the communication is the prominent role that the public sector has in Europe's social and economic welfare and the challenges it meets with economic, demographic, and social conditions. Many barriers and obstacles must overcome before widespread take-up of eGovernment can be achieved. In its Communication, the Commission calls for strong political leadership and commitment from the Member States to achieve the modernisation of public administrations, with the help of eGovernment.

Measures foreseen in the Communication to address these issues include exchange of good practices, support from European Union R&D, piloting and implementation programmes, and above all the initiatives and action plans at national, regional, and local levels.

The Lisbon strategy is not simply about productivity and growth, but also about employment and social cohesion. Against this background, eEurope 2005 also focus on achieving “an Information Society for All”. This means overcoming social and geographical differences, ensuring an inclusive digital society that provides opportunities for all, thus minimising the risk of ‘digital divide’. One important tool to achieve this is to ensure multi-platform provision of services. It is generally accepted that not everyone will want to have a PC. Making certain that services, especially online public services, are available over different terminals such as

TV sets or mobile phones is crucial to ensuring the inclusion of all citizens.

## National Strategies for IT

### *Sweden*

In March 2000, the Government in Sweden established objectives for an IT policy<sup>11</sup>.

The action plan has three prioritised areas:

- Confidence in information technology
- Competency to use information technology
- Information society services available to all

The goal is that households and companies in all parts of Sweden will have access to an IT infrastructure with high-speed connections within the next few years. This will be carried out primarily by the market. The policy states, however, that the State has an overall responsibility and, among other things, shall promote a good IT infrastructure with high-speed networks. Government funding has been made available to establish regional networks and to facilitate access to the broadband network in sparsely populated areas.

State involvement in this area can be summarised as follows: 1) At the backbone network level, all the main urban centres in the municipalities are linked to each other with a cable that is available to all operators on commercial terms. The Swedish National Grid finances this investment. 2) The network that links together urban centres receives a subsidy for approximately one third of the cost. 3) For urban networks, and property networks, the state will give tax relief to private persons and municipalities. This part of the network is the largest and most expensive, so state funding constitutes no more than 10 percent to 15 percent of the total cost.

To further increase the availability of IT, the national tax law was reformed, i.e. the *personnel computer reform*, which offers a tax subsidy to private persons purchasing a personal computer (PC). In 1998, the Swedish Government introduced a new tax reduction or “write-off” for all companies supplying their staff with personal computers, regardless of the employee’s position and need of a PC in their work. The income tax on individuals who receive the “fringe benefit” of a subsidised computer was also removed. In practice, most employers offered to buy their personnel a “private personnel computer” at a heavily subsidised price. Trade unions and other organisations, e.g. associations for retired people,

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<sup>11</sup> prop. 1999/2000:86 “An information society for all”

also offered computers. The “personnel computer reform” has been a major benefit for workers, mainly blue-collar, who are members of the Swedish Trade Union Confederation (LO).

Furthermore, private persons and businesses can receive tax write-offs for the costs of connecting to networks that significantly enhance communications capacity above that provided by the ordinary telephone network.

There are several new laws in this area. On January 1, 2001, new legislation concerning electronic signatures came into force. This law proposes how EU rules on electronic signatures shall be implemented in Sweden. Another new law on “electronic trade and other information society services based on EU directive 2000/31/EU” was accepted by the Swedish Parliament in June 2002. The purpose of this law is to promote electronic commerce.

Since 1994, the Swedish Government has had a commission to study IT (i.e. the Swedish ICT Commission). The commission carries out analyses and indicates future opportunities in the area of ICT. The commission also promotes the widespread use of ICT. The ICT Commission has submitted an action programme to stimulate growth of these broad-based services. The Government has not taken a stand in relation to the ICT Commission’s proposals. The programme consists of two main segments:

- long-term investments in broad-based information. It should be possible to use different types of information in society in tandem, by many users and for many purposes.
- continued development of broadband.

A strategy group established in 2003 is working on the development of IT strategies. This strategic group covers several sectors in the economy, including the health sector. The group shall advise the Government and be a driving force behind policy goals. Its duties consist of strengthening collaboration for competition, identifying the role of the state, analysing the social and cultural effects of IT, and making certain that infrastructure is available and secure.

In the short term, its tasks are to create co-operation within and between the ministries and between agencies, counties, and municipalities. Furthermore, it will collect and exchange information about good examples.

### *Denmark*

In 2003 the Danish Government presented an IT and Telecommunications Policy Action Plan entitled “IT for All”, including 37 initiatives in

the following areas: IT in the Danish business sector, IT and communications in the public sector, and IT for citizens.

In autumn 2003 the Government concluded that 30 of the 37 initiatives in the plan from the previous year had been realised, and that the remaining ones are being implemented.

The most significant initiatives are:

- Following the analyses of the telecommunications sector, initiatives have been taken to ensure that the telecommunications market functions more efficiently. These measures include deregulation of the market and the promotion of competition.
- The framework for IT security has been improved. Since mid March 2003, all citizens have been able to obtain a digital signature certificate free of charge.
- A better environment has been created for developing eGovernment, e.g. a much broader scope has been provided for sharing, exchanging, and reusing data in public IT systems by virtue of a common data standard (XML3).
- Effective from January 2002, a modernised home PC scheme has been launched to increase the number of home PCs and the ability of the Danes to use IT. A scheme for tax exemption on computers paid by the employer started already in 1997. The arrangement gave employees an opportunity for free access to computers paid for by the employer. Since then, the scheme has been successful in contributing to the wide diffusion of computers in Danish households.
- An action plan for e-commerce was launched in September 2002, and followed in January 2003 by an action plan for the use of IT and telecommunications by disabled persons, entitled “Disability No Obstacle”.
- Under the Danish EU presidency, a resolution was adopted in December 2002 to determine the framework for implementing the action plan eEurope 2005.

Based on these results, the Government argues that the “IT for All” initiative has laid the groundwork for a serious effort in the field of IT and telecommunications – an effort to be followed up by a variety of new initiatives. The current action plan continues on from where the last one ended in reaching the stated goals that the policy should contribute to create growth in business and industry, reform the public sector, and qualify Danes for the future knowledge society.

In Denmark, Internet connectivity of at least 256kbit per second should be extended by June 2005 to more than 95 percent of Danish households. Ninety percent will have access to 512 kbit per second, and over 70 percent will have access to 2mbit per second.

The Government recognises the positive development of IT and telecommunications in Denmark, but states that Denmark has reached a stage in development of IT that calls for greater awareness of the effect of the resources spent. Several new initiatives were presented in the action plan of 2003. Examples of particular relevance for this report include less price regulation in the telecommunication market, better coverage, and increased competition in the ADSL market.

### *Norway*

In May 2002, the Ministry of Trade and Industry presented the policy for information technology of the Norwegian Government, *e-Norway 2005*.

The Government has set three primary targets for its IT policy:

- Creating value in industry
- Efficiency and quality in the public sector
- Involvement and identity

To reach the political goals, the actions are divided into five focus areas.

A good framework for eNorway
A modified and updated set of regulations
A climate of value creation
An attractive environment for electronic commerce.
Research for innovation and value creation
Accessibility and security
Access to an electronic communication infrastructure
Widespread broadband roll-out
Use of electronic signatures by the general public
A culture of security
Robust infrastructure and information systems
Skills for change
IT in education and learning
Access to a skilled workforce
Business skills
Skills through participation
Attractive content
Access to diverse content
A competitive content industry
Access and the role of the Government
Counteracting illegal and harmful content
A modern public sector
Better organisation and effective solutions
User-oriented electronic services
Simplified reporting
The public sector as a customer

A stated challenge for the Government is to make the public sector more efficient with new and improved services. This approach recognises that resources must be transferred from administration to service production, and that IT investment alone does not necessarily make Government more effective. Although several Government agencies have advanced far with IT, progress has generally been too slow. Progressing on from the project stage is essential to realise large-scale benefits in this area.

The target of “efficiency and quality in the public sector” is closely related to “involvement and identity” since the Internet is an important channel for dialogue between local inhabitants and the authorities. The political task as stated in the IT policy is not merely to counter the formation of new social gaps, but to ensure that technology becomes a factor in diminishing traditional “analogue” disparity. Comparatively simple adjustments can be made to ensure that both the private and public sectors are able to reach larger customer groups and at the same time improve deployment of human resources, according to the Government.

Accessibility to, and the security of, information systems, services, and Internet use are critical prerequisites for realising an information society. The Government sees its role as a motivating force in the roll-out of broadband and establishment of electronic signatures. Its responsibility also includes access to telecom services throughout Norway and securing information systems.

For each area of commitment, the Government has created sub-goals and defined flagship projects, with details of deadlines and responsible bodies.

Some of the expressed sub-goals include:

*A modified and updated set of regulations*, to give online government and traditional services equal standing without obstruction of regulations. The Government initiated a national project, called the “eRegelprosjektet”, at the end of the 1990s. The objective was for electronic communication to be equal in terms of acceptance, inspiring confidence, and having the same legal validity as traditional written communication. Norwegian legislation was reviewed in connection with the project to chart existing obstacles to electronic communication. Thirty-nine laws and several regulations have now been amended. The project will be continued to assess the need for further regulatory amendments and thereby facilitate greater efficiency and the creation of new value in society.

*Access to an electronic communication infrastructure*, with competing market players in charge of building and selecting technology.

*Broadband roll-out* on the market in all regions of Norway. Primary schools, public libraries, and local authority administrative services should be given the option of broadband connection at a competitive price during the course of 2005. All colleges of secondary education should have been offered an equivalent scheme before the end of 2003. An aim during 2002 was to make broadband connection available to hos-

pitals for interoperable health networks. The roll-out of the broadband network has not proceeded as quickly as expected. Some reasons are:

- The readiness and ability to invest in the telecommunications sector has dropped significantly during the past two years
- There is not satisfactory competition in the Norwegian broadband market
- Few developed broadband services fully exploit the possibilities
- Users are not always aware of the value of broadband
- Poor co-ordination of the work on constructing relay routes for telecommunications networks

The Government will maintain the scheme regarding tax-free use of employers' computer equipment and tax-free coverage of costs associated to home PCs and broadband for PC use.

The ministries are responsible for realising the intentions of eNorway. The role of the Ministry of Industry and Trade is solely to guide and give advice.

#### *Evaluation of eNorway*

The Government has followed up eNorway 2005 with status reports, weighing results against the IT policy objectives. An evaluation in June 2003 found that the broadband market, after getting off to a slow start, has been making marked progress, but regional variations in service and quality still exist. Around 25 percent of Norwegian households connected to the Internet are expected to have broadband soon. The situation varies, but seems to be improving, for local authorities, libraries, and schools connected to the Internet. Most health enterprises and institutions have a broadband connection and the healthcare Internet provider.

As in many countries, the process of introducing electronic signatures is progressing more slowly than expected. Only two e-signature providers are currently on the market, although there are a number of users. In May, Rikstrygdeverket (the National Insurance Service), launched a national roll-out of PKI-based e-signatures for the health sector.

Carrying out the eNorway 2005 plan is based on resources from the parties involved. For example, the strategic plan for the health care and social sectors, Si@, had funding of 221 million NOK for the period 2002–2003. Some pilot projects of common interest for the public sector as a whole, are also identified:

- The AltINN project – a system where citizens may obtain information from, communicate with, and report electronically to official agencies.
- A common infrastructure for PKI
- A common information architecture for the public sector

An evaluation of eNorway in June 2004 shows that the availability and use of computers and Internet in Norway has increased substantially in the past few years – 74 percent had a stationary computer at home in 2004, compared to 60 percent in 2001, and 78 percent had accessibility to the Internet, compared to 58 percent in 2000. Furthermore, the evaluation reported that the development of broadband, eLearning, and the regulatory framework in Norway is satisfying, while more effort is needed to improve use of the technology for innovation and organisational development. Progress on digital signatures, PKI, and security is not satisfying and it appears that large groups still have problems in using the technology.

### *Iceland*

The strategy for an information society entitled “Resources to Serve Everyone” (presented in April 2004) states that the IT policy rests on four main pillars: seizing opportunities, ushering in change in a responsible manner, ensuring security, and enhancing the quality of life.

The future vision is expressed in the main objectives as follows:

#### **Opportunity**

Individuals and companies shall be provided with increased opportunities for exchanging and seeking knowledge, communicating, and conducting business wherever and whenever they wish.

#### **Responsibility**

Leaders in every area of society must shoulder responsibility and cooperate so that information technology will be used for the benefit of citizens and so that diverse individuals will be able to benefit from it.

#### **Security**

Citizens and companies shall be guaranteed access to a secure, reliable, high-speed network at competitive prices. The security of information and the protection of personal privacy shall be guiding principles in developing the information society.

#### **Quality of Life**

Added quality of life and a richer society shall be supported by exploiting the potential of information technology in education, culture, and health along with other community sectors.

The availability of broadband is relatively good in Iceland. Nearly all communities in the countryside have high-speed connection, and many of the homes are connected to the Internet.

### *Finland*

The operating strategy for development of information society policies lies within the Ministry of Transport and Communications. The communications policy addresses goals for the information society, e.g. to achieve balance between regions and population groups and to reform the structure and service of public administration in a user-friendly and secure way.

In its operating strategy for 2004–2007, the Ministry proposes that an information society council, chaired by the Prime Minister, should be established. This council would be responsible for information society matters and would include all ministers as members.

The strategy points out that, as an information society, Finland has advanced farther in a shorter period than most countries. A critical factor in an information society, according to the Ministry, is how the Finnish strengths in communications infrastructure and services can be turned into success factors in service production and extensive usage.

The communications policy should ensure that citizens and businesses in the information society have access to high-quality and inexpensive communication services. In addition, the operating strategy indicates that information society policy extends into several areas, thus requiring measures in all administrative sectors.

An important objective of the 2004–2007 financial period is to ensure that all users have access to broadband communications by the end of 2005. The Ministry will review the provision of alternative broadband connections in all communication networks and, if necessary, promote their selection. The access provision is based on commercial principles without direct financial involvement of the State. Investments in network security are another prominent objective.

The way to a safe and competitive network environment is through co-operation, in which the Ministry's administrative sector plays a central role. The Ministry's aim is that by the end of the financial period, Finland will be a secure society that enables everyone to safely manage and transfer information.

The Act on the Protection of Privacy and Data Security in Telecommunications will be amended. The reformed Act will ensure confidentiality of communications and protection of privacy in new services.

## Conclusions

The relatively high use of IT, from an international perspective, has been made possible by a strong political will at both the European and the national levels to develop IT services. Stepping into the information society is a multidimensional task. Many steps must be taken, and both political initiatives and market actions are needed and complement each other.

The Nordic countries have extensive, multidimensional strategies to develop information societies. IT is intended to serve several purposes and benefit the welfare of citizens and enhance efficiency in the public sector and the competitiveness of industries. Countries expect to reach these goals by achieving several sub-goals. However, the overriding aim in the countries studied is to make IT available, secure, and affordable. This is intended to create opportunities for reaping the fruits of the information society, including diminishing the digital divide and improving both the quality and efficiency of their large and financially strained public sectors.

Generally, the overall goals to be achieved by the information society are identified in terms of IT for economic growth, employment, democracy, regional development, and quality of life. The countries focus on specific tasks that have been identified as crucial to the development of an information society and which are a responsibility for the national level. Strategies and action plans are formulated to achieve these tasks.

Crucial tasks that are the focus of strategic plans include:

- security, standardisation, and regulatory framework
- availability, including subsidising broadband and schemes for home PCs
- development of IT in the public sector
- IT skills and IT in learning e-commerce and a functioning market

While some of the countries, e.g. Norway and Denmark, have updated plans of action that are systematically and regularly evaluated according to well-defined goals, others are less rigorous in their documentation on ambitions and results. Although these variations in the outcomes achieved by the different countries are presently unclear, it is possible that they may be identified in the future.

All countries are making considerable efforts and adjusting political priorities to decrease the digital divide. Nevertheless, the digital divide is still substantial, as reported in the previous section. This fact represents a challenge that influences the groundwork for IT development in the health and social sectors.



# eGovernment in the Nordic countries

The reforms in eGovernment build a framework for developing IT in the health and social sectors. Concurrently the development of strategies for eGovernment in various public sectors may benefit from the lessons of the health sector, which is relatively advanced in these matters. This section examines the concept of eGovernment in the Nordic countries by analysing relevant strategies, ambitions, and results.

In the Nordic countries it might be more appropriate to use the term “public sector” instead of “government”. In most contexts the meaning is the same; however, public sector is more suitable in countries where the local authorities are primarily independent and distinct from the state authorities. The international literature frequently refers to eGovernment and eHealth. Hence, we use these terms in this report as well.

## What Is eGovernment?

eGovernment means better service delivered more efficiently for the benefit of citizens, businesses, and the public sector. It describes a broad range of activities relating to the use of IT in the public sector – at the central government level, the regional level, and the local level. It is more about government than about “e”, and focus on issues such as: how to collaborate more effectively across agencies to address complex, shared problems; how to enhance customer focus; and how to build relationships with private sector partners.

eGovernment services should be oriented to the customer (citizen/business), not to the service provider. eGovernment is service delivery, independent of place and time. eGovernment is, hopefully, a single interface to government.

eGovernment also implies inter- and intra-governmental co-operation. Data can be a shared resource. When data are collected, controlled, and stored in governmental databases, new control procedures can be saved, and it will not be necessary to send the data again.

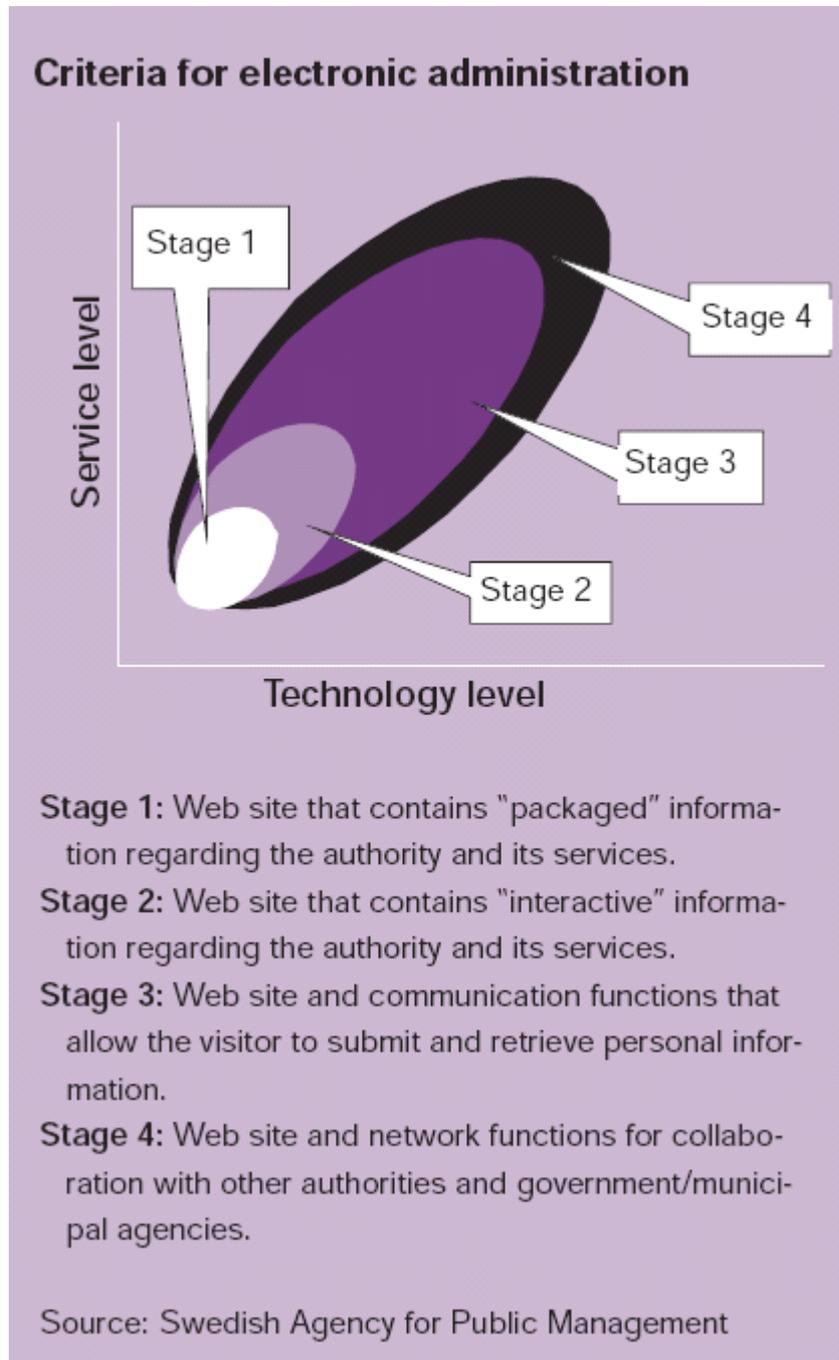
eGovernment *is not* merely transforming manual procedures into IT systems. Implementing a new IT-based service requires careful evaluation of the real needs and of the potential for using IT.

eGovernment *is not* about making information services available with no added value. It is fairly easy to convert printed information into online information services. These services generally provide remote access

to public offices independent of distance and normal working hours. However, the benefits can be expanded and enhanced by adding general search facilities, facilities to collect information from different sources, and other similar services.

Implementing new eGovernment services will often require organisational changes and different working procedures. Changes in internal working procedures are needed to benefit from the new way of communicating with citizens and businesses and to reap the potential benefits of creating a more efficient organisation.

The process of developing eGovernment can be described in four successive stages. In the first stage, the public authorities offer easy access to electronic information about their services. By the time they reach the final stage they have the ability to co-operate with other authorities and organisations through network functions.



From a technical standpoint, eGovernment services are based on Internet technologies. This involves IP networking, WWW technologies, and standard browsers for easy and flexible access to information and to interactive services. Web-based applications provide the technology to ensure efficient development of new services that can be accessed through a standard browser.

A special item to remember is the need to update laws and regulations to allow electronic exchange of data between the citizens/companies and

the public sector. Currently, many laws require written signatures on paper. The issue of protecting personal data must also be considered.

## eGovernment in Sweden

The decentralised public sector in Sweden, with strong local and regional power, implies challenges for e-Government since there is a risk that the pace of development in IT could be an obstacle to greater collaboration.

One initiative is the creation of a delegation (in June 2003) for development of electronic public services intended to stimulate citizen use of electronic public services<sup>12</sup>. This delegation was formed because of the importance of greater collaboration between counties and municipalities, and the relatively slow development of electronic public services.

Furthermore, a commission for electronic governance was initiated in January 2004. Their purpose is to establish common standards for communication between agencies. Some of the main agencies participate in a pilot project (VISAM) to develop local collaboration and improve channels of communication with citizens.

The Government has appointed a task group for IT and democracy. This group monitors and promotes the development of different technologies and methods for a participatory democracy with IT support. It follows the development of opportunities in IT to improve, simplify, and develop election forms and election participation. It evaluates whether the regulations regarding government and regional support should be reviewed, and it submits proposals as to how citizens (e.g. elderly and disabled) can gain increased access to IT.

VINNOVA, the Swedish Agency for Innovation Systems, integrates research and development in technology, transportation and working life. VINNOVA's mission is to promote sustainable growth by financing RTD and developing effective innovation systems. One of the eighteen growth areas is "E-services in public administration". The activities in this area include municipalities, counties and agencies as well as companies delivering IT and knowledge based services to the public sector. VINNOVA plans to test and evaluate electronic solutions in real-life test environments, for example where a municipality is developing public e-services. VINNOVA will also establish research and innovation environments across a range of scientific disciplines, which will develop e-services for public administrations.

The Government's vision about the 24/7 Agency is a public sector where agencies, municipalities, and counties co-operate. The foundation for the concept of the 24/7 Agency is based on the four stages of development; information, interaction, communication, and collaboration.

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<sup>12</sup> Finansdepartementet, dir 2003:81, "Delegation för utveckling av offentliga e-tjänster"

The Swedish Agency for Public Management was assigned to support the development of the 24/7 Agency. The task consisted of developing methods, initiate collaboration between agencies, counties, and municipalities. The project has produced guides, checklists, and initiated pilot projects. It was completed in 2003<sup>13</sup>.

The Government has proposed a new law aimed at further developing the 24/7 Agency in the area of social insurance. Within the proposed legal framework, the Internet is another channel of communication that requires its own legalisation.

### *24/7 in Municipalities*

During 2003, several municipalities agreed to create a common arena for the development of e-services. They co-operate on certain prioritised services. Twelve municipalities participated in 2003, and the aim is to increase this number to 50 during 2004. The project is supposed to serve as a think tank and an arena where municipalities can co-operate to develop strategies and exchange experiences, resources, and competencies.

The Swedish Association of Local Authorities, Intel, Microsoft, "IT-företagen" and "Kvalitetsmässan" sponsor the award *Swedish IT Municipality*. The purpose of this award is to present good examples that may inspire other municipalities.

Another example of promoting e-government is the *Gold Link* award. The Gold Link has been sponsored by the organisations Promise, Swedish Agency for Public Management, and the Swedish ICT Commission. The prize is awarded "to the authority or organisation in public administration displaying the most exemplary and innovative use of the Internet in their dialogue with the citizens of Sweden".

Experiences from these reforms in the municipalities show that development of IT requires:

- Active management.
- Focusing more on services than on IT itself.
- Creating a steering group responsible for the whole organisation.
- Involving users and staff at an early stage.
- Informing and co-operating with those who show resistance.
- Working out a strategic plan that gives a direction.
- Translating the strategies into actions and consequences for the organisation, colleagues, citizens, and business.
- Focusing on the perspective of the citizen.
- An attitude that this is not a project but a process that requires evaluation and redirection on a regular basis.<sup>14</sup>

<sup>13</sup> Swedish Agency for Public Management, "Samverkande 24-timmarsmyndigheter-Sammanhållen elektronisk förvaltning", Pm 2003:18

<sup>14</sup> Federation of County Councils, Swedish Association of Local Authorities, "Introduktion till kommunal E-service, Omvärldsbeskrivning och nuläge", nr 1/2002

Studies show a positive view towards the public sector on the Internet. The volume of users is high and increasing. Between February and April 2003, 3.3 million citizens used the agencies' services on the Internet, and every visitor made 8 visits during this period. Over half, 55 percent, visited an agency, 42 percent visited a municipality, and 12 percent visited a county.

Citizens have used various types of services and are content with them. Over half (55 percent) used information services, 40 percent searched for contact data, and 36 percent communicated with public sector.

Users report that they are satisfied with the services. Ninety percent of users are very satisfied or satisfied with public information and communication services. The most complex services have been given the highest satisfaction rating.

The field of involvement and participation is, however, lagging. Only 6 percent use agency websites to express their point of views.

## eGovernment in Finland

The main responsibility for eGovernment in Finland lies within the Ministry of the Interior. The Ministry has the responsibility to support public administration in the process of becoming a producer and user of network services. This entails preparing decisions related to electronic services, issuing guidelines, giving advice on electronic services and production of network services, increasing the number of public access terminals, and increasing network services in the state, regional, and local administrations, particularly in the Ministry's administrative sector.

The Ministry of the Interior is involved in implementing an action programme for eGovernment. It has published a development programme (2002—2005) for electronic services within the Ministry's administrative sector. The programme aims to make many of the services produced by the Ministry's administrative sector available to citizens and other users of web services by 2005. An earlier project for eGovernment, JUNA was carried out at the Ministry of the Interior during 1999–2001.

In 2001, the Ministry of the Interior issued a guideline for public administration concerning the electronic identity card and certificate for civil servants. The Ministry and its administrative sector jointly carried out the planning and development project on the electronic identity card for civil servants.

An Advisory Committee on Information Management in Public Administration (JUHTA) was established at the Ministry of the Interior to promote co-operation in information management between the State and the municipalities. The committee co-ordinates and promotes the development of information technology, information management, and elec-

tronic services in the central and local government. Furthermore, it sets standards, draws up guidelines, and defines administrative principles related to this area. The aim is to strengthen the role of the JUHTA Committee in the 2002–2005 action programme for eGovernment. Another area of co-operation between the State and the municipalities involves building sub-regional networks, portals, and related services.

#### *OECD assessment of eGovernment in Finland*

An OECD<sup>15</sup> assessment of eGovernment in Finland reports that the country has been a leader in exploiting information and communication technology to reform public administration. Finland is an eGovernment pioneer and has brought teams from around the world to share its experiences. However, according to OECD, it continues to face several crucial challenges concerning eGovernment and broader governance, i.e. communicating a clear eGovernment vision and increasing inter-agency collaboration. Other challenges also include strengthening internal governance structures and ensuring ownership of eGovernment initiatives.

**Organisation of eGovernment** in Finland is based on central guidance and decentralised responsibilities and implementation. The development of eGovernment is marked by the relationship between the central administration's role in promoting eGovernment and the local and regional governments' role as the primary service providers.

The organisational structure of eGovernment reflects the involvement and responsibilities of key ministries. The Ministry of Finance has the principal role of policy setting and horizontal co-ordination, while the Ministry of the Interior is responsible for vertical co-ordination and ensuring the diffusion and exchange of standards and good practices at the regional and local levels. The Ministry of Justice sets the main regulatory framework.

Several inter-ministerial and inter-agency bodies complete the eGovernment co-ordination structure and ensure collective decision making. Across government, however, ministries without central co-ordination responsibilities have been passive in developing and encouraging eGovernment initiatives in the agencies under them, and there is a lack of eGovernment collaboration among agencies.

According to the OECD report, the overall reforms and decentralisation in public administration have shaped the development of eGovernment in Finland. This redistribution of power has freed energies to develop new initiatives throughout government, but it has also drawn attention to the need for improved, central co-ordination to maintain coherence of vision and efficacy of results.

There are, of course, barriers to the development of eGovernment. In Finland, as in many other countries, relatively little is known about actual

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<sup>15</sup> OECD, "eGovernment in Finland", 2004

citizen demand. Information on demand for such services is incomplete, despite the Government's emphasis on the need to appraise user preferences as a basis for eGovernment strategies. More could be done to aggregate the information on customer needs currently available in ministries and agencies.

Over the long term, eGovernment requires the continued support of citizens and business. The OECD study argues that Finland could reinforce citizen support by better marketing eGovernment and demonstrating how it meets areas of immediate citizen concern, including service delivery, efficiency, security, privacy, and the accompanying reforms.

Another OECD report, *The eGovernment Imperative*, which analyses the opportunities and challenges of eGovernment implementation in OECD countries, identifies four main external obstacles to eGovernment: 1) legislative and regulatory barriers, 2) budgetary barriers, 3) technical barriers, and 4) the digital divide. Finland has overcome many of these barriers, though challenges still remain.

According to the OECD study, the Finnish Government has taken major steps to set the regulatory framework by enacting legislation on electronic identification, data exchange, and authentication<sup>16</sup>. However, agencies are increasingly asking for guidance on implementing the vision for eGovernment. This may reveal: 1) a tendency to rely on external direction rather than developing internal capacities, 2) a lack of ministerial leadership to promote eGovernment, and 3) insufficient internal governance structures. The solution is not necessarily more regulations, but rather a governance system that empowers agencies to take action within broad regulatory frameworks.

Regulations concerning technical standards need to be clarified and better diffused. Otherwise, there is a risk that activity may halt while agencies wait to be told what to do and/or receive clarification over what they are allowed to do.

A closely related regulatory issue is the need to deal effectively with concerns about privacy of personal data. In Finland, privacy and security remain a high priority to maintain current levels of citizen trust. The use and delivery of data are protected by law, and an independent authority ensures the respect of privacy rules. Confidence remains weak in the ability of ministries and agencies to develop technical solutions to deliver secure services.

Another type of barrier is financial. The Finnish budgetary context for eGovernment is characterised by a tight fiscal environment and a decentralised system of IT spending with central monitoring of resources. Central, one-time funds have been crucial for developing electronic service delivery frameworks (“e-enablers”) and may provide a model for setting up new incentive funds to foster innovation. An important challenge in Finland is the use of budgetary processes to enhance the availability of

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<sup>16</sup> OECD, “eGovernment in Finland”, 2004

cross-agency funding in support of integrated online services. However, insufficient funding for IT purchases has not, according to OECD, been viewed as a major barrier against developing eGovernment.

The OECD study found that the challenges for effective eGovernment implementation mainly concern management. Finland’s national eGovernment vision, initially formulated in the 1990s, is well-integrated with its administrative reform and Information Society agenda. It results from a successful collaboration among top decision makers in the public and private sectors. According to OECD, however, there has been a lack of quantifiable national targets to achieve its eGovernment goals and objectives. The lack of explicit targets overall, and within agencies, has diminished accountability and makes it more difficult to judge progress. Also according to OECD, the Government has not established clear responsibilities for eGovernment implementation and has been less than successful in mobilising employees and agencies.

On the other hand, there are benefits by taking a more qualitative approach. Rather than focusing on the overall number of online services available, Finland has focused on service quality, relevance, and access in its eGovernment programme. This reflects, in part, Finnish attention to meeting specific policy objectives through eGovernment, e.g. decreasing the cost of data collection, improving service quality, and increasing access to services, rather than simply attempting to put all services online, whether or not value is added.

Regarding the status of online services, nearly all Finnish ministries and agencies have reached stage one, providing information about their services. More than half offer interactive information (Stage 2 services), while almost a third propose transactions (Stage 3 services). Relatively few engage in data sharing with other agencies (Stage 4 services). Implementation of the more advanced services requires improved cross-agency collaboration for seamless services and the exchange of personal data.

The Finnish approach of persuasion rather than obligation within the administration, combined with highly independent ministries and agencies, has promoted agency ownership in established online services. On the other hand, considerable potential clearly remains for putting many more services online, especially services involving transactions and data sharing. Agency independence, however, means that the central government currently lacks the tools to encourage and guide additional eGovernment development in areas where agencies need assistance.

E-engagement is an important dimension of eGovernment. Finland has integrated activities into its eGovernment programme with the aim of improving online access to information, citizen consultation, and participation in policy making. Ensuring equal opportunities to access public information and easing the sharing and exchange of national public documents became priorities of the Government’s information manage-

ment strategy in the 1990s. According to the OECD, Finland is at the forefront in the development of e-engagement. More lessons could be drawn, however, from the many experiments in e-engagement by improving co-ordination and structured sharing of good practice.

**Back-office reform** is rapidly becoming one of the main challenges to eGovernment implementation in many countries. In Finland, back office reforms related to eGovernment have been slow in developing.

Organisational change in Finland has benefited from interaction between the public administration reform and eGovernment objectives. IT officials in Finland report that eGovernment has helped to improve planning, increase efficiency of working processes, enhance a customer-focused orientation, and assist in the application of good governance principles of transparency and accountability. Efficiencies arising from eGovernment, for the most part, have been channelled towards improvements in the quality and availability of online services rather than being recouped as cost savings.

Further cultural change in the Finnish administration, as in most other countries, is required to maximise eGovernment benefits. This includes the willingness to collaborate across agencies. While the Finnish public service seems relatively open to change, internal organisational change requires greater staff involvement.

The dilemma of eGovernment implementation is to balance the need to ensure that responsibility remains at the agency-level where most implementation takes place, with the need for common decisions on some horizontal issues by the central government. Co-ordination does not equal collaboration. However, and both formal and informal co-ordination have been insufficient in promoting cross-agency collaboration to provide seamless services or to encourage agencies to work together in finding common solutions.

The ability to design, create, and implement an effective e-strategy is increasingly linked to skills at both the organisation and the personnel level. The OECD survey shows that the administration is more concerned with improving project management and change management abilities, owing to the growing trend towards outsourcing IT projects, than enhancing the technical skills of personnel. Both types of skills are needed.

**The first phase** of eGovernment development in Finland has, according to OECD, shown a solid implementation of the early stages of online services on an agency-by-agency basis, adequate resources for IT investments, and the establishment of some common and necessary eGovernment enablers such as the Citizen Portal.

**The next phase** will be more difficult, requiring – in addition to the continued development of systems applications – an improved knowledge of user demands, increased inter-agency collaboration, and additional investments in re-engineering processes and change management. Finland’s decentralised governance structure has shown flexibility in

meeting the needs of citizens and business. Implementing eGovernment raises questions of how this structure can be adapted to reinforce planning and accountability, mechanisms for pooling agency expertise and resources, and incentives for collaboration across agencies.

## eGovernment in Denmark

In June 2003, the Danish Government presented a strategy for efficient and coherent use of IT in central government. The strategy addresses areas in which the central government should act as a unit to ensure that IT investments will yield the highest possible value in public administration. Already in 2002 all ministries developed a corporate IT strategy. Based on this work, many ministries changed their IT organisations in the individual agencies to be merged into a corporate IT organisation. And networks were joined or redeveloped to become one network connecting all workplaces in the ministry.

The Government has categorised its strategic goals for IT in the public sector into productivity and efficiency, infrastructure, and digital communication.

The general framework mentioned above was expanded with new initiatives in the Action plan of October 2003. The first category focuses on activities such as knowledge sharing and developing new business models, e.g. in health care of children and adolescents at risk, where cross-public business methods and models for digitally supported administration and management will be developed. Systems to improve benchmarking will be developed through tools to measure the effects of the initiatives. Since change is so rapid, another initiative launched by the Government IT Council promotes the activities of ministries in the area of IT strategies. One fourth of the public authorities view the lack of an updated IT strategy as a barrier to IT. Knowledge sharing is also important, and 65 percent of the public authorities report that they lack knowledge about implementation. The [www.oio.dk](http://www.oio.dk) portal contains information on IT skills relevant to the public sector and was launched at the end of 2003 to increase knowledge sharing.

The initiatives for coherent infrastructure stem from the finding that 79 percent of public authorities believe that a barrier to the use of IT is that the existing systems are difficult to integrate. The National XML Project, started in 2001, aims to improve the internal and external exchange of public sector data by working with common XML standards and access. Important tools are in place, and several pilot cases have been carried out. This leads to a new phase of the project with more production and implementation with broad involvement. In March 2004, 80 percent of the agencies and 37 percent of the municipalities used XML standards.

One conclusion discussed in the Danish media is that this implies high costs for the municipalities in coming years.

Furthermore, the Government has initiated work on developing guidelines for the design of public IT systems. Based on a white paper on IT architecture (published June 2003), the Government also adopted a new, public-sector IT architecture policy giving a common frame of reference for enhanced interoperability of IT usage in the public sector. So far this has led to the establishment of an IT architecture committee with representation from the entire public sector. The aim is to ensure that the recommendations presented in the white paper are implemented. Microsoft has launched an openness initiative, and Denmark is the first country in the world where Microsoft has deployed a new policy of openness. This means that documents can be exchanged between different IT systems.

The initiatives under the “Digital Communication” category state that digital communication with the public sector should be a rule and not an exception. Since March 2003, all Danish citizens have had the opportunity to order, free-of-charge, a personal digital signature for use of public and private electronic services.

An initiative entitled eDay was launched to strengthen digital communication. Hence, from September 1, 2003 (eDay) all central, regional, and local authorities have a right to send and receive communication on a fully electronic basis. The goal is for digital communication to become the principal means for public authorities to communicate with each other, and paper should be used only as an exception.

eDay2 is a subsequent project in which the Government will propose how citizens and businesses can safely communicate with public authorities by using digital signatures. In line with these initiatives, staff working with communication will receive training to develop their skills.

Examples of initiatives intended to support digital contact by citizens are to ensure widespread use of digital signatures, a common public health portal, a job marketplace, and digital registration and deregistration at the employment service.

### *Project eGovernment*

The eGovernment project was launched in 2001 and was a joint initiative by the Danish Government, Local Government Denmark (KL), Danish Regions, Copenhagen Municipality, and Frederiksberg Municipality to promote eGovernment in the public sector. The project is managed by a joint board comprised of representatives from several ministries, Local Government Denmark, Danish Regions, the City of Copenhagen, and the City of Frederiksberg.

The focus of the project is to ensure a successful changeover to eGovernment, including realisation of the potential gains from eGovernment.

The project's strategy is composed of five signposts, each with several quantitative goals.

**Signpost 1: The public sector must provide coherent services that centre on citizens and businesses**

By the end of 2006, the aim is to ensure that:

- At least 60 percent of the population use the public sector's digital services (2003: 40 percent.)
- At least 95 percent of all businesses use the public sector's digital services (2002: 72 percent.)
- At least 60 percent of all public authorities receive at least a quarter of all documents from citizens and businesses in digital form (2003: citizens 15 percent, businesses: 21 percent)
- The level of satisfaction of citizens and businesses with the coherence of the digital services/task performance is increased (specific goals will be formulated and defined)
- The level of satisfaction of citizens and businesses with the public sector's digital services is increased (specific goals will be formulated and defined)

**Signpost 2: eGovernment must result in improved service quality and the release of resources**

By the end of 2006, the aim is to ensure that:

- At least 75 percent of all digitalisation projects release resources, and that at least 25 percent do so on a large scale (2003: 46 percent and 3 percent, respectively.)
- The level of satisfaction of citizens and business with the quality of public services is increased (specific goals will be formulated and defined)
- Overall case processing times are reduced in the most common administrative matters (specific goals will be formulated and defined)

**Signpost 3: The public sector must work and communicate digitally**

By the end of 2006, the aim is to ensure that:

- At least 80 percent of all public authorities receive at least a quarter of all documents sent by other public authorities in digital form (2003: 37 percent)
- At least 60 percent of all public authorities can communicate securely in digital form with other public authorities, citizens, and businesses (2003: 26 percent)
- At least 60 percent of all public authorities utilise electronic case management (2003: 42 percent)
- At least 40 percent of all public authorities undertake purchasing in digital form with digital invoicing (2003: 15 percent)

**Signpost 4: eGovernment must be based on a coherent and flexible infrastructure**

By the end of 2006, the aim is to ensure that:

- No more than 15 percent of all public authorities state that the absence of common public sector solutions is a significant obstacle (2003: 30 percent.)
- No more than 15 percent of all public authorities state that the lack of common public sector standards is a significant obstacle (2003: 22 percent.)
- No more than 15 percent of all public authorities state that the lack of suitably adapted legislation is a significant obstacle (2003: 6 percent.)
- At least 90 percent of all public authorities possess an up-to-date IT policy, covering service provision, management-approved security policy, infrastructure, etc. (2003: 66 percent.)
- At least 1.1 m. digital signature certificates fulfilling the OCES standard have been issued to citizens, workers, and businesses (2003: approx. 65,000)

- At least 80 percent of the public authorities purchasing or developing new electronic case and document processing solutions utilise the standards and recommendations published by the Joint Electronic Document Management System project (the JEDM project). As few public authorities as possible state that lack of access to the relevant data of a public sector partner is an obstacle (specific goals will be formulated and defined).

**Signpost 5: Public sector managers must lead the way and ensure that their own organisations are capable of realising the vision**

By the end of 2006, the aim is to ensure that:

- No more than 10 percent of public authorities state that lack of political will and clear goals is a significant obstacle (2003: 9 percent.)
- No more than 20 percent of public authorities state that lack of allocation of resources for work with digitalisation is a significant obstacle (2003: 47 percent.)
- At least 75 percent of all digitalisation projects lead to a simplification of working practices, and at least 25 percent do so on a large scale (2003: 70 percent and 15 percent, respectively.)
- A large proportion of public authorities state that digitalisation forms a part of the efficiency strategies, results contracts, and/or plans of action of their institutions (specific goals will be formulated and defined)
- A high proportion of senior executives in public sector institutions (besides IT management) have, or have had, a formal role in the organisation’s own digitalisation projects (such as in the role of steering committee chairman, project owner or the like) (specific goals will be formulated and defined)

The central government, regional authorities, and local authorities each contribute DKK 5 million annually in 2004 and 2005 to the project. The work is expected to be complete by the end of 2006.

A clear division of roles and responsibilities is essential to realise the vision and implement the programme plan. Project eGovernment creates a common framework and supports cross-cutting co-operation. However, the realisation of specific gains is in the hands of individual public authorities across the boundaries of sectors and levels of authority throughout the public sector. Hence, the project does not alter the responsibility of individual authorities in the transition to eGovernment, or in the usual processes of decision making related to the Government and municipal bodies.

The project is organised under the board, with steering committees appointed for specific projects or business areas. A special task force, with a staff of 20, has been established to serve as secretariat of the Board.

The Task Force is intended to act as a catalyst for co-ordination and co-operation in the digitalisation process across all levels of the public sector.

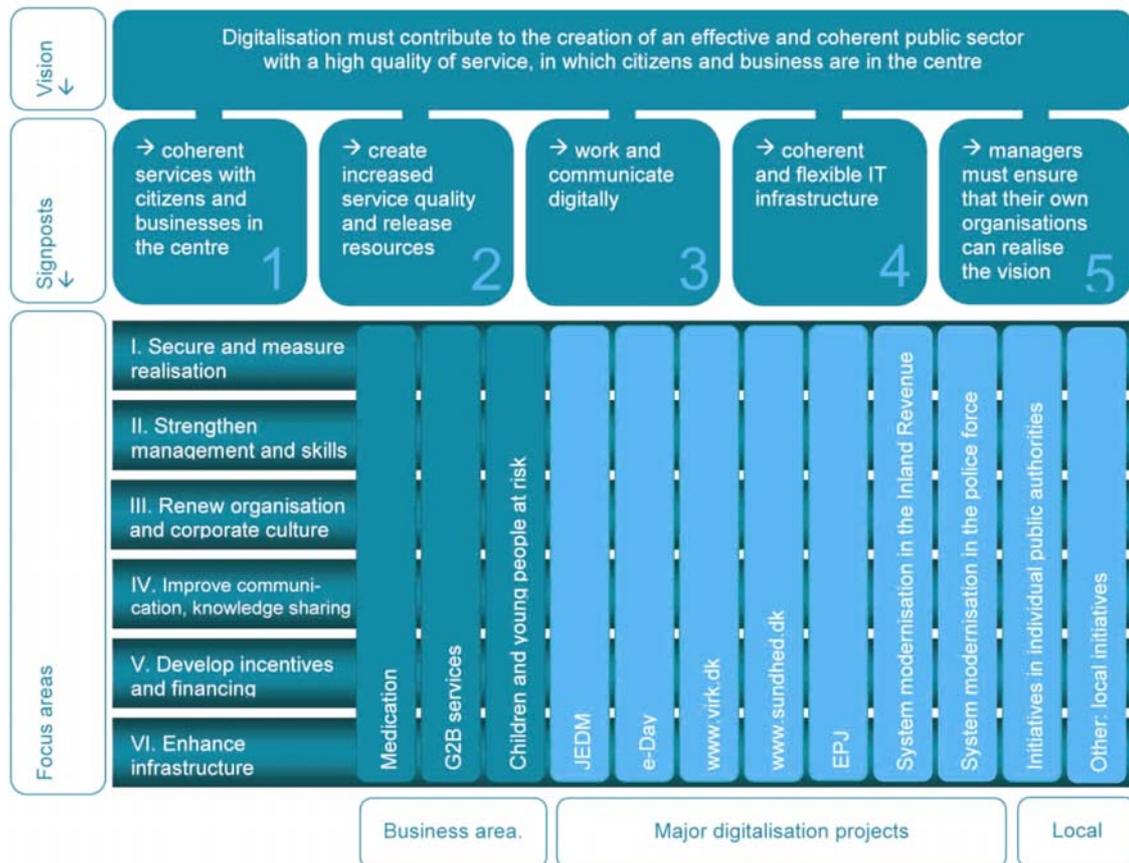
Most of the projects initiated by the Task Force are cross-sector projects, where business process re-engineering and new eGovernment services can lead to better and more efficient public services.

A general policy is that all public institutions shall operate their own homepage.

Typical services provided through the homepage are:

- Easy access to information
- Access to forms, especially electronic forms
- Interactive services with access to the institution’s own data in public sector databases, typically requiring log-on and password.
- Other services: Traffic information, route planning, weather forecasts, e-learning, and different levels of guidance.

The project is intended to provide frameworks and solutions capable of implementing the vision and aims of the strategy. The work itself involves all public authorities across sector boundaries and levels of authority. A programme plan has been developed with focus areas to ensure that the right framework conditions are present. According to the Government, Denmark has more competence in some areas than in others. For example, IT infrastructure has progressed relatively far, while more effort is required in communication and management development. The work with business areas is intended to advance the process in the most important areas and to serve as examples for other areas. Work is currently under way in the areas of G2B services (eBusiness), children and adolescents at risk, and medication administration.



Source: "The Danish eGovernment Strategy 2004-06", Project eGovernment, February 2004

### *Evaluation of the eGovernment project in Denmark*

Project eGovernment was evaluated in the autumn of 2003. The evaluation showed that progress had been made, and several results had been achieved, but it also identified obstacles and challenges to be overcome. These obstacles include:

Lack of familiarity with the vision and strategy is a major obstacle. In-depth knowledge of the vision and strategy of Project eGovernment is not widespread. Familiarity with the project is limited to a small group, while the depth and consequences of the project have not been discussed in the organisations. The vision is not brief and specific, which makes it difficult to communicate.

Furthermore, the "bunker culture" is widespread, and the existing culture does not support inter-organisational approaches and/or actions. There is no tradition of thinking in cross-organisational and inter-organisational terms, which tends to hinder cross-cutting co-operation and consequently, holistic thinking. There is also a tendency to assess management in terms of the number of employees and tasks. Hence,

merging and relocating tasks and personnel is unpopular, and there is a consequent lack of incentive to participate in cross-cutting co-operation. “Sow-harvest” issues are unresolved – i.e. the improvements in efficiency that follow a digitalisation process may be harvested by an organisation other than the one that made the investment. The distribution issue is not clear – who will harvest what someone else has sown?

Another obstacle is the lack of managerial commitment and skills, e.g. management insight into business thinking and familiarity with project management and managerial methodology. There is a pronounced, but unrecognised, need for change management.

Unclear division of responsibilities and tasks in several areas relating to Project eGovernment is another barrier to success. This applies, e.g. to the steering committees of cross-cutting projects, leading to a lack of decision-making capability.

One-sided IT thinking – generally too much focus on the technical aspects of IT. The organisational aspects are not a naturally integrated element, and better interconnection of the two areas is required.

In a report<sup>17</sup> that references international studies, Denmark ranks fourth in readiness for eGovernment. At the top of the list are Canada, Singapore, and the USA, which are further advanced than Denmark in adjusting public services to the needs of citizens and businesses. This result is confirmed by the IDC, which, in a corresponding European survey, ranked Denmark in first place. Other analyses from the World Economic Forum, the OECD, and the UN confirm this picture.

The lessons learned by the progress and obstacles of the eGovernment project, and from other countries, has given the Danish Government a list of areas upon which Denmark can usefully focus:

- Increase organisational efforts by concentrating on the user
- Back-office integration must be encompassed by front-office solutions
- The benefits of improvements in efficiency must be realised – measurement and evaluation must be carried out
- Leadership and skills must be enhanced

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<sup>17</sup> Project eGovernment, “The Danish eGovernment strategy 2004-06”, February 2004

*Use of IT in the public sector in Denmark*

Statistics Denmark annually studies the public sector’s use of IT<sup>18</sup>, and found in 2003 that electronic documents are available at most municipalities. The most common service offered to citizens is the option to electronically download documents – offered by 93 percent of municipal services, 79 percent of services by state authorities, but only 67 percent of services by regional authorities. Electronic ordering of material is also common – offered by 83 percent of the services at regional level, 79 percent at the state level, and 62 percent at the municipal level. Other services, such as online payment, are still limited in electronic form.

Communication with other official authorities is still low, but expectations are high. It is lowest in municipalities and highest in regional authorities. It is expected to increase from 11 percent to 42 percent between 2003–2004 at the state level, and from 17 percent to 75 percent at the regional level.

The most severe barriers in state agencies, counties, and municipalities are difficulties with finding resources for development work. Other barriers perceived as troublesome for the organisations involve problems with integrating systems. However, all major barriers, except the costs for IT, have decreased in recent years.

Several effects have been reported from the projects, and the evaluation showed that among the most important are those of reforming the work process. Another important consequence of digitalisation concerns new roles within the organisations. At the regional level, freeing of resources is more important than at the state and municipal levels.

## eGovernment in Iceland

The strategy on the information society presented in April 2004, named “Resources to Serve Everyone”, presents the main visions of eGovernment: seizing opportunities, ushering in change in a responsible manner, ensuring security, and enhancing the quality of life.

To seize opportunities, a special project management team will be established to focus on eGovernment. From 2004 to 2007, the team shall be responsible to assist and encourage public institutions in their efforts towards reaching eGovernment objectives. Furthermore, the following committees shall be appointed and shall complete their assignments during 2004–2005:

- committee on the technical aspects of electronic case procedures
- committee on the preservation of electronic data
- committee on registering meta data for public information.

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<sup>18</sup> Statistics Denmark, “Den offentlige sektors brug af it 2003”, January 2004

An electronic portal will be set up to enhance eGovernment. A project management team on eGovernment, appointed by the Prime Minister’s Office, will be asked to organise the task and seek consultation with municipalities and other parties on its implementation in 2004. The most important public information should be accessible to the public and to companies by 2005. The means and the areas for potential increases in consultation and dialogue between the public and official institutions will be investigated, and discussion boards will be tried out. Special consideration should be given to ways in which small administrative units can adopt eGovernment and adjust to altered circumstances, considering whether their number can be reduced, whether they can be unified, or whether they can increase co-operation.

The second element of the policy, responsibility, implies the goal “Access for Everyone”. Convenient access to sources of information and knowledge needs to be ensured. This is to be accomplished, e.g. by the ready availability of computers and the Internet in schools and Iceland’s libraries and by further strengthening services for individuals at these establishments. All of Iceland’s main libraries are supposed to receive support in installing wireless networks for access by their customers.

Another aim is to connect all the principal government institutions to a high-speed network by 2006 and secure communications achieved between them during the same year. In 2005, medical institutions are expected to be connected to a health-service network with efficient high-speed connections. Municipalities will be encouraged in their efforts to provide all compulsory schools and the leading cultural institutions under municipal control with high-speed connections by 2005. Electronic services of the public sector must be adapted to the needs of varying groups, e.g. the blind, visually debilitated, and handicapped.

The present social minister in Iceland focuses on family-related issues, and activities based on this priority have been launched. The Ministry of Social Affairs includes a “family office” that supports the ministry in this field. It is stated that IT should be a central factor in designing the services. One example is the ambition to create a website that offers all services that a family needs.

The policy regarding security is to aim for electronic certification. The state will set requirements concerning the content, form, and handling of electronic certificates for transactions with national institutions. Those requirements might become the model for a general Public Key Infrastructure (PKI) for industry and municipalities and in line with European and international standards to enable integration with the Public Key Infrastructure of neighbouring countries. A committee shall be appointed to discuss the division of work between public bodies in security matters dealing with the utilisation of information and telecommunications tech-

nology, protection against electronic terrorism, junk mail, consumer protection, and such ethical issues as immoral material on the Internet, etc.

## eGovernment in Norway

A new strategy for ICT in the public sector was presented in February 2003<sup>19</sup>. This strategy states that enhancement of user-orientation, efficiency, and simplification must be carried out in the individual sectors and agencies, while the strategy itself deals with the challenges that must be solved centrally.

Infrastructure is the core of the strategy, which argues that proactive IT development must address the need for a functioning infrastructure to enable co-ordination between public IT systems in the various sectors, administrative levels, and geographical locations. This does not mean that user orientation of services, efficiency, and utilisation of IT in democratic processes are less important, but these areas of utilisation should take place at the local level, in sectors, agencies, and municipalities.

HØYKOM is a programme to stimulate public-sector use of broadband-based services. The programme started in 1999 and has had an overall budget of about 40 MEuro. The Norwegian Parliament recently decided that the programme shall continue in 2005. Stimulating demand by public sector organisations for applications and solutions based on broadband communication is a key element in the policy for market-driven development.

HØYKOM has a special focus on distributed service areas, e.g. education, health care, and community information services. These areas include projects with applications that need high transmission capacity, such as Internet-based interactive learning, telemedicine, on-line video surveillance, geographic information systems and topographic maps, video and film distribution, and 3D animation over the Internet.

For 2004, HØYKOM has a total budget of MNOK 86.5, or about 10.5 MEuro. The programme presently supports about 70 projects throughout Norway. Since its inception in 1999, the programme has provided grants to 350 projects (from about 830 applicants). The northernmost counties and the most remote areas of the country are slightly over-represented in the project portfolio.

According to a survey by Statskonsult in the summer of 2002<sup>20</sup>, the challenges in the public sector that need to be addressed in coming years are:

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<sup>19</sup> Ministry of Labour and Government Administration, "Strategy for ICT in the Public Sector", February 2003

<sup>20</sup> Statskonsult, "IKT i det offentlige 2002", Statskonsult Notat 2002:4

- User-orientation of information and e- services is underdeveloped and uncoordinated
- Data interchange and communications across agency and sectorial boundaries constitute a problem in many areas
- Security and confidence in electronic transactions must be improved
- The focus on cost-benefit assessments and realisation of gains in working processes and organisation is underdeveloped
- IT is too poorly utilised for exchange of experience, competence building, and innovation
- Strategic managerial competence in the IT area needs to be improved

Based on these challenges and the goals of eNorway, the action areas that are considered for eGovernment are:

- Reporting, re-use, and availability of data
- A common infrastructure for digital signatures (PKI)
- Development of broadband facilities
- Electronic services
- Market conditions
- Democratic participation and transparency
- E-business
- Knowledge management
- Benchmarking

The strategy has a time perspective frame to the end of 2005, in accordance with the plan for eNorway 2005. To ensure feasibility and achievement of results, some areas have priority. The priority areas and their associated proposed actions are reporting, reuse, and availability of data, a common infrastructure for electronic signatures, and knowledge management. These priorities imply the activities described below.

#### Electronic reporting

- Co-ordinate reporting routines, including reporting schedules and work processes.
- Eliminate reporting of information which is not used or which can be obtained from other sources.
- Customise and standardise the central governments agencies’ data capture interfaces for reporting.

#### Re-use of data

- Co-ordinate use of terminology, work routines, and ICT solutions, including areas other than the Register of Reporting Obligations of Enterprises (e.g. the Norwegian Centre for Medical Informatics – KITH).
- Establish a council with expertise in the various fields that can provide independent views on co-ordination of specific terms and work routines.

- Establish criteria for data quality, describe maintenance routines, and appoint agencies to
- be responsible for retrieving, maintaining, and making available public information.

#### Making information available

- Implement necessary standardisation for retrieval of data from public agencies/registers
- and making them available to others.
- Consider extending the Register of Reporting Obligations of Enterprises with data
- relevant for developing electronic services and re-use, which are currently not included
- in statutory reporting to the register.
- Establish principles for pricing of the provision of public information to the general
- public, business and industry, and public administration to encourage
- co-ordination, re-use, and business development.
- Establish a secretariat function for ICT standardisation in the public sector to
- review relevant needs for standardisation and interface requirements, in relation both to data
- interchange and to ensuring compatibility between the different ICT solutions employed.

#### Common infrastructure for electronic signatures (PKI)

A co-ordinating body is to be set up according to section 28 of the Regulations relating to electronic communications with and within the public administration, which entered into force on July 1, 2002. Among the co-ordinating body responsibilities, are the following:

- Systematising experience, supporting agencies that take development initiatives and implementing the necessary impact assessments.
- Categorising ICT solutions in the public administration according to the need for security and use of electronic signatures and, on this basis, establishing some common security levels for such solutions. This work involves assessing the requirements of the various services and proposing common solutions that include as many services as possible.
- Developing common requirements and guidelines for use of PKI in the public sector. The requirements are to be based on established market standards and pay due consideration to current regulations in the area. The requirements shall moreover safeguard necessary considerations regarding co-ordination with other countries. This may include work on certificate content and profiles, certificate policy and technical requirements. The body will also assess solutions available on the market against the common requirements in order to establish their suitability for use in the public sector.

- Establishing necessary co-operative for public agencies in both central and local government sectors and encouraging co-ordination of different ongoing projects in the public sector.
- Establishing or participating in a suitable arena for dialogue with market players who offer solutions for authentication and electronic signatures.
- The use of common requirement specifications, e.g. in standard agreements, should be considered to promote the desired development in the area, particularly as regards the need for open solutions, re-use, and common requirement specifications.
- Funds should be allocated to support development projects in the public sector that are willing to utilise common solutions in co-operation with each other and with the private sector to ensure the greatest possible increase in the benefit to users.

#### Knowledge management

*Knowledge management* is, in this context, defined as identification, development, and dissemination of knowledge critical for agencies. This should be strengthened by systematically developing the learning and knowledge network both within and across sectors as an instrument for promoting the goals of the modernisation programme. ICT plays an important role in achieving this. A pilot project is therefore proposed for an ICT-based network for knowledge management. The goal of the project is to extend the scope to embrace other parts of the public sector on the basis of the results. It is proposed that the established network for “reference municipalities” shall be one of the pilot projects. This network is a part of the modernisation programme.

Source: “Strategy for ICT in the Public Sector”, Ministry of Labour and Government Administration, February, 2003

A process for co-ordinating IT standardisation in the public sector has started. Currently, several agencies have co-ordinated standardisation and IT architecture. This sectorial work may, however, result in fragmented solutions. Therefore, based on the above strategy for ICT in the public sector, a policy for co-ordinated IT architecture within the public sector has begun (described below).

#### *Progress of eGovernment in Norway*

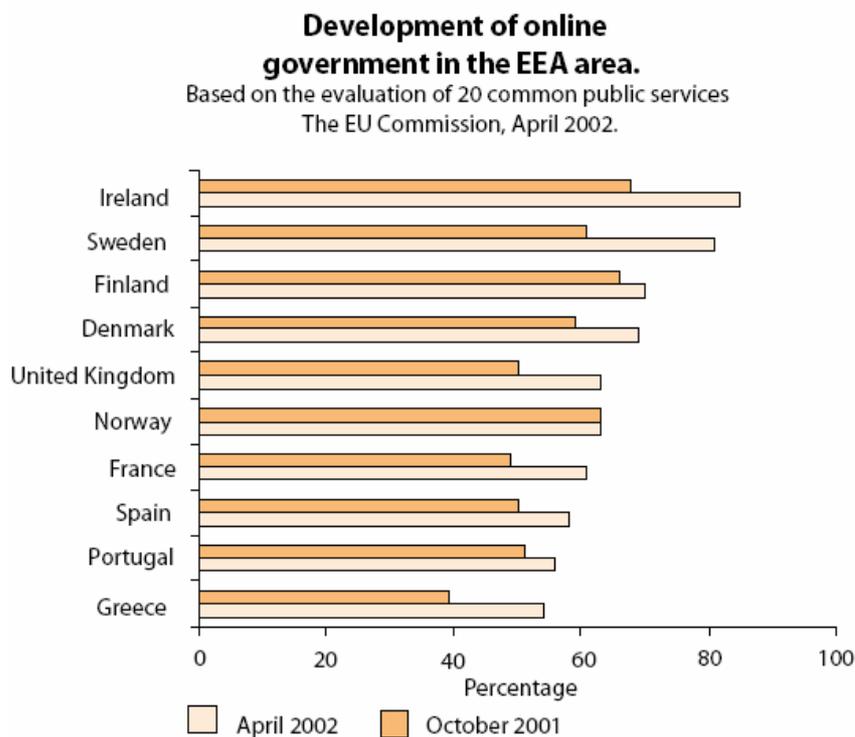
The evaluation of eNorway in June 2003<sup>21</sup> analyses the development of IT in the public sector. It found numerous examples of good IT initiatives, although progress has been slower than expected. International rankings show that Norway is no longer at the cutting edge of development. Most agencies have developed simple interactive services, and many of these can provide more advanced services tailored to individual needs. However, only seven government agencies and three local authorities are able to offer fully-integrated electronic services.

<sup>21</sup> Norwegian Ministry of Trade and Industry, “e-Norway, Status Report June 2003”

The degree to which the public sector will be able to reap the benefits from introducing electronic services remains unclear, according to the evaluators, even though the public is largely ready for new services.

The evaluation from early 2003<sup>22</sup> argues that the public sector has failed to reap the organisational rewards offered by IT. Furthermore, the evaluation continues to state that “Norwegians are among the most active populations when it comes to contacting government services online, but there are reasons for thinking that the services provided by the state are not developing in line with demand”.

Online government services were developing at a slower pace than expected. An EU survey from 2002 showed that Norway fell from third to fifth place among those countries with the most government services online. The survey was based on 20 services provided by the public sector for both individuals and enterprises. In April 2002, Norway was the only country whose development had not progressed since the previous survey (see figure).



Source: e-Norway Status report January 2003

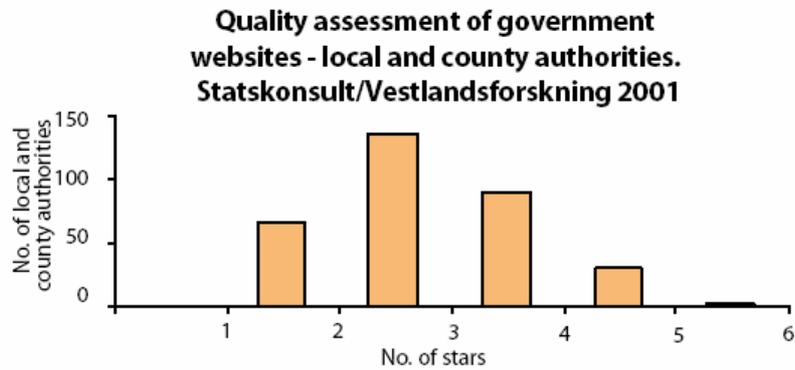
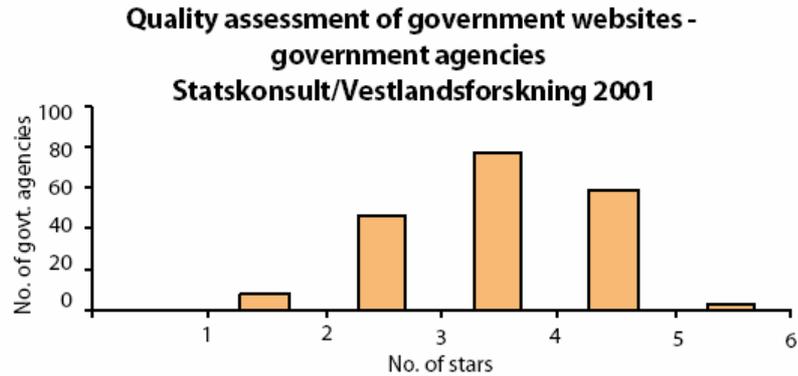
The basis of quality criteria for government websites has been assessed<sup>23</sup>. A number of 529 government and municipal organisations were assessed

<sup>22</sup> Norwegian Ministry of Trade and Industry, “e-Norway, Status Report January 2003”

<sup>23</sup> Vestlandsforskning and Statskonsult, Quality assessment of government websites. 2001

and given points ranging from one to six stars. The assessment indicates that Government sites are consistently better than municipal sites.

Furthermore, the results show wide variations in user-friendliness and accessibility. Very few Government websites fulfil the WAI<sup>24</sup> requirements for accessibility.



Source: e-Norway Status report January 2003

<sup>24</sup> Web Accessibility Initiative, World Wide Web Consortium.

Within local municipalities, the evaluation found that IT is most widespread in administration and technical operations, while it is least used in care and nursing activities. Furthermore, few municipalities collaborate on IT-based tasks. The municipalities mention several obstacles standing in the way of such collaboration. Between 40 percent and 50 percent of the municipalities mention culture, tradition, and physical infrastructure as the main reasons, while 20 percent refer to problems related to costs, data security, and expertise.

A study on the use of ICT in Norwegian municipalities found that 87 percent of all municipalities had their own websites and 44 percent had their own intranet in 2002. In 51 percent of the municipalities, under half of the staff had access to an e-mail address and a PC.

Less than half of the municipalities, 45 percent, indicated that they had worked out an ICT strategy. Among municipalities that had an ICT strategy, 62 percent reported that an "ICT infrastructure" was part of the plan, while 58 percent and 42 percent of the municipalities reported that an "ICT security policy" and "citizen services via the Internet" were part of the strategy.

Services within the municipalities are digitalised to only a limited extent. The most common service available was the option to download and print forms, and 44 percent of the municipalities in the survey offered this service on their websites in 2002. Sending information to the municipality through the website was possible in only 7 percent of the municipalities, and only 2 of the 418 municipalities that responded to the survey used digital signatures in communication with citizens or enterprises.

IT is more widespread in administrative systems. Electronic filing systems are used in 95 percent of the municipalities. Use of geographic information systems (GIS) and electronic document handling systems are also widespread, in 85 percent and 72 percent of the municipalities, respectively.

The survey asked about important barriers against using ICT in general. Lack of integration between applications were reported to have "some" or "large" significance in 88 percent of the municipalities, while lack of ICT-qualified staff was reported to have "some" or "large" significance in 81 percent of the municipalities. The municipalities were also asked about the importance of different barriers against serving citizens by the Internet. Difficulties in finding resources for development were reported to have "some" or "large" significance in 87 percent of the municipalities, while 82 percent of the municipalities reported that difficulties to readjust work routines had "some" or "large" importance.

This study corresponds to the ones carried out in Denmark in 2001 and 2002. At the end of 2001, all Danish municipalities had their own websites (the question is not part of the survey for 2002). In 2002, it was possible to download and print forms from 93 percent of the municipalities' websites, and submitting personal data via the website was possible

in 48 percent of the municipalities. In 2002, 59 percent of the Danish municipalities had their own intranet.

## Nordic Co-operation for Electronic Communication

In 2003, the Swedish Agency for Public Management was assigned by the Nordic Council of Ministers to host a network on digital signatures. The Network is charged with finding a way for agencies in the Nordic countries to communicate electronically. The task includes finding a secure solution, which also will be tested in practice.

The situation in the Nordic countries today has been described as the grounds for further work.<sup>25</sup> All countries have implemented the EU directive from 1999 on electronic signatures and adjusted their regulatory frameworks to facilitate electronic communication.

The Nordic countries have chosen various organisational, technical, and economic solutions regarding the infrastructure for the digital signatures. They are also at various stages when it comes to diffusion of electronic certificates and signatures to citizens, companies, and agencies. However, they are all at an early stage of development, especially when it comes to services that require collaboration between agencies.

All Nordic countries have chosen a PKI solution. Only Finland offers the citizens electronic certificates that correspond to the directives of a qualified electronic signature. There are also projects to offer EID in different packages with various security levels. In Sweden, there is a market for these services and several suppliers offer electronic certificates. The citizens can receive a BankID for free. Denmark has defined their own standard, OCES, which has a lower level of security. The state finances OCES certificates for citizens and the agencies costs for taking the certificates.

Norway and Iceland do not yet have an infrastructure for electronic signatures. The Norwegian Government has a goal to have an infrastructure for electronic signatures available in 2005. Iceland has a 2-year pilot project to define and test an infrastructure model.

Several agencies in Finland, Sweden, and Denmark, offer services that require electronic identification, and it might be possible to implement e-services on an inter-Nordic basis where agencies communicate with each other. Norway and Iceland intend to wait with a test until the infrastructure has been established.

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<sup>25</sup> Nordic Council of Ministers, Statskontoret, "Digitala signaturer i Norden", Pm 2003-11-24

## eGovernment Comparison

The assessment of eNorway from June 2004 summarises the positions of Norway and other countries as shown in various studies. The results show that, in general, the Nordic countries are well positioned, but the results vary depending on the study and its focus.

	FN (UNDESA) Global eGovernment Readiness Rankings 2003	WEF -Global Information Technology Report 2003-2004	Accentures eGovernment survey 2004	Economist Business Intelligence Unit/IBM – eReadiness Index 2004	Taylor Nelson Sofres – Government Online 2003	ITU Digital Access Index 2003
1.	USA	USA	Canada	Danmark	Danmark	Sverige
2.	Sverige	Singapore	Singapore	Storbritannia	<b>Norge (2)</b>	Danmark
3.	Australia	Finland	USA	Sverige	Finland	Island
4.	Danmark	Sverige	Danmark	<b>Norge (7)</b>	Singapore	Sør-Korea
5.	Storbritannia	Danmark	Australia	Finland	Nederland	<b>Norge</b>
6.	Canada	Canada	Finland	USA	Canada	Nederland
7.	<b>Norge</b>	Sveits	Hong Kong	Singapore	Færøyene	Hong Kong, Kina
8.	Sveits	<b>Norge (17)</b>	Storbritannia	Nederland	Australia	Finland
9.	Tyskland	Australia	...	Hong Kong	New Zealand	Taiwan, Kina
10.	Finland	Island	<b>15. Norge (16)</b>	Sveits	USA	Canada

Source: Norwegian Ministry of Trade and Industry, "Tilstandsrapport eNorge", June 2004

The United Nations (UN) study is one of the most comprehensive studies available. The ranking is based on several subjects and many statistical indicators in fields such as infrastructure, public net services, and use of services. The World Economic Forum (WEF) report bases its results on 64 variables in 9 fields, focusing on framework and environment for modernisation and use of IT for growth. The Accenture study examines 200 public services and bases the evaluation on the status of these services. The Economist survey covers a large number of indicators, e.g. large public investments in infrastructure, IT maturity, and financing. Besides the statistical indicators, the study also bases its judgements from a reference group. The Taylor Nelson Sofres study focuses on the extent of government services online. It is comprised of a telephone interview with a representative sample of the population. Finally, the ITU Digital

Access Index ranks 178 countries according to criteria such as prices, education, and use of IT.

Another consultant report<sup>26</sup>, shows that Nordic countries are European leaders in eGovernment, with Denmark, Sweden, and Finland ahead of the pack both in terms of availability of eGovernment services and in readiness of the population to use such services. Challenges that the Nordic countries need to overcome include developing internal organisations, designing and integrating applications, and developing standardisation. A large potential is seen in local authorities.

## International Experiences in eGovernment

The OECD eGovernment Working Group and the OECD eGovernment Task Force studied lessons from eGovernment initiatives and current experiences in OECD member countries<sup>27</sup>. They found that the ICT can help in achieving specific outcomes such as improving patient care, and can contribute to broad policy objectives such as reducing government expenditures. It may also be a major contributor to reforms and modernisation of the public sector, and can open up the policy process thus building trust and enabling citizen involvement.

However, as in the Nordic countries, OECD found several barriers impeding the development of eGovernment. Legislative and regulatory barriers such as accountability frameworks and budgetary arrangements may inhibit collaboration. Another problem is confusion about applicable laws. Furthermore, concern about the digital divide impedes the benefits of eGovernment, and OECD countries show significant differences in access to ICTs and the Internet.

OECD has designed some recommendations for these processes that are summarised below.

### Ten guiding principles for successful eGovernment

#### *Vision/political will*

**1 Leadership and Commitment:** Leadership and commitment, at both political and administrative levels, are crucial to managing change. Committed leaders are required to deal with disruptive change, to persevere when benefits take time to emerge, to respond when things go wrong, and to establish visions and plans for the future.

**2 Integration:** eGovernment is an enabler, not an end in itself. It needs to be integrated into broader policy and service delivery goals, broader public management reform processes, and broader information society activity.

<sup>26</sup> IDC, “eGovernment in the Nordic Region, 2003 Vendor Shares and 2002-2007 Forecast”

<sup>27</sup> OECD, “The eGovernment Imperative”, 2003

*Common frameworks/co-operation*

**3 Inter-agency collaboration:** eGovernment is most effective when agencies work together in customer-focused groups of agencies. Agency managers need to be able to operate within common frameworks to ensure interoperability, maximise implementation efficiency, and avoid duplication. Shared infrastructure needs to be developed to provide a framework for individual agency initiatives. Incentives can help encourage collaboration.

**4 Financing:** IT spending, where appropriate, needs to be treated as an investment, with consideration of projected streams of returns. eGovernment requires a level of certainty of future funding to provide sustainability to projects, avoid wasting resources, and gain maximum benefit from given funding levels. A central funding programme could help foster innovation and allow for key demonstration projects.

*Customer focus*

**5 Access:** Governments should pursue policies to improve access to online services. Many advantages of online government information and services are not replicable offline, so that those who lack access will be excluded unless action is taken.

**6 Choice:** Customers should have choice in the method of interacting with government, and the adoption of online services should not reduce choice. A principle of “no wrong door” to access the administration should be adopted. An understanding of customer needs should drive services.

**7 Citizen engagement:** eGovernment information and services should be of high quality and engage citizens in the policy process. Information quality policies and feedback mechanisms will help maximise the usefulness of information provision and strengthen citizen participation.

**8 Privacy:** eGovernment should not be delivered at the expense of established expectations of privacy protection, and should be approached with the goal of protecting individual privacy.

*Responsibility*

**9 Accountability:** eGovernment can open up government and policy processes and enhance accountability. Accountability arrangements should ensure that it is clear who is responsible for shared projects and initiatives. Similarly, the use of private sector partnerships must not reduce accountability.

**10 Monitoring and evaluation:** Identifying the demand, costs, benefits and impacts of eGovernment is crucial if momentum is to be sustained. eGovernment implementers cannot expect support if they cannot articulate potential benefits.

Source: OECD, Policy Brief “The eGovernment imperative: main findings”, March 2003

## Conclusions

The work of developing eGovernment in the Nordic countries includes activities in several areas of such as technology, legislation, organisation, and the market. Some countries and sectors are ahead of others, and there are opportunities for countries and sectors to learn from each other.

The first category includes initiatives to enable various systems in the public sector to communicate safely. Digital signatures, electronic identity cards, standardisation, and technical aspects of communication between different systems are technical questions that need to be handled. This field has received considerable attention, and intense efforts are solving many of the earlier challenges.

Legislative matters concern the laws that need to be reformed when IT is used as a communication channel between citizens and the public sec-

tor. These questions are also closely connected to technical aspects on security and privacy of personal data. A common complaint is that legislation lags behind the process.

Organisational aspects relate to reforms in work processes and collaboration between organisations. A shared lesson is that interagency collaboration has proven to be a serious obstacle, as is managing the change that accompanies this development.

The Nordic countries have decentralised public sectors that influence both budget systems and culture. Decentralisation contributes to the “sow-harvest” problem, where benefits do not arise where the costs were invested. One way to reduce this problem is to increase the funding for eGovernment across ministries, agencies, and local authorities.

The organisation of the eGovernment process varies between the countries. The countries have committees, delegations, and other groups that are responsible for working out strategies, action plans, and ensuring inter-ministerial co-ordination. Developing the collaboration between agencies and service providers also requires a structural framework.

Activities connected to the “market”, e.g. development of digital services based on citizen demand and needs, seem to be neglected. A possible explanation for this is the bureaucratic nature of the participating actors. This may imply less capacity for innovation, but also an administrative focus on the process and its goals. More efficient administration is one goal, but IT also has the potential to directly improve the services offered. The “e” is not an end in itself, and focusing only on making the current administrative routines and services available electronically is not enough.



# Part B – IT in Health Care and Social Services

IT in health and social services has the potential to improve welfare while simultaneously improving the efficiency of systems. Budgets are being increasingly strained. Availability and quality of the services need to improve, as does the attractiveness of the sector for personnel. IT does not solve all of these problems, but may offer new opportunities to reduce the strain on the system.

This section describes IT in the health and social services. IT in the health sector is described from the perspective of certain key aspects, e.g. strategies, security, co-ordination, infrastructure, and applications. Concerning social services, the strategies, action plans, and initiatives at the national level are largely covered within eGovernment initiatives, but some services are linked to the health sector. Major efforts have been made in all the Nordic countries and at the European level to develop IT-based services in the health sector.

The aim of this overview is to analyse the extent to which countries and sectors can learn from each other, and to identify the potential benefits of co-operation and collaboration.

## Driving Forces and Barriers

The Nordic countries share many common experiences. The decentralised systems represent one of the greatest challenges, requiring substantial efforts to co-ordinate development. Inadequate management has also been a barrier to change. The health and social sectors are bureaucratic and do not offer the most innovative environment. There are examples of pilot projects that have been driven by enthusiasts, but have not been incorporated into ordinary business afterwards.

Another problem found in this sector, and in the development of IT in other parts of the public sector, is that the costs and benefits from investments may not come within the same organisation. For example, benefits may be realised in primary care from the costs incurred by hospitals. In addition, costs for the new investments are one of the most crucial matters, since the financial structure is decentralised.

The technical problems have diminished in recent years, and the competence and IT maturity of personnel have generally increased. The organisational problems connected to developing IT, however, appear far from being solved according to most evaluations.

Several forces drive IT in these sectors. One of the strongest is the demand for greater efficiency. This demand can be expected to become even stronger as the population gets older and financing becomes more limited. Another driving force is the demand for individual treatment and care, together with requirements for participation and information. Care in the home is increasing, and IT may present new opportunities for this group.

Trends working in favour of IT in health and social services:

- Increased share of older people
- Work time becoming more expensive and computers less expensive
- Increased IT maturity
- Demand for individualised care
- Demand for more information and participation
- Increased requirements for integrity
- Demand for documentation and evaluation
- Demand for seamless process of services
- Increased care in the home

Forces that working against IT:

- Slow adjustment of laws and regulations
- Lack of management for change
- Lack of co-ordination and overview
- Out-dated organisations and work processes
- Lack of common standards
- Attitudes
- Insufficient education and competence

The consequences of IT in health and social services may be substantial. Traditional borders between levels and actors may change. Decentralisation and centralisation may both increase. Small service units may perform advanced services, but centralisation may increase since specialists are involved at a distance.

## IT Strategies for Health and Social Care

This section describes strategies for health care in the Nordic countries and at the European level. The aim here is to give an overview of the ambitions and priorities for developing IT in health care.

Strategies at the national level are developed and implemented in different contexts in the Nordic countries since state, regional, and local

responsibilities differ among the countries. These differences have implications for the IT strategies.

Because the health sector is generally decentralised in the Nordic countries, the state level is mainly responsible for the regulatory framework. Agencies are responsible for control and surveillance, while regional and local units are important providers. In Finland, health care is a responsibility of the municipalities, which are responsible for primary care and are joined together in larger units for hospital services. In Norway, the municipalities are responsible for primary care, but the state has a more extensive role and has been responsible for the regional hospital services since 2002. In Iceland, the state has a relatively large impact, which has increased to meet the requirements of specialisation and need for centralisation. In Sweden, on the other hand, the counties play a dominant role in both primary and specialised care, although in the 1990s the municipalities were given responsibility for many care activities. Also in Denmark, the health sector has traditionally been a responsibility of the counties, although the state level is said to play a greater role than in Sweden. However, a new structure is being discussed where five large regions would be responsible for health care.

The strategies mirror the role of the state in the process of developing IT in the health sector, but it should be remembered that much of the work with both strategies and action plans is undertaken at the regional and local levels.

### *Sweden*

In Sweden the counties have a relatively independent responsibility for the health care system at all levels, while the municipalities are responsible for care of the handicapped, elderly, and patients after the medical treatment has ended. The counties and the municipalities have their own financing, but receive yearly block grants from the state and are subject to an equalisation scheme.

The Government's proposition "An information society for all" proposes that investments and activities for IT in health care should have priority. A working group was established to work out strategies and coordinate activities in telemedicine. In 2002, the working group delivered a report<sup>28</sup> presenting strategies in five areas:

- Strategies to establish technical infrastructure
- Strategies for telemedicine in hospitals and primary care
- Strategies for telemedicine in municipalities
- Strategies to strengthen patients rights
- Strategies for a well-functioning market for health technology

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<sup>28</sup> Ministry of Health and Social Affairs, "Vård ITiden – strategier och åtgärder för att bredda användningen av telemedicin och distansöverbyggande vård", Ds 2002:3

The Government has never ratified the report, and hence, Sweden cannot be said to have a full IT strategy in the health sector. Nevertheless, since the counties are relatively independent they have developed strategies for their work in this field.

Activities related to these strategies also include collaboration and networking through Carelink, such as supporting the further development of services on Sjunet, supporting networking of specialists, initiating pilot projects and studies, and implementing common IT solutions.

### *Denmark*

As in Sweden, the counties have been largely responsible for health care. A new structure, in many ways similar to the Norwegian, is being discussed and creates five large regions that would be responsible for health care (See [www.detnyedanmark.dk](http://www.detnyedanmark.dk)).

The current structure implies that the responsibilities for the hospital sector and primary care are decentralised to the counties, while home care lies within the municipalities. The Ministry of Health is responsible for legislation and preparing overall guidelines for the health care sector. The state, counties, and municipalities finance health care, but the counties finance the major part.

Several steps have been taken during the past 10 years to reach the current position of IT in health care sector. In 1994, the Ministry of Health initiated MedCom. The aim was to develop EDIFACT messages for the most frequent communications between hospitals, GPs, specialists, and pharmacies, and to increase electronic communication instead of paper-based communication. In 1996, the Ministry formulated an action plan for electronic health records, which recommended pilots in electronic health records (EHR)/electronic patient records (EPR) with financial support by the Government. In 1998, the Ministry launched the EHR Observatory with the main goal to disseminate experiences from EHR sites. The following year, the Ministry of Health presented the “National Strategy for IT in the Hospital Sector 2000–2002” with the aim to make EHR the core of IT systems in hospitals.

The strategy of 2000 pointed out three main areas in need of a nationally co-ordinated development:

1. IT in the hospital sector (EHR, content, structure, and integration).
2. Communication in the health care sector.
3. Challenges of an organisational, economic, and technical nature.

In 2003, the current strategy was launched, “National Strategy for Information Technology in the Health Care System 2003–2007” (The Ministry of the Interior and Health, 2003). The overriding aim of this strategy is

that shared information is the foundation for seamless care and patient involvement. It states that the most important reasons for increasing the use of IT in health care are related to improvement in the quality, efficiency, and effectiveness of health care delivery. IT use shall contribute to fulfil the overall political goals for the health care system, e.g. a high level of quality and patient satisfaction, shorter waiting lists, efficiency, effectiveness, and freedom of choice.

Three stakeholders are essential in IT development: The patient, the health professional, and society as a whole. It is important to decrease the need for collecting identical information about the patient when health care is delivered (or continued) in different institutions. A prerequisite for reaching this goal is to reuse relevant existing information. This will also enable the patient to take on a more active role in the use of information and, in the future, ensure that the health consumer has access to and control over his/her own health information.

A central vision of the strategy is that IT should enable all clinicians to share clinical information relevant to the treatment at hand, and that this will allow beneficial organisational changes, including reshaping of workflow. Furthermore, this kind of organisational change requires a major effort on the part of the providers, and most of the financial support for this change is not provided on the national level<sup>29</sup>.

The strategy implies that present day health care communication is largely unstructured information, which is pushed in EDIFACT message form and on paper according to anticipated needs of the recipients.

A step ahead from the current situation would be one where all health information about an individual is electronically accessible. Now any provider can pull the desired information, albeit in the original with rather proprietary structuring and formats.

However, retrieval of relevant information is more useful when produced in a familiar format. Otherwise, digital reuse of information across institutions is not possible, and the full benefits of IT cannot be achieved.

The goal of the present initiatives in the strategy is therefore a common and shared information structure. Information can then be retrieved with equal ease across all providers' contributions, and it can be reused for a variety of purposes including decision support, automatic scheduling, quality assurance and improvement, and research.

### *Iceland*

In Iceland, the state is responsible for health care, and increased requirements for specialisation have led to greater centralisation in recent years.

The Government's goals for IT in health care are included in the strategy for development of the Information Society 2004–2007. One goal is a

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<sup>29</sup> Lippers, S and Kverneland A, "The Danish National Health Informatics Strategy", The National Board of Health, 2003

health net that links all institutions within the sector to enable, e.g. telemedicine services. This net is expected to be in place by the end of 2006.

The Ministry will not run the net, but will rely on the technology of private companies. The Ministry's responsibility is to set the regulations regarding the mode of communication, security issues, transmission capacity, etc. Instead of defining the structure and the services of the health net in any detail, it was decided to present a wide description of the net and develop it through individual projects.

Many projects have been planned for the health net. An action plan was established in 2000, and individual pilot projects work with applications to connect services to the net.

The recently published strategy for IT in the society summarises the activities in the health sector as follows:

- The health care network that links health care institutions and enables, e.g. telemedicine, should be made fully operational by the end of 2006.
- Systematic action shall be taken towards introducing electronic patient records for all health services, to an equal extent in hospitals, health care centres and among independent health care operators. A cost estimate is to be established and an operational plan made ready by 2004.
- Electronic transactions shall be enabled between the State Social Security Institute and health care workers (specialist physicians, physiotherapists, dentists, etc.) no later than 2005.
- Electronic transactions are to be implemented between the State Social Security Institute and the public. All the main types of service are to be accessible on the Internet no later than 2006.
- A survey shall be conducted, focusing on the possibilities for people suffering from handicaps to use information technology in their communications with the health care system. The Ministry of Health and Social Security is to sponsor such a survey during 2004.

### *Norway*

In Norway, the responsibility for the health sector lies mainly at the national and municipal levels. The municipalities are responsible for primary care, while five regional health authorities owned by the state run the hospitals within their respective regions.

Norway is now in its third national plan for eHealth. The two first plans covered the periods 1999–2000 (“More Health for Each bIT”) and 2001–2003 (Si@!). The new plan for the period 2004–2007, is named Te@mwork 2007 (S@mspill 2007). The Directorate for Health and Social Affairs is the co-ordinating agency and has also been responsible for the planning process. The plans are backed, to a limited extent, by central financing, but can be seen as an agreed agenda for future developments.

Si@! focused on electronic communication in the health and social sectors, telemedicine, national health net, and public information. An external consultant has evaluated this plan.<sup>30</sup> One main conclusion is that the strategy has contributed to accelerate and co-ordinate development of IT in the health sector. The evaluators also indicate that the resources correspond well to the results. Several activities have been initiated, and the evaluators note that the existence of a national plan has been important, especially because of the turbulent period with major organisational reforms in the sector. However, the strategy could have focused more on the development of electronic health records and how the organisational barriers could be reduced.

All sub-goals in the strategy have not been fulfilled, perhaps because they were too ambitious. Telemedicine is not used on a wide scale, and care is not yet sufficiently involved. The evaluators also suggest that command and control of the projects could have been stricter.

The extra financial resources that have been available have been crucial, but rules and regulations have been used to only a limited extent. Common standards have not been made compulsory.

The evaluators recommend that the next strategy focus on electronic health records and organisational barriers. The projects need more command and control, which should increase through better documentation and evaluation. Methods other than financing should be used for reaching the targets, e.g. compulsory standards and greater involvement by top management. Exchange of experiences and diffusion of good examples should increase.

Te@mwork 2007 has a dual focus. The first is *further penetration of electronic co-operation* among those who have started to co-operate. This focus shall improve the information flow between parties that have already initiated electronic co-operation.

A major issue is to ensure the operation of the Norwegian Health Net. An organisation responsible for operations will be established. The five regional nets and one connecting net shall be further integrated into a uniform net. More parties and services shall be included.

The current lack of uniformity in defining terminology shall be addressed by a top-down definition of an acceptable overall information structure for health and social care. The information structure will be a reference for further efforts in terminology, coding, and classification.

Norway has a strong legislation concerning personal information. Basic requirements will be established for information security, which communicating partners must agree to adhere to. Specific attention is also given to widespread implementation of digital signature/PKI (public key infrastructure), where the National Insurance Service has developed a solution available to the entire health care sector.

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<sup>30</sup> PLS Rambøll, Evaluering av tiltaksplanen "Si@!", mars 2004

The electronic health record (EHR) system, whether implemented by hospitals, GPs, or other care providers, is the key to efficient information flow. All care providers are required by law to document what they do. Extensive implementation of EHR systems by all providers is a prerequisite for efficient electronic co-operation. A national strategy addressing this will be established, also including research.

The co-ordinated effort for developing standards for electronic messaging will continue. A mechanism will be established for certifying the adherence of software products to existing standards. Co-ordinated efforts for implementing electronic messaging will continue. Specific attention is given to broad scale implementation of electronic scheduling and referral from GPs to hospitals.

It is an ever increasing challenge for caregivers to stay professionally updated with the advancements in medicine and care. A national Internet site to access databases, national guidelines, and related sources of information shall be established.

The second focus of Te@mwork 2007 is the *inclusion of new parties in electronic co-operation*. New groups shall be introduced to and motivated for electronic co-operation. The potential of information technology shall be utilised to meet the increasing demand for co-operation and efficient information flow in care processes in an ageing population.

To date, the main partners in electronic co-operation have been hospitals, GPs, laboratories, radiology institutes, and the National Insurance Service. The inclusion of new parties is governed by the ambition to establish seamless care processes, including the above parties, but also institutions in the municipalities with care responsibilities, e.g. rehabilitation units and institutions for elderly or disabled people. The 434 municipalities in Norway vary widely in size and population composition. A key way to ensure co-ordinated development across the nation is to establish a programme for care-related IT in the municipalities.

The patients and users of health care and social services shall be included, both by providing information services and by electronic co-operation in areas such as medical advice, prescription renewal, and appointment scheduling. One objective is to support patients and users in taking more responsibility themselves, and to utilise their insight about their own condition to improve the care process.

The plan also includes specific sectors and applications where developments have been modest, such as e-prescription.

The plan emphasises that investments in IT cannot be realised without organisational change. Therefore, the initiatives in IT are combined with initiatives in organisational development. Laws and regulations are other areas that need to be reformed. In particular, the availability of information in combination with personal integrity needs to be analysed, according to the strategic plans.

Te@mwork is expected to contribute to the general goals for the health sector; quality, efficiency, involved patients, co-ordinated services, and a seamless process of health care. Te@mwork is also part of eNorway and the strategies and goals that are set up for eGovernment.

Te@mwork will become tangible through yearly action plans that present concrete strategies. The plans will include timetables, responsible actors, financing, budget, organisational changes, and cost-benefit analyses. Central actors at the state, regional, and local levels will participate in this work. The state level finances only a small part of the initiatives. Hence, the goals and activities need to be established by the other parties.

Experience from earlier initiatives and action plans shows that implemented activities must be followed until they are established well enough to exist independently. Other lessons concern the importance of focus and that key activities receive sufficient financial and human resources to yield results. Parties should be given control over resources to ensure that they are used where they yield the greatest benefit.

### *Finland*

The responsibility for organising and financing health care and social welfare services is mainly vested at the local level, in the 448 independent municipalities. Every municipality has the responsibility to organise health and welfare services for its catchment population. This responsibility can be fulfilled either by producing services themselves, or joining with other municipalities in common health care centres or hospitals. Hospital services are provided jointly within districts consisting of several municipalities. The municipality bears the main responsibility for financing health care and social services. Municipalities receive annual block grants from the Government for all local operational costs. Private health services are partially compensated by a mandatory health insurance scheme. Citizens do not have freedom of choice of public health services.

The Ministry of Social Affairs and Health drafted the first Finnish national strategy concerning the application of information technology in healthcare and welfare during the mid-90s (1995-98). As early as 1996, the National Committee for the Strategy for Utilising IT in Social Welfare and Health Care proposed a new citizen-centred care model. The model included seamless services where clients would be active partners and where the present organisational and information barriers would be made invisible. Seamless services need seamless information access. To make this possible, one must draw on the opportunities offered by information and communication technology.

Subsequent reviews and updates followed in the period 2000- 2002. Those strategies cover also the needs of e-Health implementation and therefore no specific strategy for e-Health has been developed in Finland.

The key target of the Finnish healthcare ICT strategy is to use new information technology as a tool in reforming health and social services.

Key principles of the Finnish strategies are to use ICT in order to:

- support new cross organisational care models, like seamless care and services and citizen-centred care
- make reliable and accurate information available easily and rapidly at the time and place where it is needed for citizen and patient care;
- maintain and develop professionals’ skills, by offering the ability to update their knowledge and expertise through online knowledge bases and (continuing) e-education;
- promote citizen empowerment and participation in the healthcare process;
- integrate distributed local legacy systems to regional systems;
- develop a secure e-health communication platform for health care;
- implement national EHRs and digital documentation systems for social care that are interoperable both at the semantic and technical level;
- support and develop home care and self care.

In 2001, the Finnish government launched the National Programme for Securing the Future of Health Care. One of the eighteen projects of the programme concerns the implementation of national interoperable Electronic Health Records (EHRs). This strategy defines that at National level interoperable EHR-systems have to be implemented by 2007. These systems should be developed utilizing common international eHealth standards and also assessed in terms of their interoperability and security.

In support of the national health-IT strategy, new, temporary legislation has been prepared during the years 2001-2004 (and will be valid until the end of 2005), such as:

- Legislation for seamless services in social affairs and health;
- Legislation for e-prescription services.

The implementation of e-Health measures in Finland is realized simultaneously on the local/regional and national level. At the regional level, local information systems are being integrated and linked to form regional networks that use common national services (e.g. security and link directory services). At the national level, common messaging standards and the basic structure of the Electronic Health Record (EHR) are being defined. The development of a secure communication platform for eHealth, the definition of the necessary legislation and the architecture of the national eHealth info-way are being coordinated by the national EHR-implementation project. Major enablers for eHealth such as a PKI-service

for health professionals and service providers and citizen identification tools (citizen smart card) are also implemented at the national level.

#### *Resources for IT in health care*

The flow of funds in the health sector varies between the countries, and the state, regional, and local levels have different fiscal responsibilities. In Finland, health care is financed by the state and the municipalities, where municipalities account for about half of the financing. In Sweden and Denmark the state, counties, and municipalities levy taxes for health care. County taxes are the most important sources of financing, while only a minor part is state financing. The reforms that are under way in Denmark will change the financial system, and taxes will be levied at two levels (state and municipal) instead of three. This implies that the regions will receive state financing for health care, while municipalities will contribute to the financing of health activities and be responsible for care and preventive activities. In Iceland, the state is the main source of financing. In Norway, the state provides funding to the counties and municipalities for health care, but the municipalities also levy taxes for this purpose.

These differences are shown in the flow of funds to and within the health sector, and this influences the way that IT is financed. In some countries, e.g. Norway, the strategies are linked to financing, while other countries, e.g. Sweden, do not receive additional funding from the state for this purpose. In Sweden, however, special project funding has been available, while in Denmark the block grants from the state have included financing for IT.

In the Swedish health care sector, IT amounts to around 3.5 percent of the total budget. No extra support is given by the state for these investments, with the exception of the limited extra finances for pilot projects within different research programmes, e.g. in ITHS and Swedish Agency for Innovation Systems (VINNOVA).

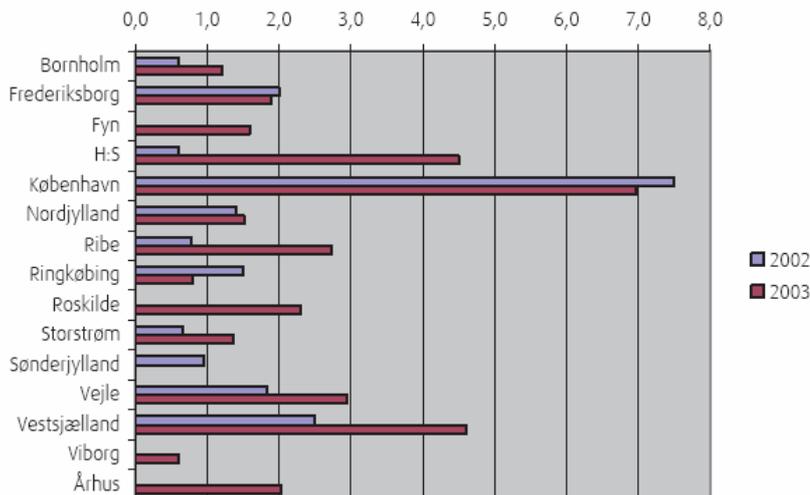
More state support for IT investments has been discussed, and the report "Vård ITiden" from the Ministry of Health and Social Affairs<sup>31</sup> argues that continuation of project financing is necessary to increase IT investments. Some studies also suggest a larger role for the state on a permanent basis<sup>32</sup>.

In Denmark, Status Report 2003 from the EPJ Observatory shows that in 2002 the hospitals IT budgets, on average, were about 1 percent of the total budget, while in 2003 this had increased to 2.8 percent. There are, however, substantial variations between various counties, and the proportion ranges from 0.6 percent to 7 percent.

<sup>31</sup> Ministry of Health and Social Affairs, "Vård ITiden", Ds 2002:3

<sup>32</sup> ITPS, "A learning ICT policy for growth and welfare" A2003:15

**IT budget in the hospital sector in various counties, 2003. Share of total budget in percent.**



Source: Statusrapport 2003, EPJ-observatoriet

In Norway, central financing in Si@! was 222 million NOK during three years. The contributions from various participating partners (hospitals etc.) by far exceeded this amount. The national health net and electronic communication have had priority during the period, and accounts for around 38 percent to 39 percent each of total central financing. Telemedicine has received 6 percent and public health information services 4 percent.

In Finland, the Ministry of Social Affairs and Health has earmarked the amount of € 10–15 million per year, for the period 2004–2007, for Information Society projects pertaining to eHealth. The major part of this money is distributed by the Ministry, through annual calls for research and development projects.

### *European outlook*

The eEurope 2005 Action Plan presents several policies and targets for the using IT in the health sector, for both the European Commission and EU Member States. These policies and targets include:

*Electronic Health Cards:* The European health insurance card will be adopted in 2004, replacing the paper-based forms citizens need for health treatment when in other Member States. The eEurope 2005 target is to build on this, using Commission proposals for a common approach to patient identifiers and electronic health record architecture, and create a European electronic health card.

Such cards could feature added functions, such as medical emergency data and secure access to personal health information. Combined with

other developments, this could bring greater efficiency to health information management, continuity of care across Europe, and greater security and control for users over their health data.

*Online Services:* Another eEurope 2005 target is that Member States and the Commission should ensure that citizens can access online health services (information on healthy living and illness prevention, electronic health records, teleconsultation, and e-reimbursement, etc.) by the end of 2005. There is no shortage of interest – health-related information is one of the “top” searches on the Internet, so the quality of health information on the Internet must be ensured. Hence, the Communication on Quality Criteria for Health Related Websites proposes a quality framework for these websites. The Commission will monitor the Member States’ activities in both making health information accessible and implementing these quality criteria. A public health portal to improve the public health information in the EU is also planned.

*Health Information Networks:* Health Information Networks aim to speed the flow of health information through the health care system, so they range in nature from local hospital-doctor-patient networks to Europe-wide systems for spotting emerging health threats. They are therefore a crucial infrastructure for eHealth.

Member States are to develop these networks between points of care (hospitals, laboratories, and homes), rolling out broadband connectivity where required. The Commission is working in parallel at the European level, focusing on public health data and co-ordinating actions for Europe-wide rapid reactions to health threats.

The European Commission has also been supporting R&D into health telematics through the *IST programme* and its predecessors. European research activities are structured around four-year programmes, or so-called Framework Programmes. The *Sixth Framework Programme (FP6)* sets out the priorities – including the IST Priority – for the EU’s research, technological development and demonstration (RTD) activities for 2003–2006. The focus of IST in FP6 is on the future generation of technologies. This research effort will therefore reinforce and complement the eEurope 2005 objectives

Example results to date include integrated regional health information networks, standardised electronic health records, telemedicine services (teleconsultation and home telemonitoring), and personal systems for citizens to support and manage their health status. Another action is improving the use of telematics in the community pharmaceutical regulatory system, e.g. EudraVigilance (medicine safety), the Europharm Database, and e-submission between regulatory authorities and industry.

In April 2004, the commission presented an action plan for eHealth in Europe.<sup>33</sup> The action plan promotes monitoring, benchmarking, and co-

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<sup>33</sup> Commission of the European Communities (2004), “e-Health - making healthcare better for European citizens: An action plan for a European e-Health Area

ordination at the European level. The plan covers the topics and challenges that also are the focus in the national strategies in the Nordic countries, e.g. interoperability of systems and electronic health records, enhancing infrastructure, standardisation, financial e-enablers, and regulatory framework. Pilot actions should be initiated for a health portal, health information network, and the use of cards. Disseminating good examples and benchmarking at the European level are other actions in this plan, which also connects explicit tasks with timetables for each action.

Obstacles for wider implementation that are identified by the EU Commission are commitment and leadership of health authorities, interoperability of health systems, user friendliness, lack of regulatory framework, security issues, the need for cross-country networks, lack of cooperation between stakeholders, and e-exclusion. In recent years, these obstacles have received substantial attention in the Nordic countries.

The Council has reacted on the Action plan presented by the Commission. The Council recognises the benefits from eHealth and underlines the contribution that eHealth can make for increasing interrelationships between national health systems. However, the Council invites member states to further the development and implementation of eHealth as part of national public strategies.

### *Conclusions*

The strategic plans and proposed activities for IT development in the Nordic health sectors have many components in common. Increasing shared information is an overall goal which implies activities for EHR, security, telemedical consultations, classification and standardisations, regulation, and web-based services. To an increasing extent, these issues are addressed at the European level as well.

Some countries are ahead of others. Sweden, Denmark and Norway focused on building national nets in earlier strategies, and now they pay more attention to activities needed to increase communication on the nets, e.g. security, regulation, standardisation, and applications. Involving more actors and increasing the collaboration and communication flow are important ambitions at this stage. Iceland is working both on developing a health net and finding ways to increase shared information through linking actors to the net and activities for EHR and telemedicine. In Finland, the national policy focuses on regional developments for electronic communication, including seamless care, portals, and home care. The advantage of this strategy is that it could lead to a less complex development process in the region. However, it might also lead to wide differences between the regions and limit the possibilities for collaboration.

The financing and structure of the system are important for the impact of the strategies. Sweden has relatively independent counties, which have their own strategies for these matters. The proposed actions at the national level have not received financing, and the Government has not decided on the proposals. It is not desirable to have separate strategies at the county level, since development needs to be co-ordinated. Other actors (see below) have the role of being driving forces. Denmark and Norway, on the other hand, both have relatively extensive policies at the national level and financial e-enablers are connected to the strategic ambitions. Also, the five regional health authorities in Norway are explicitly instructed to co-operate. These enablers are essential to stimulate the development of electronic communication and to avoid sub-optimisation and inefficiencies.

What is written in strategic document is, however, not as important as what is actually happening in the field. Strategies should be evaluated regularly and, if necessary, processes should be redirected or intensified. This should receive as much attention as the launching of the strategic plan.

## Co-ordination Within and Between Health and Social Care

All Nordic countries have organisations established to co-ordinate and promote the use of IT in health care. Lack of co-ordination is a barrier for IT, since the technology must be used to communicate between levels and actors within the sector. Furthermore, to deliver seamless care, co-operation is needed not only between the various organisations in the health care sector in each country, but also between sectors. Several initiatives of this type are under way in the Nordic countries, and most countries also aim to co-ordinate services between health care and other social services.

This section describes the co-ordinating organisations and the main initiatives and projects to co-ordinate the development of IT in health care and social service sector.

### *Sweden*

In Sweden, the potential for co-ordination is good. No one has the power to take a leading role, since the counties each have major responsibilities for their own health systems. Carelink plays an important role, but does not have any formal authority in relation to the counties.

Carelink was established in 2000 to develop the use of IT in health care. Its role is to cope with the challenge of co-operation between relatively independent counties. Counties, regions, municipalities, and private

companies in the health sector can become members of Carelink. The founders of Carelink are the Federation of County Councils, the Swedish Association of Local Authorities, the Swedish Pharmacy chain Apoteket, and the Association of Private Care Providers.

Carelink works with supportive services such as Sjunet, directory services, and security. Other important tasks include information and diffusion of best practices and good examples. Carelink is a co-ordinating partner in national projects and networks, covering most of the perspectives that concern the development of IT in health care. Classifications are, however, the responsibility of National Board of Health and Welfare.

Several of the projects initiated by Carelink play a co-ordinating role both within the health sector and between health care and care of the elderly and disabled. This is important since health care in Sweden is a responsibility of the counties at the regional level, while care of the elderly and disabled is a responsibility of the local authorities (municipalities). Carelink also has a co-ordinating role between health care and other organisations/agencies.

Carelink runs several projects and has initiated several activities focusing on co-ordination. Examples include:

- The HSA project to develop a model for a uniform electronic directory. Basic requirements are that the information should be available to certified individuals, not possible to alter, and that it should be possible to identify the sender. Currently, the focus is on the diffusion of HSA in the counties and municipalities.
- Common infrastructure, aimed at creating co-ordinated information on a patient, through development of IT in the health care sector.
- Carelink PLUS, aimed at enabling systems in different organisations to communicate, by pursuing agreements on the technological prerequisites between the actors involved.
- The SAMBA project, where several counties have established a common description of the health care process.
- PALL, aimed at creating a virtual medication list for the patient, builds on projects in Sweden in the field of medication and e-prescriptions.
- The “InfoVU” project is run by the Federation of County Councils, the Swedish Association of Local Authorities, and the National Board on Health and Welfare. One objective is to establish a common terminology for the evaluation of health care services. Carelink is involved with IT issues in this project.
- The Carelink RIV project, to establish common standards for e-messages in the health care sector. The project will also establish ground rules for security and traffic.
- The marketing and diffusion of SITHS, in which all counties have agreed to common standards for security (see below)

- Project for electronic communication between organisations in the health sector, e.g. the National Board of Health and Welfare, the Swedish National Tax Board, and the National Social Insurance Board (see below)

Despite this relatively large number of initiatives, ITPS<sup>34</sup> argues that Carelink’s resources for co-ordinating IT investments are insufficient for creating efficiency in IT investments. ITPS suggests four alternative ways in which more resources can be allocated. One alternative is that the National Board of Health and Welfare is responsible for offering a state-financed, common communication system in the Swedish health care sector. The second alternative is that the counties enter a binding agreement about an organisation that purchases common systems and develops standards. A third alternative is to seek a solution where both counties and the state support this development. The fourth alternative is to do nothing until the present study on the role of the counties has presented its results.

These alternatives have pros and cons, but economic incentives and state support for collaboration between counties are necessary according to ITPS, since counties have limited resources, and a common infrastructure is needed.

Regarding collaboration with social services, the Government has stated that implementation of the plan for social inclusion should focus on the needs of the individual and be based on closer collaboration among various bodies, both non-profit and professional, and at various levels of society.

However, the actions taken towards such collaboration do not focus primarily on the role of IT. One action that has been taken is the Government’s draft Act (2002/03:20) that will enable local authorities and county councils to collaborate in joint committees for the purpose of delivering health and domestic care services. Another example is the Government’s proposal to allow financial co-ordination between local authorities, county councils, social insurance offices, and the county labour board.

### *Iceland*

The ministry has taken the initiative to define standards for the entire sector. The ministry has acted as the co-ordinator for projects in the health net programme. All primary health care centres use the same IT programmes, and efforts have been undertaken to develop common electronic documentation between hospitals and health centres.

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<sup>34</sup> ITPS, “A learning ICT policy for growth and welfare” A2003:15

According to the current strategy, electronic transactions shall be enabled between the State Social Security Institute and health care institutions by 2005.

### *Norway*

The present strategy, *Te@mwork 2007 (S@mspill 2007)*, emphasises co-operation between health and social services. The aim is to involve central actors, e.g. municipalities and pharmacies, in the process to create prerequisites for seamless care. The focus is primarily to increase involvement from patients, pharmacies, and municipalities. With the first category (patients), web-based information, and the Internet are used as a tool for communication with the health sector, and telemedicine applications are included in the action plan. The second category of actors to be involved (pharmacies) includes increased action for e-prescriptions where work with standardised communication is already under way.

In the third category (municipalities), the focus is on activities such as home care. Communication between social services and health care is often unsatisfactory, e.g. between home care and health care organisations. Many factors have increased the demand for co-ordination between health and social services. Increased requirement on efficiency is one factor. Other factors are political, e.g. the new policy for alcohol from January 2004, which increases the need for co-operation between specialised health care and social services.

A report from 2002 stated that the use of IT in the care sector was limited<sup>35</sup>. The reason for this could be that the use of IT in the municipal sector is limited. However, the study shows that the municipalities that use IT to a relatively large extent are satisfied, both from the perspective of the patient and the producer. The activities that are operational are usually based on inexpensive and easily available technology. To make telemedicine more common, these activities should be adapted to connect to the national net.

IT investments are a responsibility of each municipality, and both the tempo and technical solutions differ. The differences between municipalities are increasing, and thus the possibilities for collaboration with other actors.

*Te@mwork* argues for a national policy to co-ordinate the development of IT within the municipalities. A proposed programme for the municipalities would increase collaboration between health care and social services. The intent is to base the programme on a commitment to quality improvement by the Government and the municipalities.

The programme has three main goals:

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<sup>35</sup> Nasjonalt senter for telemedisin, "Telemedisin i pleie og omsorgssektoren, NST-rapport 05-2002

- that care provided by the municipalities should be connected to the infrastructure to enable co-operation with other health services
- that technical developments and IT investments should be co-ordinated
- that development in this field should be co-ordinated and focused on topics that are currently most urgent; e.g. updated information about use of medicine, co-operation on individual plans, well-functioning communication between the sectors when patients move from health to social care services, and support from specialised health services to municipality-based care.

Implementation of these actions will be handled in co-operation between the Ministry of Social Affairs and representatives of the municipalities.

Another important area for collaboration concerns codes, classifications, and terminology. This is the responsibility of the Social and Health Directorate and KITH. The role of the directorate is strategic, while implementation and practical work is done by KITH. Codes, classification, and terminology are analysed and established in the KoK programme.

Although a substantial amount of work has been undertaken with classifications and standards, the programmes show weaknesses according to the Department of Health.<sup>36</sup> The work is characterised by a bottom-up approach, and implementation is weak. Furthermore, there are too many different definitions, and co-ordination between verbal and technical language is lacking.

Te@mwork 2007 launched a top-down approach to supplement the existing standards. The task is to describe the actors, define the flow of communication, assure quality, co-ordinate definitions, and revise the structure. The strategy also focuses on the need for a test and certification system for electronic interchange and electronic health record (EHR).

KITH, the Norwegian Centre for Informatics in Health and Social Care, was established as a co-ordinator in 1990. It is owned by the Ministry of Health (59.5 percent), the Ministry of Social affairs (10.5 percent), and the Norwegian Association of Local and Regional Authorities (30 percent).

The vision of KITH is to stimulate the use of IT in the health and social care sectors as a tool for improving care. Their role is to serve as an advisor and co-ordinator. The development of national requirements, specifications, and standards related to EHR, electronic interchange and information security is the essential basis for KITHs work. This work relates to the international developments in the field.

KITH has managed a national discharge summary and referral project. Activities towards organisational changes in municipal services have been implemented. Another goal was to establish a high volume service

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<sup>36</sup> Ministry of Health, Ministry of Social Affairs, “Te@mwork 2007”, 2004

for GPs and hospitals, focusing on co-ordination of different projects, organisational development, and development of standards.

Another co-ordinating body is Norwegian Centre for Telemedicine (Nasjonalt Senter for Telemedisin, NST) which aims at developing and implementing telemedicine in new areas. NST works both to implement telemedicine applications and serve as a telemedicine “think tank”. NST is organised around three programme areas with many activities, i.e. “Health services programme”, “Patient programme”, and “Globus programme”.

NST has restructured its business and limited the number of projects from 40 to fewer (but larger). A reason for this change is to create more realistic configurations with several health care centres and many patients. Another change involves plans to open district offices in each of the five hospital regions and to increase co-operation with the industrial sector.

NST has received funding from the Social Ministry for a project, SES@m, which focuses on secure digital co-operation between the organisational levels in health and social care. The project will run for 2.5 years and aim at finding models for using telemedicine based on seamless care with secure communication. It is divided into five sub-projects, e.g. security, connection to the national health net, and telemedicine applications.

### *Finland*

The Ministry of Social Affairs and Health has established national working groups and expert groups both to co-ordinate the development of the national e-health communication architecture and the regional implementation projects. Stakes (the Centre of Excellence for ICT – OSKE) has got the responsibility to co-ordinate both the secure communication platform and the e-Health information architecture actions.

The Association of Municipal Authorities co-ordinates the harmonisation of the structure and data content of the EHR. Because in Finland both service providers and the software industry have selected HL7 standards as base communication standards, the Finnish HL7 Association co-ordinates the development and implementation of public communication standards.

One part of the Finnish e-Health strategy is to use national services where practical. Until now the following national services are under implementation:

- Certification of health professionals using PKI services (the National Authority for Medico-legal Affairs)
- National code server (Stakes)
- Information portal for health professionals (Duodecim ry.)

- Information portal for social workers (Stakes)
- Information portal for citizens (National Public Health Institute)

Other national services like a national link repository for EHRs and an e-forms server are under discussion.

Major EHR-software vendors are participating in the co-ordination process.

### *Denmark*

In Denmark, several bodies participate on a national scale to build IT communication in health. One co-ordinating body is the National Board of Health (SST, Sundhedsstyrelsen) which is responsible for classifications, the structure of electronic health records and partners of the national health net.

Another co-ordinating body is the Danish Centre for Health Telematics, established in December 1994 based on an initiative from the County of Funen. The Centre gives advice and project support to national authorities, county councils, municipalities, general practitioners (GPs), hospitals, IT service providers, etc. in the field of health telematics.

The main projects co-ordinated by the Centre are the regional network FynCom, the national network MedCom (which became a permanent organisation in 1999), and the European network projects PICNIC, CoCo and PRIMACOM. The Centre also works with the integration and communication aspects of electronic health care records.

Several activities are carried out within the national network MedCom, e.g. co-ordinating initiatives on service applications and technical and legal aspects.

Under the present strategy for IT in the health sector, most central initiatives concern the co-ordination of activities, e.g. implementation of electronic health records, EHRs, a national terminology server and organisation, the National Patient Registry transformation into a registry based on 'Clinical Process' and continuity of care, collaboration among counties on integration engines, integration of quality databases, access to pooled data from EHRs, connection between municipal care systems and EHRs, participation in international standardisation activities, and creating a central body to oversee the IT strategy progress.

The eGovernment project also includes a task force to improve digital communication between municipalities and hospitals related to the hospitalisation and discharge of patients. The aim of this MedCom “Municipality Project” is to provide more unified treatment<sup>37</sup>. In preparation for disseminating this project to the entire sector, another project has been initiated to guarantee the connection between health care systems in the municipalities and the hospitals. The project makes possible for hospitals

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<sup>37</sup> see [www.e.gov.dk](http://www.e.gov.dk)

to be informed of relevant contact addresses for home care in the municipality. A message is sent automatically to the relevant municipality prior to discharge of the patient. Thereby, necessary arrangements, e.g. concerning rehabilitation, can be planned and put into effect before the patient returns home. An effort has been made to provide the necessary technical, legal, and organisational support for continued work in the area. Several organisational, legal, and technical problems related to the project have occurred, and these problems have been addressed separately in sub-projects.

Some of the tasks under the eGovernment project during 2002 and 2003 included:

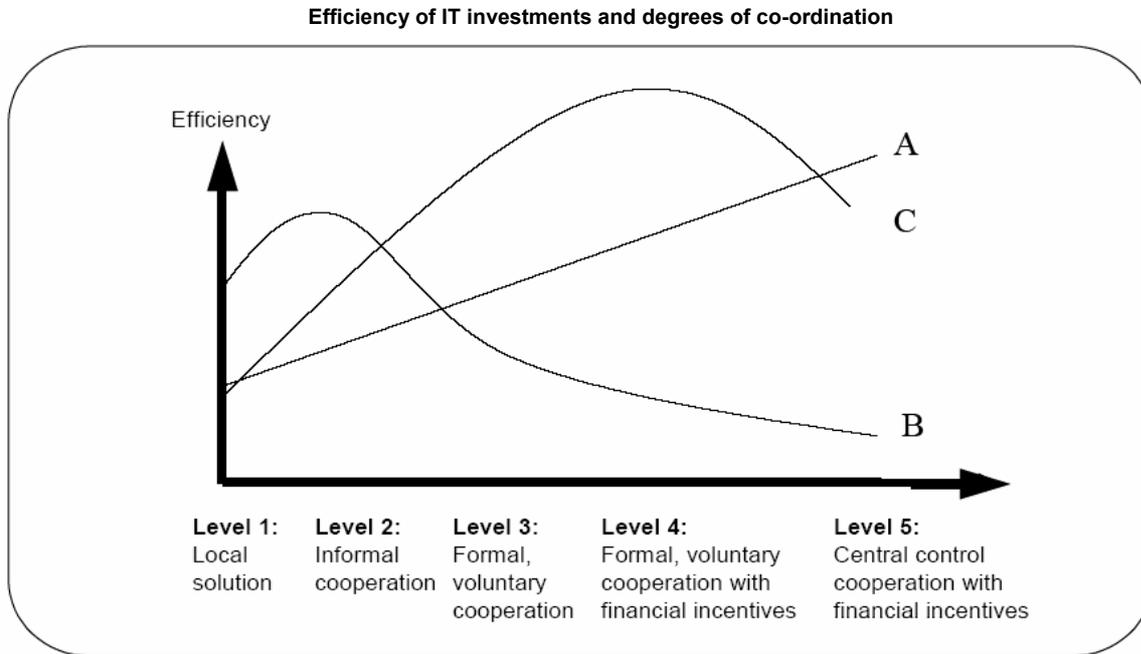
- Focusing on the relation between the hospitals and the municipalities
- Project for sharing of knowledge and accumulation of experiences
- Gather parties to legal specifications and clarification of further needs
- Establishing a standard XML initiative under MedCom
- Monitoring the work related to legal clarification
- Co-operating on the business model for medication – from the prescription by the physician to the correct consumption by the patient.

#### *Efficiency and co-ordination of IT*

The figure shows alternative ways of organising the co-ordination of actors in health care. The figure shows the connection between efficiency of IT investments and various degrees of co-ordination and central power as presented in a Swedish evaluation.<sup>38</sup> Level 1 considers the needs of one's own activities or departments. The disadvantage of this type of investment is that it gives limited returns in the form of increased productivity and reduced cost, and can also be entirely counter-productive for the organisation in general. The other extreme is central control (Level 5) which can provide considerable gains through co-ordination since the systems of all units can communicate with each other, and a few people can be responsible for the operations of all units connected.

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<sup>38</sup> ITPS, "A learning ICT policy for growth and welfare" A2003:15



Source: ITPS, "A Learning ICT Policy for Growth and Welfare", A 2003:15

Lines A-C show the relationship between degrees of co-ordination and efficiency. In A, efficiency gradually increases with an increasing degree of central control.

However, there are factors that may modify this relationship. One is that all systems do not need to communicate with each other. The task may be local with no benefits from collaboration, giving Case B above. Another factor that results in total central control not always being optimal is the need of innovation. Development takes place largely through experimentation, by someone finding a new solution that works better than the previous solution, and later others follow. Although co-ordination is needed, to lay the foundation for new development it is also desirable that everyone has the opportunity to think differently. Hence, neither the entirely local solution nor the entirely central solution is optimal. Rather, a combination of the solutions would be most appropriate (Case C in the figure).

The Nordic economies reflect various stages of control. Traditionally, the Swedish health sector has been at stage one, i.e. independent counties and municipalities, but has progressed to stage 2, and in some cases through Carelink to stage 3. Finland – where the municipalities have broad responsibilities – depends on informal alliances. Denmark may be the country where voluntary co-operation has developed most, and where the directives from the state are also substantial. In Norway, the regional health companies are owned by the state, but relatively independent municipalities have extensive responsibilities for other parts of the sector. In

Iceland, strategic directives from the state level give a framework for development, although local independence may characterise parts of the system.

### *Conclusions*

All countries have co-ordinating bodies within the health sector; e.g. between hospitals and primary care, between health units and pharmacies, and between institutionalised care and home care. Vertical and horizontal co-ordination between actors is needed to ensure seamless care, efficiency gains, and other benefits from technological advancements. Programmes and projects are launched for the necessary ingredients in this process; co-ordination of terminology, standardisation, technological co-ordination to enable the system to communicate, directories and registers, etc.

Centralisation and co-ordination of these services are needed. One pit-fall resulting from too little co-ordination and centralisation is that differences increase between units, municipalities, and counties.

Efficiency and co-ordination are key issues, and creating a risk for new inefficiencies is obviously unacceptable. However, increased central control does not necessarily imply that all services and information flow should be co-ordinated. It is essential to identify where, and for which services, co-ordination and centralisation are important. Our view is that services and functions that are best left to local solutions and that benefit from local modelling should be left undisturbed, at least for the time being. Information flow that needs to be communicated, services that benefit from collaboration, and functions that need to be co-ordinated, we believe, should receive attention.

Digitalisation of the health care sector seems to have worked according to these principles. Services that require collaboration to benefit the patient and information flows that can reap benefits from co-ordination are the focus for actors working with these issues. This focus on efficiency gains for the sector, and benefits for the citizen, when drawing up strategies, goals, and action plans is an approach that the social sector can learn from.

## Examples of IT Collaboration

The work with eGovernment has shown that one of the greatest challenges facing countries involves collaboration between agencies and other actors to use technological developments more efficiently and to develop new services that benefit citizens. Work is in progress and examples of processes are under way in this area.

This section presents examples of collaboration on IT developments. The description does not aim to cover all ongoing projects and reforms involving collaboration, but to offer some examples within important areas or specific functions.

### *Norway*

In Norway, the SATS project aims at improving social and labour market policy by increased co-ordination between labour market and social security systems. The overriding aims are to increase the labour force and decrease the group dependent on welfare allowances. Other aims are to improve the quality of services while increasing efficiency of the agencies involved. A working group has been analysing the task of consolidating these institutions since some of the individuals in the systems may transfer from one social security to another.

Merging the agencies for social, labour, and security issues is a major reform, and various alternative organisations can be envisioned. Currently, tasks are divided across three organisations. Ministry of Labour and Government Administration (Aetat) is responsible for labour market services, including labour market education and qualification. The national office for social security (Trygdeetaten) is the second agency affected by the reform. Trygdeetaten has a broad responsibility and handles various questions in various stages of life, e.g. old age pension, maternity leave, social aid, and sickness allowance. In some areas, Trygdeetaten is responsible for decisions where the municipalities have substantial influence. The municipal social offices represent the third type of organisation, and are relatively labour intensive. In addition to economic social aid, these offices deal with, e.g. advice to homeless people and actions for unemployed young people.

The work with merging the three agencies is divided into two stages. The first includes activities that are necessary regardless of the organisation in the future, e.g. describing current technical solutions, analysing the need for information security, and designing co-ordinated solutions for local services. Stage two will be realised when the organisation of the new agency is complete. It is estimated that the single agency will not be operational until 2007, at the earliest.

The sub-project on IT in Aetat, Trygdeetaten, and social offices has delivered two reports. The first report describes the current use of IT within the three agencies. The second focuses on organisational issues and various IT solutions in different organisational scenarios. Since the degree of unification is unknown at present, the discussion focuses on IT based on various levels of collaboration between the agencies.

A short-term IT solution based on existing systems is proposed, at the same time as a centralised model is developed for the future. This IT solution consists of, e.g. a common website, intranet, and a common sup-

port system for local offices. In the medium term, services in specific fields should be co-ordinated in the IT system, across traditional borders. Hence, it is important to define which groups and what kind of information needs to be co-ordinated. One of the greatest challenges is the multitude of different systems that are used by the municipalities.

Economic consequences, time schedules, and risks are also analysed and described. One risk is whether there are enough internal resources and competence to handle the management of change and co-ordination with other projects, e.g. pension reforms. Furthermore, there is no co-ordinating party with independent power or a mandate to push the process along. Another risk concerns the budgets for the agencies, and the future financing of the reform. The costs for the years 2005–2007 are calculated at 500 000 million crowns. This amount does not include upgrading of IT systems within the municipalities.

IT will be used in this reform to fulfil the ambitions that the citizens should be able to collect information and communicate with the reformed agency. IT should also support the staff and handle the large quantities of information needed, and serve as a tool for evaluation and management.

In 2003, Trygdeetaten established a solution for sending physicians certificates directly from the electronic health record, without manual handling. This exchange of personal data requires a high security level with digital signatures and PKI. By the end of 2004, the application will be extended into more areas of communication between the health sector and Trygdeetaten.

### *Sweden*

Discussions are under way between the Swedish National Tax Board, the National Board of Health and Welfare, Carelink and the National Social Insurance Board. Currently, most documents between the health care sector and these agencies are sent in paper form. This is a time-consuming routine that could be improved by using communicating IT systems. Not only would this save resources, but it would also improve the quality of the services for citizens by shortening the time span of the process.

The death certificate is a document sent from the health sector to Swedish National Tax Board in paper form for manual registration. An electronic process would be more efficient. Another example concerns certificates on the cause of death, which are currently scanned by the National Board of Health and Welfare.

A problem in converting these routines into an electronic process is that the health sector has little incentive to undertake these investments. This is an example of the classical “sow-harvest” problem where the party that reaps the greatest benefit from the investment pays only a part of the cost.

### *Denmark*

In Denmark the eGovernment project covers many of the aspects needed to implement collaboration between agencies. For example, a mutual, cross-public initiative has been launched – the FESD-project.<sup>39</sup> This initiative encompasses a common tender for one or more electronic document management systems, and is issued in co-operation between the state, regional, and municipal levels of government. The initiative also includes implementation support in 11 selected pilot organisations.

The project's goal is to ensure the use of mutual data and standards to secure interoperability and communication among authorities. The implementation projects in the pilot organisations are expected start in Q2 2004 and continue into Q1 2005. Later in 2004, other public organisations will be given the opportunity to purchase the system and the organisational consultancy under advantageous terms. Hence, they can draw on the implementation experiences from the pilot organisations.

### *Finland*

In Finland, a large, multidimensional project has been initiated for social services. IT plays an important role in this project. One aim of the project is to support the development of IT in social services. Development of IT in social services may increase both the efficiency in the sector and the quality of services. The technological development is said to be part of the overall development of the services and integrated in current policies.

To support the development and use of IT in the social sector, action plans for the role of IT in this process have been drawn up at national, regional, and local levels. Applications presented in the action plans include digital documentation, electronic records of clients, standardisation and classification, better involvement of users, improved security, development of new and improved services for the citizens by using IT, increased collaboration, and more efficient tools for assessment and evaluations.

One project in social services where IT is a main ingredient is the eConsultation project. This project works according to the same principles as telemedicine in health services. In Finland, the municipalities are responsible for providing their inhabitants with social welfare services, including social work services. As most of the municipalities are small, many employ only one or two social workers. In most cases they have limited access to professional consultation and other expert services.

The eConsultation for Social Services project aims to support social workers and other professionals in the social sector by making relevant expertise and knowledge more readily available. The impetus for this

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<sup>39</sup> [www.e.gov.dk/fesd](http://www.e.gov.dk/fesd)

three-year project was provided by the Finnish Ministry of Social Affairs and Health, and it was launched by STAKES in September 2001.

The eConsultation project aims to

- gather information, guidance documents, recommendations, and examples of good practice and make them available through a national Internet portal
- provide better opportunities for professionals to set up their own networks for peer support
- develop models for consultation services, both face-to-face and econsultation
- establish an online directory of consultants

The project will establish a portal that will bring together scattered information sources under the same Internet address. The project itself will not produce any new information. The portal, aimed and structured to meet the needs of social workers and other social welfare professionals, will be open to all those interested in social welfare information. The portal will also contain regional and special interest extranet services. They offer social workers forums for discussion, co-operation, and peer support. Access to the extranet services will be restricted to identified social-sector professionals. The portal will be bilingual with Finnish and Swedish contents and user interfaces.

When the information available through the portal and the peer support offered by the extranet services are insufficient, an expert to be consulted can be found by searching the portal's databank. However, the data protection of the portal system will not be strong enough for econsultation on client cases. The actual consultation must be conducted elsewhere.

The eConsultation project is being implemented in close co-operation with nine regional centres of excellence on social welfare, operational from January 2002. The project contributes to the implementation of the “future package” adopted by the Council of State in spring 2000. In line with the goals of the future package, the project aims to utilise information technology to develop the system of social and health services and to promote the utilisation of information technology throughout Finland.

### *Conclusions*

The Norwegian reform is an example of IT-based development where digitalisation of information is part of a large institutional reform aimed at improving the efficiency of organisations and services for vulnerable groups. Digitalisation is not an end in itself, but is connected to organisational change and a reformed service concept.

The Swedish discussions on digitalisation of specific information flows exemplify how discussions can cope with traditional “sow-harvest”

problems by bringing them to the table. Negotiations and discussions aimed at reaching an agreement, is the way to solve this problem. In this case, the process includes a co-ordinating body, Carelink, having the expressed mission of creating benefits for society by developing the use of IT among actors within and connected to health services.

The Finish example shows how IT-based information can be used in supporting personnel in the social sector. Telemedicine is a well-recognised concept in the health sector, but it may be possible to adapt some of these concepts to the social sector.

## IT for Specific Groups

IT can benefit specific groups in many ways, e.g. by creating new IT-based services, by modernising traditional services, by increasing efficiency in administration which may release time for the personnel, and by possibilities for fruitful and efficient collaboration with other actors.

This section describes IT in services directed towards specific groups. The section aims to provide an overview of areas where citizens with specific needs have been the starting point for reforming work processes and developing new and IT-based services. Described first are examples of IT-based services enabling care in the home and IT used in services for the elderly. This is followed by a brief description of IT for improving services for children and adolescents at risk. Finally, initiatives for improving e-inclusion of socially excluded groups are presented.

### *Care in the home*

Home care for the elderly and other groups is undergoing change, and IT plays an important role. Important developments in this field include systems that can communicate with hospitals and other organisations in the health sector and mobile computers that enable communication from “the field” without the need to use a common office.

The project CareMobil in Denmark aims at supporting this development by creating new concepts and demonstrating the use and potential of IT in elderly care. The project is a collaboration of six municipalities and one private supplier, and is supported by Ministry for Social Affairs, Local Government, the Association of County Councils in Denmark, and the Digital Task Force.

CareMobil consists of three stages: analysis and design during 2003, development and implementation during 2004, and a pilot project after 2004. The project has identified several work processes that would benefit from IT-based solutions, e.g. planning, orders, and registrations. The personnel working with the elderly may use IT to communicate with each

other before, during, and after the visit as well as register status and changes in plans.

Projects of this type offer a potential for more time for the elderly and more efficient resource utilisation. They also provide a better platform for communication between the authorities and the providers of the services. Improving this communication strengthens the reform of a free choice of providers. Therefore, a sub-project has been initiated where the systems of the municipalities can communicate with the systems of the providers.

However, this project raises questions about how to handle personal information and when and which information should not be shared. Due to the complexity of the legal aspects, a special group is analysing these questions within the Ministry.

Alarms are another area where IT can be used in home care, e.g. to signal in case of a fall or change in temperature. This type of application is tested and used locally in several Nordic countries.

In Finland, the ITSE project aims to improve the independent living and communication of elderly and disabled people by utilising assistive technology. The specific aims of the project are: to improve knowledge and promote expertise of the staff who work in the social and health services; to develop new models and networks for welfare and health care services; and to disseminate knowledge of new technical developments and services to the staff and users in relation to high technology.

The ITSE project began in the spring of 2001 and will continue until mid 2004. It is funded by the Ministry of Social and Health Affairs and co-ordinated and evaluated by the National Research and Development Centre for Welfare and Health (STAKES).

The project is being implemented in the form of 18 regional sub-projects across the country. Regional sub-projects follow the overall aims of the ITSE project, but are planned according to local needs. For example, one sub-project trains assistive technology tutors for home care services in the 55 counties in the region. Another sub-project creates a local assistive technology service network, specifies their services, and evaluates new assistive technologies. A third sub-project trains local social and health care professionals and teachers on communication devices. The sub-projects mainly include different social and health care professionals, although some users of assistive technologies also participate in the projects.

In Iceland, a model of home care is used to assess the needs for tools in home care throughout the country. The model of using the same system over an entire country to determine needs of care is also of interest to other countries.

Dementia is a disorder where collaboration between participating actors is needed. This disease requires collaboration between regional and local health services as well as care within the municipalities.

A model of collaboration has been based on a project from Fredriksborg<sup>40</sup>. The model gives a structure for responsibilities and collaboration between regions, municipalities, and physicians. Furthermore, areas in which aims and action plans should be developed are identified, based on the experiences from the project.

The model is being implemented in Fredriksborg, and several other regions are developing and implementing similar models with the aim to create an efficient and seamless process of care for patients with dementia.

The model specifies the stages in the process, the important areas where action plans and aims need to be worked out, the organisational issues that need to be solved, how to implement the model, and how to evaluate the process. However, the model is open for local conditions when implemented, and the exact context of the organisation, action plan, process, and collaboration need to be worked out by the parties involved.

In Sweden home care for elderly and others that are dependent on care in the home is an important field that receives growing attention. Several projects have been initiated during the past years with the aim of developing models and work processes for elderly care, where securing seamless care and co-ordination between organisations is essential.

One example of a project that focus on support for relatives, is the Swedish project ACTION (Assisting Carers using Telematics Interventions to meet Older Persons' Needs). Elderly and their carers get information through material developed within a network by persons in the same situation. Carers can communicate with the network through the Internet, visual telephone, local call-center and receive education within a package of material.

Another example is a service named SABH (Hospital connected, advanced child care in the home), which started as a project year 1998 at the Astrid Lindgren Child Hospital in the county of Stockholm. The goal is to give children with severe illness the same care at home, which they otherwise would get in the hospital. The basis of the model is modern information technology in combination with a mobile "24 hours a day- team", a doctor, a nurse, a guidance officer and a child nurse. The service has been evaluated and is now offered as a regular service for selected patients in the catchment's area.

Research programs like ITHS and programs within VINNOVA have supported many of these projects. The focus of ITHS2 is regional co-operation, healthcare at a distance, homecare and elderly care. At VINNOVA, one of eighteen "growth areas" is "IT in home healthcare". The goal is to develop and increase the use of mobile IT-solutions to give patients a more safe and secure care in their homes, and at the same time create market-growth for the involved companies and partners.

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<sup>40</sup> Ministry for Social Affairs, "Model for en koordineret indsats på demensområdet", 2001

Below are examples of projects that focus on IT for health services in the home, and which are based on collaboration between health care and social sectors. They are financed by various sources:

**Old@home in Gävleborg** aims to improve staff information about care at home and in the health sector. The employees are developing the flows of information.

**Co-operation in Health Services in Örnköldsvik** develops solutions to give personnel right information in an efficient way regardless of time and place.

**Hand Computers in Home Services** helps nurses work more efficiently through hand computers with mobile care that is connected to the computers of the municipality.

**Wireless Sensors for Medical Surveillance** can measure, e.g. respiratory rate and transmit the information to a health supplier.

**Network for Diabetics in Blekinge** where nurses have some of their contact with patients through the Internet. Hand computers are connected to the Internet to increase mobility.

**Co-operation in the Care Process in Västerbotten** with mobile solutions and video conferences to improve contacts between hospitals, primary care, and home care. The model has been extended and will be used in entire Västerbotten by 2004.

**IT for Mobile Co-operation in Home Care in Stockholm**– this project aims to make existing IT-systems to work together.

**Organisation and Technology in Home and Elderly Care in Linköping** – researchers develop a model to identify organisational prerequisites that are needed for efficient IT development.

**Sams – IT by Co-operation in Home Care in Stockholm**– several existing projects join to create a common base for continued work, aimed at creating an architecture of IT based on patients’ needs.

Source: Utbult Mats, “Vård nära Dig”, Teldok Rapport 152, 2004

Projects in Norway are addressing similar questions, e.g. the GRO Comfort Zone for Elderly. This project focuses on home-based care services. The overall goal is to create a complete service package for senior citizens in their own homes, and the aim is to establish an adequate infrastructure in private homes, at home-based care service centres, and at private and public services and institutions.

Major problems to be solved include:

1. Guaranteed data deliverance (fault tolerance). All alarm signals must be delivered to the home-based care service centre responsible for the area where the alarm was activated.
2. Security and privacy. The system shall protect confidential patient data from any form of abuse.
3. The project shall offer a complete service package for senior citizens.
4. Cost effectiveness (compared to institutionalisation).

The project “Smart Home Technology in Norwegian Home-Based Health and Social Services” studies processes to introduce smart home technology in municipalities. The project was carried out by the Norwegian centre for telemedicine and the Delta Centre (a unit in the Ministry of Health and Social Affairs) from September 2001 through 2002. It revealed several challenges that should be investigated more thoroughly. One lesson is that awareness about the use of smart home technology in

the home care and nursing sectors must be increased so the technology becomes more known and more accessible for those who need it.

There are two overriding goals in this project. One is to identify, understand, and disseminate the processes leading towards well-utilised smart home technology. The second is to give most users access to the most suitable smart home technology, meeting their needs and demands. Smart home technology is used in several municipalities in Norway. However, it appears that some municipalities have not been able to take full advantage of the technology. Why do some succeed while others do not? By studying processes of introducing smart home technology into municipalities, the project hopes to show other municipalities how to achieve success and what bottlenecks to avoid when introducing such technology.

#### *Children and adolescents at risk*

Children and adolescents at risk have received political attention in Denmark. In general, the use of IT in this field is limited. However, eGovernment in Denmark, the Ministry of Social Affairs, Local Government Denmark (KL), Danish Regions, Copenhagen Municipality, Frederiksberg Municipality, the Ministry of Finance, the Ministry of Science, Technology, and Innovation, and the Digital Task Force have taken the initiative to create a business area on children and adolescents at risk. The area encompasses the development of one or more business models supported by digitalisation in relation to placement in care and preventive measures for children and adolescents.

Expenses for placement in care and preventive measures for children have increased substantially in recent years, without sufficient information about causes or the results of activities. Expenses were estimated at DKK 8.5 billion in 2002, an increase of 35 percent since 1995. There is a need to analyse existing administrative practices and learn more about the effects of current interventions.

The aim is to improve management and case processing, e.g., by improving systematised case processing, matching between needs and interventions, management information systems, and co-operation among public authorities.

Both the Government and the municipal parties view the opportunities for quality improvement in case management and economic management through digitalisation to be positive.

The procedures affecting the special focus area cross state, municipal, and county boundaries, and there is a need to better co-ordinate the initiatives. A cross-public business model is needed for digitally supported administration and management in services for children at risk.

The organisation supporting the special focus area for children at risk includes a steering committee, a secretariat for the steering committee,

and various project groups that deal with specific sub-projects. The steering committee is comprised of representatives from the Ministry for Social Affairs, Local Government, the Association of County Councils in Denmark, the municipalities of Copenhagen and Frederiksberg, the Ministry of Science, Technology and Innovation, the Ministry of Finance, and the Digital Task Force.

During 2003, several analyses and pilot projects were set in motion. By the summer of 2004, redesigned working practices should have been defined within and across the boundaries of public authorities, and joint concepts formulated for effects, efforts, and expenses/finances. Finally, a model for IT support should be developed, including a description of how IT tools should be constructed in general, and how the development and implementation of such tools should be financed.

#### *IT for groups at risk for social exclusion*

The "information society" promises new opportunities for social inclusion and has the potential to overcome traditional barriers to mobility, distance, and knowledge resources. It can generate new services for disadvantaged people and for people seeking employment or being at risk in the labour market. On the other hand, IT also involves new risks for exclusion that need to be prevented. Internet access and digital literacy are a must for maintaining employability and adaptability, and for taking economic and social advantage of on-line contents and services.

In Denmark all home pages of public organisations undergo an annual quality check to ensure that public electronic information is easily accessible in terms of both form and content. One example of a project is the "Solicom IT project" aimed at giving "socially excluded" groups, including refugees and immigrants, a chance to submit proposals for initiatives and explore the possible use of IT. The project surveyed socially excluded individuals and groups, and their responses provided the basis for activities. The project has been widely disseminated in Denmark and was also diffused in Germany and Italy.

In Norway "eNorway partners" are among the relevant organisations (social partners, other associations, municipalities, county municipalities and government agencies) developing initiatives for e-inclusion. The "partners" can present their initiatives, complete with deadlines for implementation, in an appendix to the main plan.

Handicapped people are a priority of the Social Minister of Iceland. One activity that has been launched is a communication and information system for the handicapped. This system shall include digitalisation of work processes and shall improve communication. The system will also be included in the financial systems of the social security system. Another initiative for the handicapped is a project to assure that technology

is adapted to the needs of this group. A website will be set up for handicapped persons, students with special needs, teachers, and social workers.

In Denmark, a portal for handicapped is being prepared to supply relevant information about various handicaps and support from different sources. The Danish Centre for Technical Aids for Rehabilitation and Education has been designated as a national information and resource centre aiming at equal opportunities for people with disabilities. It is a non-profit organisation partly financed through public funds and partly through its own revenues.

In Sweden, a major information campaign has been carried out for promoting an information society for all. Responsible actors are the Swedish Handicap Institute and the major user organisations for people with disabilities. The focus of the campaign is Accessible Internet. Campaign activities are directed towards Information Technology designers, but also towards politicians and the general public.

Many project in Sweden, within different research programmes, focus on people with special needs, such as elderly, mentally and physically disabled and chronically ill. One example from the county of Västerbotten is the TILLIT project (Taking care of Life situation and Life quality of the individual through information exchange and quality – social technology for an independent life of elderly and disabled). The purpose of this project is to increase safety and quality of life for people who need support from both municipality and county, through improved communication between the caregivers. The project has developed a database, which functions as an information forum where different caregivers can communicate.

Another application in the county of Västerbotten is sign interpreting at a distance, through videoconference technique. There are eleven interpreters in this large county serving deaf and hearing disabled citizen. The municipalities in the county can also use this service.

One of the goals in Swedish politic concerning disabled people is "Complicity and equality for all, independent of disability". Between 1996 and 1999, the Foundation of Knowledge financed several pilot projects in the area of "IT and education for disabled", for example projects that developed IT supported pedagogical tools and models, such as voice directed IT programs.

### *Conclusions*

Many activities are under way that focus on care in the home for elderly and others. This is a field where many local projects serve as good examples and should have the potential to diffuse into a wider use. There are also examples of programmes aimed at a more extensive approach and collaboration with other actors. The projects address technical, legal and

organisational issues. Modelling the way the work is organised is a good example.

The Danish example of creating a business area in the eGovernment project for children and adolescents at risk is a good example of where an under-served group was the starting point integrating IT with the goals of the policy area. It shows that digitalisation is not an end in itself, but a means for improving services. Pinpointing services that are not satisfactory and that could be improved by using IT, together with the necessary development in work processes and organisations, seems to be a better strategy than focusing on the digitalisation process itself.

Target groups for social services are often those affected most by the “digital divide”. This adds to other challenges in the digitalisation and reform process of social services. Action is necessary to improve IT maturity and increase the use of IT among these groups. The Nordic countries are concerned about the digital divide and have many initiatives to diminish it. Broadband to remote areas, home PCs, initiatives for the handicapped and elderly are all examples of activities for e-inclusion. Adapting the technology to the needs of specific groups may be necessary both to prevent e-exclusion in general and to create prerequisites for new services that benefit these groups and improve efficiency in the social sector.

## Infrastructure for IT-Based Health Services

This section describes the infrastructure and technology used in the Nordic countries. The questions to be answered are whether a national health net exists, how it has developed, how it is organised, how it is used, and what technology it is based on.

### *Sweden*

Sjunet is a national communication net within the health sector. The net started as a regional project in 1998 within the ITHS programme, involving seven counties. Sjunet is administrated and further developed by Carelink since year 2000. Today all counties, hospitals and primary care units are included, as well as the Swedish Pharmacy chain Apoteket, some local authorities and some private caregivers.

Sjunet offers secure communication, distribution of images, medical applications, and other services for which Internet is considered to be insecure.

Sjunet is an IP-based broadband that consists of nodes linking together all of the counties, local authorities (municipalities), and the largest private health care providers. In its first version, Sjunet was a “Virtual Private Network” (VPN) offered by Telia but not available to the public.

Since 2003 technology has been based on VLAN which is separate from the Internet.

From the outset, the need for certain common services was obvious. Some services relate to the functionality of the network infrastructure. Others are practical services where a need for co-operation has been identified or where it is more cost efficient to procure the service in collaboration. Infrastructure services include, e.g. DNS, protocols, nodes, and directory services. Of special interest is the provision on security certificates, following the PKI standard, from a CA-server (Certified Authority) that allows decryption and authentication of messages sent on Sjunet. All hospitals connected to Sjunet can make use of this service. The PKI infrastructure relies on another joint service, the health personnel directory (HSA). This is built with X500 directories in each member organisation of Sjunet. The directory allows the use of secure messaging and provides correct contact details for health care. There is also IP telephony and video traffic on Sjunet. The videoconferencing service includes a video-bridge for multiconferencing, a videonumber directory, gatekeepers (video-switches), and a number of guidelines. Under way is another infrastructure project, “Secure e-mail”.

### *Iceland*

Currently, Iceland does not have a national health net. However, one is included in the present strategy, stating that the health care network linking health care institutions and enabling, e.g. telemedicine, should become fully operational by the end of 2006.

### *Denmark*

The objective of the MedCom project is to develop a nation-wide health care network connecting the actors in the health care sector.<sup>41</sup> At the end of 2003, all hospitals, laboratories, and pharmacies, 2,100 GP practices, and 10 municipalities – in total over 2,500 different organisations – were using the health care network on a daily basis. More than 2 million messages are exchanged each month, which represents 60 percent of the cross-sectorial communication.

From the start, the purpose of MedCom was to develop nation-wide standards for the most common communication flows between medical practices, hospitals, and pharmacies, e.g. referrals and discharge letters, laboratory results, x-ray letters, prescriptions, and hospital billing. These communication flows amounted to over 30 million messages per year.

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<sup>41</sup> The project is funded by Ministry of Health, Ministry of Social Affairs, Association of County Councils in Denmark, Copenhagen Hospital Corporation, Copenhagen and Frederiksberg Municipalities, The National Board of Health, Danish Pharmaceutical Association and Dan Net A/S.

***MedCom I: 1994–1996***

The MedCom I project in the period 1995–96 developed and validated national EDI standards for the most frequently exchanged messages between GPs and the other health care sector, i.e. discharge letters, laboratory reports, and prescriptions.<sup>42</sup>

***MedCom II 1997–99***

The MedCom II project in the period 1997–99 focused on rapid developing of communication standards. The target groups were also extended. The local authorities of the health care sector were brought into the project together with dentistry and telemedicine.

***MedCom III: 2000–2001***

During this phase, electronic communication came into use on a large scale. Electronic EDI communication overtook daily, paper-based communication in the primary health care sector. The majority of physicians, hospitals, laboratories, and pharmacies changed to the use of electronic communication instead of writing letters.

***MedCom IV: 2002–2005***

MedCom migrated in 2002 to Internet technology and series of Internet based projects between the health care actors have therefore been launched. Another important area is re-use of MedCom’s standards in the hospital area.

The background to MedCom I was to counteract the tendency for the counties to “re-invent the wheel”. Already in 1992, Funen County submitted a proposal to organise a joint, nation-wide project bringing together national government, the counties, private companies, and health care organisations under the name of “MedCom – The Danish Healthcare Data Network”.

The development projects in MedCom I ran from 1994 to 1996 as 25 pilot projects spread across the country, which altogether involved most of the IT suppliers to hospitals and medical practices. However, the dissemination of the standards went slowly. A decision was therefore made to carry out a second project – MedCom II.

Internet technology started to be used in MedCom II. EDI communication among hospitals, medical practices, and pharmacies became everyday reality in all Danish counties. Altogether more than 2000 medical practices, pharmacies, hospitals, and laboratories were connected to the health care data network at the end of 1999, and between one third and

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<sup>42</sup> Med Com, “MedCom IV, Status, Plans and projects”, October 2003

one half of all standardised communication between the parties in the health care sector was exchanged electronically.

During MedCom III approximately 80 projects were carried out covering quality assurance, telemedicine, communication between hospitals, and communication for home and elderly care. Four project lines were launched: the Hospital Area, Telemedicine/Internet, Local-Authority Communication, and International Projects.

The MedCom IV project builds on previous MedCom projects and consists of four project lines; the Internet Strategy, The Local-Authority projects, The XML-EPR Communication project, and the MedCom’s SUP project. These project lines are described below.

Another initiative for infrastructure with accompanying services is FynCom, a regional net intended to increase IT in the Funen health care sector. Establishment of electronic communication and information access assures that relevant data is available for all parties at the right time during the period of care. FynCom is responsible for the Funen health care network which includes general practitioners, hospitals, pharmacies, municipalities, physicians on call, physiotherapists, chiropractors, and dentists in Funen. Most of the GPs, all hospital departments, all pharmacies, and some municipalities in Funen are using the health care network to exchange prescriptions, referrals, discharge letters, clinical chemistry, and radiology requisitions/replies, letters, information about hospitals admittance and discharge, reimbursement claims, etc.

There are several services for GPs and citizens in FynCom, e.g. VisInfo – the County of Funen information system containing visitation information from the hospitals to the GPs. Via the Internet, a GP can obtain information on waiting times for hospital admittance, treatment guidelines, visitation guidelines, patient information, etc.

The infrastructure used in three major EHCR projects varies. One is the generic model in Århus that enables communication to other proprietary systems. Another model is the middleware model, which is applied in the Copenhagen Hospital Corporation. They will build future EHCR systems and integration of existing systems on the middleware’s data model. Hospitals in Vejle and Viborg counties use several different proprietary systems. A method for retrieval of patient data has been launched to gain access to data across counties and systems. Data are exported from the systems according to the SUP format. The data are then accessible by other authorised parties through a web browser. The fourth model is called a semantic model. The National Board of Health has developed a basic frame of reference for EHCR. This model is based on a problem-oriented way of documenting the activities. Currently, two areas of the basic model have been documented in more detail, i.e. medication and diagnostic imaging.

*Norway*

Norway has had a national health net since the summer of 2003. This net was one of the focus areas in the previous strategic plan, Si@!. The net was established to connect the regional nets.

The use of the net varies between the regions, but is increasing in all of them. The health nets in region North, and in region Mid-Norway have had a substantial traffic load for 2 to 3 years, but development in the other regions has been slower. Mid-Norway has a long tradition of regional co-operation, and the hospitals all use the same software for electronic health records (EHR), PACS, laboratory systems, and other main IT systems. This has made it fairly easy for them to operate the main systems from a common location on the net and reduce costs.

The three health regions in the west, south, and east have, for many years, had a net for electronic messaging based on a common mailbox. This service has been used for EDIFACT messages, and has been an inexpensive and simple solution for many actors. A limited company, owned by the Regional Health Authorities, responsible for the operation and further development of the Norwegian Health Net will be effective from October 1, 2004. The company's main responsibility is to supply a secure infrastructure for communication, while the applications (tele-medicine, etc) are the responsibility of the health service providers.

*Finland*

To create nation-wide services, there are several tasks that need national co-operation. For example, actions to secure integrity and other initiatives need to be taken for the systems to communicate.

Government policies, aimed at development of broadband infrastructure, state that particular emphasis should be placed on specific applications (e.g. health, education) and deployment to target groups (e.g. remote regions, SMEs).

The Ministry of Social Affairs and Health does not have a specific policy on broadband. The general policy in Finland has been to let the market create appropriate solutions and build the technological infrastructures that the public institutions also utilise. Lately, there seems to be a broader consensus that remote and scarcely populated areas will need special attention and extra resources for the roll-out to have national coverage.

There is a strong trend towards moving from isolated hospital information systems to networked regional systems. The first phase was to connect all Finnish hospitals together using broadband connection (via ATM network). This was done during the last half of the 1990s. At the same time, hospitals and health care centres will be networked inside a hospital district. The result is an open (and commercial) national health

information highway – a target set by the previously mentioned national IT strategy for health care.

In Finland, both the industry and health care providers have selected a message based integration architecture for regional and national communication. Finland's health system uses HL7 message standards and will be using increasingly more XML messages for transferring patient information between health providers and professionals.

The national PKI architecture for e-health applications is now under development. This architecture includes security and e-consent features and is supported by the Finnish social security smart card.

The regional data systems that are used in the social and health care sectors were developed during the 1990s within the framework of the Satakunta Makropilot project and the temporary law on seamless social and health care services that was passed as part of the project. The temporary law will be extended to 2005. In connection with the extension, other municipalities will be invited to join the project.

### *Conclusions*

Denmark, Sweden, and Norway have national health nets. Sweden has a broadband that is separate from the Internet, while the Danish net migrated to Internet technology in 2002. The Swedish net evolved from a project involving seven counties in 1998, while in Denmark the development of a health net was a joint national project already in 1992. In Norway, the regional nets were connected in the summer of 2003, and Iceland is planning to have a net by 2006. In Finland, the infrastructure is on a regional basis.

Connecting services to the national net requires substantial technical work to make the existing technologies communicate. The countries vary in how far they have come, and also which strategy they have chosen. In Denmark, the development has been driven by several large projects, while in Norway the development has been more centralised, but based on projects in the five former health regions. In Sweden, development of the net has been a project in co-operation between independent counties.

## Security in the Health Care and Social Sectors

### *Sweden*

By the end of 1990s, some counties (Östergötland, Skåne, Stockholm) initiated the project SITHS (Säker IT i Sjukvården), partly financed by the Knowledge Foundation. Carelink was given the task of implementing SITHS in Sweden. Its results are now used in several counties, and most counties have signed an agreement to build the security infrastructure

according to the definitions of SITHS. The model is based on PKI for identification and signing. The employee has a personal electronic ID card for identification. The card contains a certificate that opens for digital signatures.

The requirements behind SITHS is an infrastructure that is sector specific, is built on standards, works for all actors in the sector at a national level, is based on mobile smart cards and admits sector certificates. Employees with several positions need several certificates.

There are also other initiatives concerning these questions, e.g. a national network for information security, the NIS group.

Collaboration with open-source software, with a programme code that others may freely copy, gives rise to many legal questions. At present, these ideas are developed. Carelink published a report in 2003 on the legal consequences of disseminating open-source software in the public sector. An open-source programme has a licence that allows the programme to be copied, modified, and diffused. The program's code is freely available.

### *Denmark*

In 2002, National Board of Health developed guidelines for security in the health care sector. Its primary purpose is to give advice on how organisations in the sector can ensure that security is adequate according to existing laws and principles for an acceptable level of security. The guidelines are directed towards hospitals, and do not cover other actors in the sector.

The current strategy for IT in health sector (2003–2007) proposes that the National Board of Health will assist all actors and organisations in the sector to fulfil the security requirements concerning patient health records and other information. Guidance and informative materials will be offered.

In November 2003, the National Board of Health published a report on IT security in the sector.<sup>43</sup> This report analyses the use of digital signatures and the pros and cons of various kinds of certificates, e.g. different certificates for identification such as personal certificates and the circumstances for which this would be issued. It is recommended that the certificate would be valid for the entire sector. There are also certificates linked to a certain activity and not a person. Even here there are alternative set-ups. For certain activities it is recommended that the certificate should be connected to the server and its applications, and available to personnel with a digital signature. Furthermore, there are software and hardware certificates where the certificate is an installed file. A PIN code is used in these cases.

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<sup>43</sup> National Board of Health (Sundhedsstyrelsen), "Digital signature og PKI i sundhedsvæsenet", November 2003

Work on security in the health sector is connected to security in eGovernment and electronic communication in the public sector. After launching a public certificate for electronic services in 2003, the focus increased on how to enhance the use of certificates to improve security and electronic communication in the health sector. There are three types of Government OCES certificates: personal, collegial, and business. It has a software-based certificate and may be used in organisations where each employee has his/her own computer. This is, however, inappropriate in a hospital where often several persons share a computer.

Other areas discussed in the guidelines are the definitions by which employees, organisations, and activities will be identified and the administration and responsibilities of the organisations involved.

### *Norway*

Norway has a distinct legislation regarding personal information and employees in the health sector. Two new laws, regarding confidentiality of personal information and regarding health professionals came into force in January 2001. In January 2002, a new law was established concerning registers and information in the health sector. These laws consist of rules for handling electronic health information and include rules on integrity and security, which have implications for electronic health records. In the previous law on personal information, the rule was to apply for the right to handle personal information, while the new law separates sensitive and non-sensitive information. For sensitive information, it is still necessary to apply for the right to handle such health information, although there are many exceptions.

The Directorate for Health and Social Affairs (Social- og Helsedirektoratet) published a guideline in 2002 on security in the regional health companies. This guideline presents an overview on the activities needed to establish a system for security, and methods to collect and present information. A system for managing security should include certain elements, e.g. goals, strategies and action plans, a responsible organisation, auditing, internal control, description of technical solutions, and a description on the personal information that is collected.

The National Insurance Service (Rikstrygdeverket), on behalf of the health and social care sector, has established certification and services for digital signatures and PKI. KITH has played a major role in the process of establishing this service.

### *Iceland*

Security is included in the general policy for IT in society. The policy aims for the general and widespread use of electronic certification so that any communicating partner may be positively identified: electronic signa-

tures and coding shall be introduced insofar as is deemed appropriate. The state's requirements shall be published with regard to the content, form, and handling of electronic certificates for transactions with national institutions. Those requirements might become the model for a general Public Key Infrastructure (PKI) for industry and municipalities. When the time is appropriate, European and international standards shall be adhered to, aiming for integration with the Public Key Infrastructure of neighbouring countries.

### *Finland*

Security issues and privacy protection have been, and remain, key elements in the IT strategy of the Ministry of Social Affairs and Health. The Ministry has actively supported the development of authentication procedures that are based on PKI solutions.

Actions supporting national strategy include the creation of new legislation. In 2003, the Ministry prepared modifications concerning certification and digital signatures to the Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services. The following temporary laws have been accepted:

- Legislation for Seamless Services in Social Affairs and Health, which includes new statements for authentication of citizens, health professionals, and organisations in e-services.
- Legislation for e-prescription services

The Ministry intends to enlarge the geographical area where the experiment takes place. It will also create an Internet-based national service for the certification of health care personnel.

National Guidelines for Safeguarding will be defined during 2004-2005. This includes an eConfidentiality statement, the patient's right to issue informed consent. Also requirements for secure digital archiving will be developed.

Based on the decision made by the Finnish Government, the interoperable core data set has to be implemented at the national level by the end of 2007, and all EHR systems will be certified for interoperability and security after 2007.

### *Conclusions*

The security and legal aspects are important, especially regarding electronic health records and when information crosses borders between levels, institutions, and actors within and between sectors. The legal aspects of these information flows need to be fully analysed, and laws need to be adjusted. One question to address is for whom the information should be available.

Key aspects that need to be included in a secure system are that the information should not be available to unauthorised individuals; integrity needs to be high to prevent false prescriptions, and eventual attempts need to be traceable. In addition, it should be possible to identify the user afterwards. Relevant legislation includes the laws regulating registers, personal information, patients' rights, and employee rights and obligations. The use of e-mail and health-related matters on the Internet are also matters that need to be regulated.

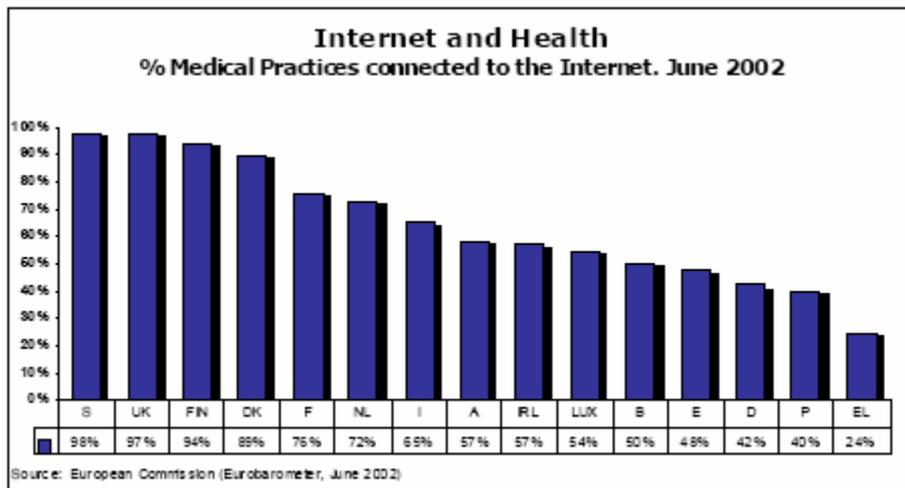
Security aspects are presently in focus. In Denmark, security aspects are currently a priority, and in Sweden the counties have agreed on a security framework. In Norway, important reforms have been undertaken in legislation to have the regulatory framework keep pace with development, but in Sweden the regulatory framework is said to be a crucial problem for development.

## IT for Communication in Health and Social Care

This section presents examples of IT applications in the Nordic countries. The section aims to illustrate the various types of applications used in the different countries, to serve as inspiration and diffusion of good examples, and to open the possibility of finding counterparts in other Nordic countries. However, among several hundreds of projects, we just cover some example of various types. Many other cases, just as interesting, are not included.

### *European outlook*

The Nordic countries are at the forefront in Europe. The 2002 Eurobarometer survey showed that an average of 78 percent of EU medical general practitioners were online, with – at the highest level – 98 percent in Sweden and 97 percent in the United Kingdom.



IT in health services in Europe is relatively low, but growing fast. On average, in the European Union of 15 Member States, 48 percent of medical practitioners use electronic health care records, and 46 percent use the Internet to transmit patient data to other care providers for the purposes of continuity of care. But a fully interactive use of the Internet to deliver care to patients through the provision, e.g. of e-mail consultation (12 percent), or to enable patients to book appointments online (2 percent) appears to be only in its early stages.

<b>Eurobarometer EU 15</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
GPs with internet connection	44%	77%	78%
for continuing education	34%	70%	72%
to transfer patient medical data	9%	37%	46%
to offer telemedicine services	5%	7%	12%

### *Sweden*

Many important applications in Sweden are connected to Sjunet, the national communication net. Several examples of Sjunet's services can be found within the field of telemedicine, including the secure transmission of patient information, clinical rounds, teleradiology and collaboration between caregivers in different organisations.

Sjunet is used for health care communication across organisational boundaries, between organisations with separate intranets, for example between two hospitals, between a hospital and a municipality or between

a caregiver and a pharmacy. Many local projects and applications use internal nets.

A large number of prescriptions are being transmitted electronically to pharmacies through Sjunet. In addition, Sjunet is also used for IP telephony, file and media transmissions and access to knowledge databases. These services are possible because Sjunet is based on IP technology.

Sjunet's video platform is used for videoconferencing in health care irrespective of network technology – whether Sjunet, ISDN or the Internet. Videoconferencing equipment is available in most county councils and hospitals and is used for meetings, telemedical consultations, education, clinical rounds and health care planning between municipalities and county councils.

By using Sjunet's IP-based network, local clinics and hospitals are able to consult specialists in neurophysiology from university hospitals for the analysis of EEG and nerve conduction studies. The specialist can access databases with patient information at referring clinics. Once the analysis has been done, the specialist sends the report to the referring physician. A cost-benefit study of this example shows considerable savings – both for health care and patients.

Another programme is *Distributed Radiotherapy – A Joint Centre Model* project, which introduced the notion of distributed care in this field. Traditionally radiography has been available mainly in the university hospitals. Within this programme mobile equipment has been developed involving open standards to ensure integration with equipment used in small local hospitals. The smaller hospital is twinned with a larger hospital where specialists in physics and radiotherapy oversee patients' treatment. The vital dose planning is carried out remotely using a series of CT scans and a twice-weekly video case conference between the two teams that support the programme. This service is offered on a regular basis in two different locations in Sweden – relieving frail patients the burden of distant travelling to receive vital care and therapy.

Another example shows the use of IT to meet the challenges of providing advanced clinical services to citizens in sparsely populated areas. When it recently was difficult to recruit an MRT specialist, the Radiology Clinic of Sollefteå in northern Sweden began a co-operation with the European Telemedicine Clinic in Barcelona. Through the establishment of a secure connection for the transmission of data (Sjunet), between Sollefteå and Barcelona, pictures can be sent for analysis in Spain. This has rapidly reduced the queues due to the increased number of examinations, despite the fact that there are no MRT specialists in Sollefteå. Sollefteå Hospital is the first institution in Europe to carry out this sort of co-operation within the field of radiology.

Relatively unique in Sweden are quality registers such as RIKS-HIA which stands for "Register of Information and Knowledge about Swedish Heart Intensive care Admissions". The register includes data on patients

within heart intensive care. The purpose is to increase knowledge about the process of care and thereby increase results. The information includes a hundred of variables, e.g. background, treatment and complications. A large amount of all hospitals, 90 percent, participate which gives an overview of new methods of treatment and results, which may be used to identify weaknesses in the process of care. There are also other registers that also aim at improving treatments and results, as well as being used for research. Some examples are registers for knee-operations, stroke and cancer.

An area of communication, which receives attention, is communication between health actors and the Swedish pharmacy chain (Apoteket). E-lak<sup>44</sup> supports development of electronic communication between health service, care, and pharmacies. This initiative includes several activities, e.g. e-dos (where all prescriptions that should be taken at a specific time are packed together), e-prescription, and e-orders. Apoteket has an application on the web for e-dose, and all pharmacies have the technical capacity for e-prescriptions. In May 2004, 27 percent of first time prescriptions were e-prescriptions, but regional differences are great. Some counties report only a few percent while others report over 90 percent.

However, the use of IT in the municipal care is generally low. Around 10 percent of the municipalities have a reasonable IT support for their elderly care. In primary care, IT is more common, and nearly all primary care suppliers use IT in their internal work, while digitalisation varies widely between hospitals. On average, 75 percent of the Swedish hospitals practice some kind of telemedicine. Around half of these involved consultations such as advice or lab results.

Carelink, together with Federation of County Councils and Swedish Association of Local Authorities has undertaken a study describing use, need and visions on IT in municipalities<sup>45</sup>. The description shows that at the time of the study, less than half of the municipalities have IT for nurses, occupational therapist and physiotherapists. The study shows that there is a large potential for digitalisation of communication flows within the municipalities and between the municipalities and county councils (hospitals, primary care centres). Economic restrains is said to be the largest barrier, but there are also good examples despite limited resources.

Together with the Association of Private Care Providers, Carelink has also undertaken a study describing the use of IT in the private care sector<sup>46</sup>. About 10 percent of Swedish health care is carried out by private caregivers on contract, for example within elderly care, advanced home care, care of people with disabilities and primary care. The study shows a

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<sup>44</sup> E-lak: A forum/network led by Carelink, with representatives from most county councils/regions, several local Authorities and the pharmacy chain Apoteket.

<sup>45</sup> Carelink, "IT i primärkommunal vård och omsorg – nu och i framtiden", rapport nr 1/2002

<sup>46</sup> Carelink, "IT-stöd i privat bedriven vård och omsorg 2003"

number of interesting examples and a great need of secured seamless care and coordination of information exchange between the different organisations.

In one county, Blekinge, the project OVK was initiated in 2001 to find out which information that was necessary to ensure seamless care and the role IT should have in this process. This was a method to systematically work out a platform for seamless care and increased use of IT. Another project, based on the experiences from OVK, is TILLIT, described in the chapter "IT for groups at risk for social exclusion".

An essential programme for developing IT applications in Health care is ITHS1<sup>47</sup> which was initiated by the Knowledge Foundation<sup>48</sup> and the Federation of County Councils in 1997. The purpose was to increase cooperation with social care and health services and to increase knowledge about the advantages with IT. Later also the Vårdal Foundation<sup>49</sup> became a financing part. ITHS1 had SEK 150 millions at its disposal between 1997 and 2002 and co-financing was 20-50 percent. Financing was given to competing 112 projects within five areas; telematics, infrastructure, industrial applications, education and research.

The evaluation of ITHS1 shows that the projects have resulted in new forms of collaboration and new applications. More than 75 percent stated that the project has achieved the expected results. Around half stated that establishment of new work processes was the prime motive for the project. As many as 40 percent stated that the initial project would not have been done without ITHS1, but most of the projects remain active after the project period, with self-financing (40 percent), implementation in ordinary business (28 percent), other external financing (30 percent), and/or new financing from ITHS2 (13 percent).

The Knowledge Foundation and the Vårdal Foundation decided on a new program year 2001, ITHS2, with a budget of SEK 65 millions. The main goal of this new program is to build a better regional collaboration within distant health care, home care and elderly care. Together with Carelink, these Foundations also arrange national seminars to disseminate information about ongoing projects and good examples of IT in health care.

Swedish nurses union (Svensk sjuksköterskeförening) have developed a strategy to secure the development of nurses competence in IT. In this strategy there are several statements such as: IT should be included in basic education, nurses who has not got any education in IT should be given this, the continued education on IT should increase and be flexible, education in IT should be encouraged by the employer, internet should be available for all nurses and that all nurses should have an e-mail address.

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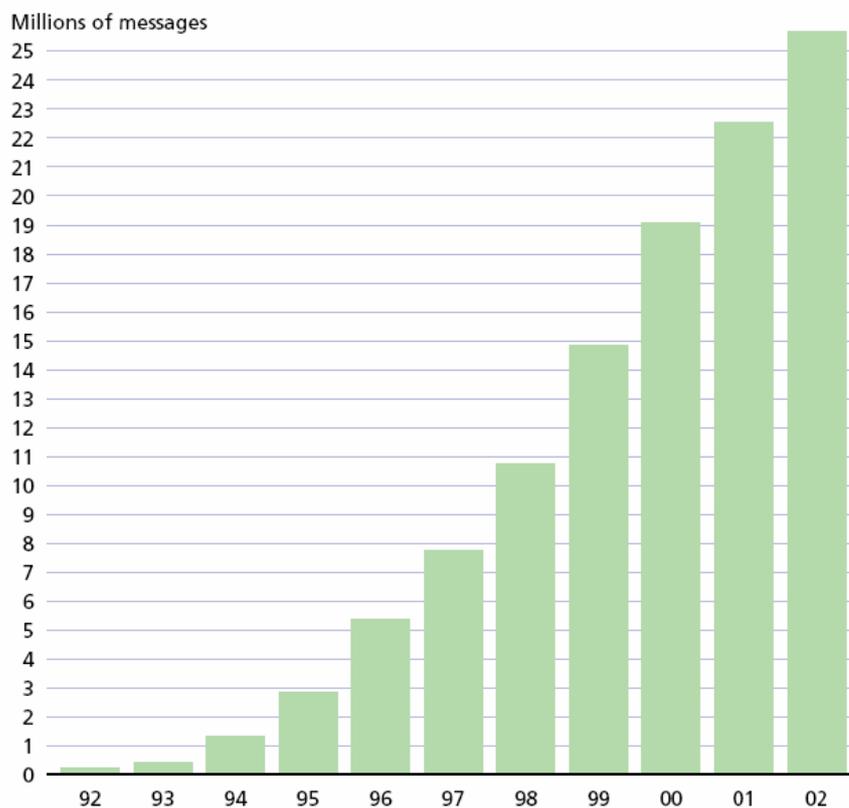
<sup>47</sup> ITHS1: Forskningsprogrammet IT i Hälso- och Sjukvården

<sup>48</sup> The Knowledge Foundation (KK-stiftelsen): [www.kks.se](http://www.kks.se)

<sup>49</sup> The Vårdal Foundation (Vårdalstiftelsen): [www.vardal.se](http://www.vardal.se)

*Denmark*

Denmark is at the forefront in many applications and e-prescriptions as well as in communication between municipalities and counties in the health care process. Around 90 percent of the physicians use electronic health records, and the use of e-prescription is well established. Nearly all hospitals use the national health data net and four counties use web based x-rays for communication between general practitioners and specialists. Six counties have teleconsultations between general practitioners and specialists in dermatology. A national, web-based service has been established where general practitioners can order test results from laboratories throughout the country.



*The spread and use of the healthcare data network has developed appreciably over the last ten years. Today, 2.3 million messages a month are communicated.*

Source: MedCom, "MedCom IV- Status, planer og projekter", Oktober 2003

General medical practices are now engaging in new IT opportunities for general practitioners that were introduced in the new agreement between the Association of County Councils and the GPs (effective April 1, 2003). By January 1, 2004 all physicians who had received a computer billing

fee in January 2003 must be able to communicate according to all the MedCom-approved standards as they existed in October 2002. They must follow the standards for prescriptions, billing, discharge summaries, and laboratory results in their communication, and – to the extent that it is safe and practical to do so – referrals and laboratory requests. All physicians who did not receive a computer billing fee in January 2003 must join by January 1, 2005. In addition, provision is made to offer patients e-mail consultation, give results to patients by e-mail, and schedule appointments and renew prescriptions on the Internet.

Electronic EDI-communication dominates over paper communication in health services.

**EDI communication**

<b>Spread</b>	<b>Number</b>	<b>%</b>
General practitioners	1939	88%
Specialists	444	57%
Pharmacies	331	100%
Hospitals	64	100%
Local authorities	24	26%
<b>Gains</b>		<b>Saving</b>
Medical practice	50 min./day	
Telephone follow-up to hospitals	66%	
Per message	DKK 25	
<b>Total electronic communication:</b>		
2.3 million messages a month. 70% of all communication in the primary healthcare sector.		

Source: MedCom, "MedCom IV- Status, planer og projekter", Oktober 2003

Within MedCom IV four project lines are developed further:

- The Internet Strategy, the purpose of which is to introduce a nationwide, Internet-based health care data network and achieve large-scale use of web lookup, telemedicine, and other Internet-based forms of communication in the health care sector. The background to this strategy concerned intranets based on Internet technology that were

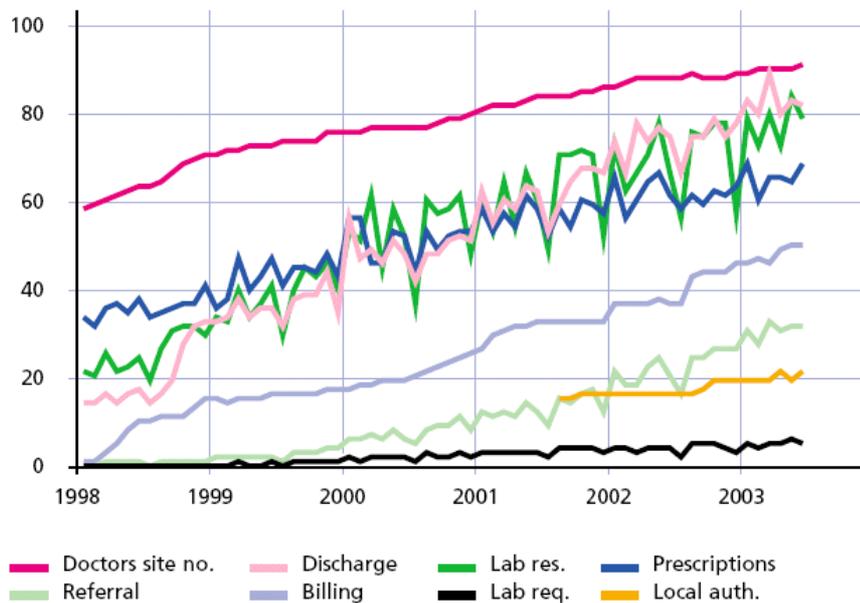
being established in many organisations: counties, the Copenhagen Hospital Co-operation, local authorities, the Danish Pharmaceutical Association, the Danish Medical Association, etc. At the same time, encrypted VPN connections were established between counties to exchange data attributable to individuals, e.g. x-ray images. The idea underlying the project is to use existing intranets as a base and link them together via VPN technology to ensure a common Internet-based infrastructure for different forms of exchange of health care data: EDI (e.g. electronic prescriptions), secure e-mail (e.g. e-mail between medical practices and the health visitor service) and lookup via the Web (e.g. lookup in record information, including medication forms).

- The Local-Authority project aims at achieving large-scale use of MedCom’s standards for communication between hospitals and local-authority home care. The objective is to have the computer systems in the local authorities talk to hospitals’ computer systems via EDIFACT standards, thereby enabling information on joint clients to follow the patients smoothly (without having to be keyed in again when they move between the areas of responsibility of hospitals and local authorities). The development of this electronic communication will take place in two stages. The first stage covers exchange of basic information in the form of electronic notice of admission, admission response, and notice of discharge. The second stage consists of exchange of information in the form of electronic nursing reports and notification messages.
- The XML-EPR Communication project aims to achieve large-scale, nation-wide use of all relevant MedCom messages for communication internally in hospitals and between hospitals. Work is needed to ensure that hospital systems are able to speak the same language as other IT systems in the health sector. The overall aim of this project is to adapt MedCom’s standards from the primary sector so that they can be re-used in the hospital area. The project will cover 26 types of messages and involve 36 different IT suppliers. A decision has been made to change over from EDIFACT to XML for internal hospital communication.
- MedCom’s SUP project aims to achieve Internet access to Patient Administrative Systems (PAS) and EHR patient records both within a county and across county boundaries. The project is designed to enable data retrieval (“pull”) from other Patient Administrative Systems (PAS) and EHR systems via the Internet. This should support the introduction of EHR systems in hospitals by ensuring that pre-defined information can be exchanged between existing IT systems at the hospital and across counties. As the SUP retrieval from various patient systems takes place by means of the same national SUP format, retrievals from different records will appear in a uniform format – irrespective of which patient system they originate from. The

project aims to provide access to view predefined patient data in PAS and EHR systems “belonging” to other institutions – either in the same county or in other counties. The standardised retrieval format makes it possible to conduct data analyses on all predefined, structured data across the patient records stored in a SUP Database.

## MedCom status

Percentage of possible messages



*The “Doctors site number” curve shows the proportion of doctors who use EDI communication, while the “Local authorities” curve shows the proportion of local authorities connected to the healthcare data network. The other curves show how large a proportion of discharge letters, laboratory requests, laboratory results, prescriptions, referrals and bills from general practice to the National Health Insurance Scheme proceed electronically.*

*Only in laboratory requesting and communication with the local-authority health visiting service is there still a need for further development and dissemination projects.*

Source: MedCom, “MedCom IV- Status, planer og projekter”, Oktober 2003

Several other services have been developed on the net in Denmark. One example is WebReq, a new web-based laboratory requisition system. This service reduces the costs of expensive electronic requisitions for biochemistry tests. WebReq can be used in two ways; one is an integrated solution where the basic information about the GP’s login and password and the patient’s name and ID are transferred automatically to the web server. The other is a solution where the login and password are trans-

ferred using a simple html programme on the computer used, and annual entering of the patient’s ID and name.

#### *The electronic health record in Denmark*

The introduction of the electronic health record (EHR) in the Danish health care system has not happened overnight, but has been achieved on the basis of many activities and projects over time. The establishment of the EHR in Denmark has been central in the National IT strategy 2003-2007, because it will create the necessary continuity in the treatment of the patient. In the following the activities and projects, which has been the foundation for the establishment of the EHR in Denmark will be described.

In 1996 the Ministry of Health and the hospitals owners began collaborating in order to initiate and stimulate the development of EHR. The aim was to optimise the quality, service and collaboration in the health sector by promoting the development, introduction and use of EHR. The programme initially established<sup>50</sup> was driven by 14 regional and local projects.

In 1999, a new strategy<sup>51</sup> was published. The aim of the new strategy was to collect all the local and regional projects into one national project organisation, which would realise one goal – to create seamless patient care. In the strategy it was emphasized that implementing and using EHR would be a precondition for a systematic development of quality within the health care sector. By the use of information technologies, the already existing technologies had to be integrated.

In May 2003 a new strategy 2003 – 2007<sup>52</sup> replaced the existing one. This strategy not only points to local initiatives with should be implemented nationally, but the aim of the strategy is also to strengthen the coordination of the IT deployment as a prerequisite for an effective use of IT in the health sector. IT use shall contribute to fulfil the overall political goals for the health care system, e.g. a high level of quality and patient satisfaction, shorter waiting lists, efficiency, effectiveness, and freedom of choice.

Listing the visions and objective of the 2003–2007 strategy, these are:

- The development of IT in the health care sector must contribute to a better interaction between the citizen and the health sector and it must support the individual in attending to his or her own health and treatment.
- IT must ensure that the individual citizen/patient will experience a continuous care even though he or she is in contact with several

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<sup>50</sup> Sundhedsministeriet, Handlingsplan for Elektroniske Patientjournaler. Strategirapport. 1996

<sup>51</sup> Sundhedsministeriet, National strategi for IT i sundhedsvæsnet 2000-2002. 1999

<sup>52</sup> Indenrigs- og Sundhedsministeriet, National strategi for IT i sundhedsvæsnet 2003-2007. 2003

sections of the health care sector. The exchange of patient data must therefore be seamless.

- For the health professionals IT must act an integrated toll in the daily clinical work place. It must not only be a tool to register information but also to find information, which will be relevant for the decisions taken in the patient treatment. The use of IT will also be a tool, which will ease the communication between other health professionals both internally and across institutions and sections.

In order to implement the visions and objectives stated, the strategy sets forth initiatives, which will increasingly strengthen the development and use of EHRs. These are<sup>53</sup>:

- Co-ordinated implementation of EHRs
  - based on the Basic Conceptual Model for EHR Clinical Process (B-EHR)
  - pilots to clarify organisational and technical issues
  - large scale implementation planned from January 2004
- A national terminology server and organisation
  - to underpin the continued work on classification and modelling
- A Public Health Portal provided during 2004
  - citizen access to health information
  - physician access to updated patient medication lists
  - intercommunication for health professionals
- The National Patient Registry transformation into a registry based on 'Clinical Process' and continuity of care
  - for better planning
  - for clinical quality development
  - for health professionals' easy access to patients' medical history

As it is illustrated by the above the 2003–2007 strategy is therefore the centre focus of several activities, and some of these will be described in detail in the following: The development of an electronic system (EHR), developed through a basic structure for this in the Clinical Process (B-EHR) and tested in a pilot project (GEPKA), with the technology being developed in another (SNOWMED CT).

The development of EHR systems in Denmark is based on the national B-EHR<sup>54</sup> (Basic structure for the electronic health record). This development of a conceptual model for communication in EHRs has moved towards a two-folded structure, i.e. a conceptual model for documentation of clinical information.

The first step toward the development of specifications for standardized EHR communication were made in December 1999 when the Danish

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<sup>53</sup> Lippert, S, "The National Strategi for Health Informatic", Presentation at MIE 2003.

<sup>54</sup> In Danish G-EPJ - Grundstruktur for Elektronisk Patient Journal.

National Board of Health took on the approach of modelling a common structure for EHR to be more specific compared to e.g. the European Pre-standard for Electronic Healthcare Communication, i.e. CEN/ENV 13606.

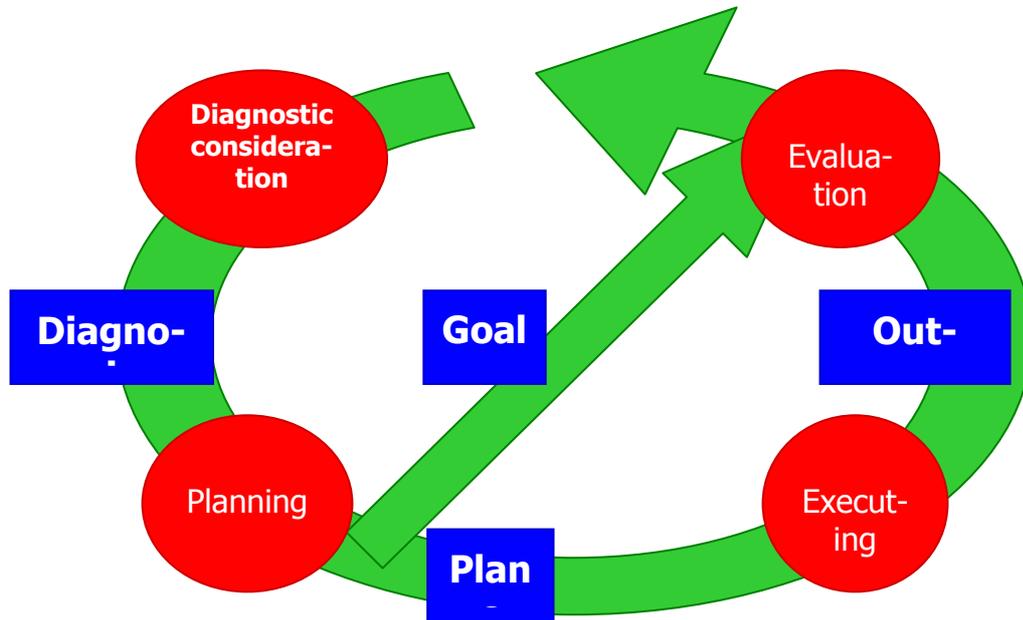
Comparing the Danish conceptual model to the CEN/ENV 13606 it was clear that the CEN/ENV 13606, part I contained the extended reference architecture for communication health related information partly or solely by EHR. Both the Danish model and the CEN/ENV 13606 use object oriented analysis documented through UML (Unified Modelling Language) notation. However, whereas the CEN/ENV 13606 focuses on the composition of the EHR as such, the Danish model would address the information processing in clinical situations, including relations and structure of the information components.

During 2001 a Clinical Process was conceptualised, as a process to describe and define the concepts and their relations in a way that was meaningful for health professionals when documenting and searching for structured information in EHR<sup>55</sup>.

To a large extent clinical information processing is not visible in clinical documentation as it is traditionally conducted in e.g. a medical record. It is a systematic approach performed by the health professional in his or her own mind. In fact, this mental process is often executed at such a rate that the health professional him- or herself is hardly aware of each step of the Clinical Process. The Clinical Process as illustrated below includes in a generic level: “Diagnostic Consideration” leading to a “Diagnosis”, “Planning”, “Execution” of “Plan” and “Evaluation” of “Outcome” from intervention, the “Outcome” validated by “Goal”.

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<sup>55</sup> Asp, L & J. Petersen, A Conceptual Model for the Documentation of Clinical Information in the EHR, MIE2003, 2003



As illustrated, the Clinical Process is a specialization of the general method for problem solving due to stressing the point that the domain is health care and the modelling of the specific clinical information achieved and used according to the work processes. The conceptual model therefore is a visualization of the basic components of clinical work processes especially regarding documentation.

The Clinical Process consists of four separate steps that can be processed separately and iteratively, simultaneous sharing information in EHR:

**Diagnostic Consideration** is a process of collecting and analysing facts in order to understand the patient condition and determine the problems faced. This process implies that the practitioner, based on the facts at hand, describes the problems that are in focus. The documentation of the problems is expressed primarily as structured diagnoses.

**Diagnosis** is a clinical judgment where an actual or potential patient condition is in focus. Within the context of the conceptual model this professional judgment is defined in a much broader sense than a solely medical view. This is a consequence of the genuine cross professional perspective of the common documentation model for the EHR.

**Planning** is a process during, which activities to be conducted are outlined according to expected or desired outcomes. This process implies that health professionals – founded upon cross-professional clinical knowledge of health related problems – fill in concrete plans for diagnos-

tics, treatment, prevention, care, rehabilitation etc. Accordingly, through this outlining of plans the practitioner can indicate operational objectives and thereby document the desired outcome for all implicated parties to be aware of.

**A Goal** is the documentation of what is expected or desired outcome of intervention by practitioners, patients or third parties involved. The goals that are documented in this part of the clinical process are not objectives or intentions, but operational goals. This does not imply that the goals should always be quantitative, just an underlining of the operational aspect e.g. as to which extent the goal should be reached within a certain time limit.

**A Plan** is the documentation of which interventions, the practitioners have foreseen as suited to meet the clinical situation of the patient. This element could have been named 'prescription' or 'action plan' as well as 'Plan'. In any way, the structured information concerns the planning of interventions in a broad sense within a certain perspective of time. One plan can include other plans with a 'whole-part' relation.

**Execution** is a process in which planned interventions are conducted. Putting a plan into effect can result in plans at hand being executed and accomplished partly or as a whole.

**Outcome** is a documentation of the actual results following the interventions conducted. In this context, outcome is seen broadly as information about the patient's condition, i.e. results of examinations as well as different kinds of treatments and preventive actions due to e.g. medication, nursing, surgery, rehabilitation programmes etc.

**Evaluation** is a process in which the actual outcome is compared to the expected in order to establish whether the goal is achieved and the patient's condition thereby acceptable. The concept of 'clinical evaluation' includes both a comparison and an assessment. Evaluation in the context of this conceptual model includes merely a comparison between goals and outcomes – the following assessment can be carried out in the process of 'Diagnostic Consideration' as mentioned above. This way of perceiving evaluation as a distinct comparison makes room for an automated evaluation. This process can be conducted automatically in an EHR-system if the clinical information is suitably structured, i.e. according to common coding- and classification-systems. As a consequence, the health professional might only need to be involved in the evaluation when goals are not achieved.

As stated, the B-EHR builds on structured data only. By structuring data and by clinical systematic documentation, is it possible to re-use clinical

data cross-sectional. B-EHR does not necessarily need to structure its data within a specific classification system.

National Board of Health has suggested that a new Danish terminology should be developed in order to achieve consensus in the area. The terminology will be the framework within the B-EHR and the new suggested terminology will be established on SNOMED Clinical Terms (SNOWMED CT). SNOWMED CT is dynamic, scientifically validated clinical health care terminology and infrastructure that makes health care knowledge more usable and accessible. The terminology provides a common language that enables a consistent way of capturing, sharing and aggregating health data across specialities and sites of care. In Denmark it contains (among other things): 350,000 concepts, 800,000 terms, hierarchies and the relation between concepts (1.3 million)<sup>56</sup>.



In order to monitor the many projects, which the different national IT strategies had set forward, an EHR Observatory was founded in 1998. During the years the EHR Observatory not only hosts a yearly EHR conference, but it also publishes annual data from regional projects dealing with impact on organisational issues, benefits of EHR, integration with other information systems and security aspects of EHR.

One status report published in 2003<sup>57</sup> shows that the main advantage with electronic health care records is the ability to follow the patient, avoid mistakes, improve planning, and increase teamwork across disciplines. The main barriers are insufficient resources and resistance to change. The EHR Observatory evaluates electronic health care records from a broad perspective, including studying the various IT projects in the health sector from several perspectives, e.g. functionality, standards, integration, communication, technology, strategy, and implementation. Since the evaluations are made yearly and are accompanied by fairly detailed recommendations, it should be valuable material for organisations involved in these questions.



<sup>56</sup> EPJ-Observatoriet, Statusrapport 2004, MEDIQ, Aalborg Universitet, 2004

<sup>57</sup> EPJ-Observatoriet, Statusrapport 2003, MEDIQ, Aalborg Universitet, 2003

In order to test the B-EHR, the GEPKA project (G-EPJ Prototyper og Kliniske Afprøvninger) was initiated as a collaboration between the the Association of County Councils, Copenhagen Hospital Corporation, National Board of Health and the Ministry of Interior and Health.

During the project period from January 2004 to 2004, the GEPKA project would clinically test the B-EHR in order to see if it covered the basic clinical needs for documentation and information exchange, to technically test and validate the exchange of B-EHR data, and ensure that the technological as well as the organizational precondition and consequences of the implementation of B-EHR were described and discussed.

The EHR Observatory simultaneously conducted a systematic evaluation of the GEPKA project during the entire project period. In August 2004 an evaluation of the GEPKA project was published<sup>58</sup>, which focused on three main areas: Evaluation of prototype, test of exchange of data and clinical validation. The conclusions were that in many areas the GEPKA project had been a success. However, even though the project had experienced massive support from the participating hospitals and suppliers, there were also some valuable lessons to be learned. These were:

- The development of the system had been a greater task than assumed.
- The user interface was not ripe to be used in a clinical setting.
- The organisational preconditions, including the need for education in IT plus an understanding of the logic behind B-EHR, had not been met.

The EHR Observatory stated that there was still a firm foundation for the continued development of EHR based on commonality of standards and guidelines within the Danish health care sector, even though the task was more comprehensive than previously assumed.

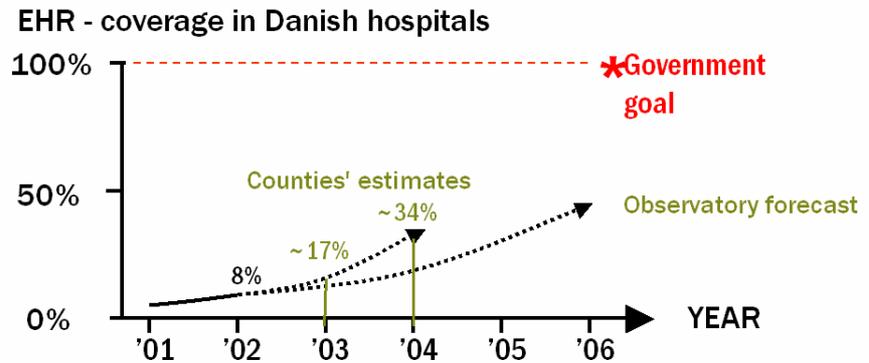
In the strategy 2003 – 2007 one goal is that the implementation of the EHR must be completed at all Danish hospitals before January 2006<sup>59</sup>. One forecast from the observatory has been that the government will not meet its goal of 100% coverage in the Danish hospitals as the figure illustrates below<sup>60</sup>.

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<sup>58</sup> Bruun-Rasmussen, M, K. Bernstein, S. Vingtoft, MIDIQ/EPJ-Observatoriet, GEPKA-projektet prototypeevaluering, August, 2004

<sup>59</sup> This goal was modified in May 2004. The goal is still to implement EHR on all Danish hospitals before January 2006, or as soon as possible thereafter.

<sup>60</sup> Libbert, S. and Kverneland, A, Presentation “National Health Informatics Strategy in Denmark”, 2003



The work is underway in implementing the EHR in Denmark, and even though the goal will not be met, many valuable lessons have been learned and these can be applied to other Scandinavian countries when implementing EHR.

#### *Iceland*

The first telemedicine project in Iceland started in 1993 with transmission of x-rays between a small hospital to the University Hospital. Since then, hospitals have been connected to the largest hospitals.

According to the strategic plans, telemedicine will become a routine in ordinary health care services. Currently, only radiological services are provided on a routine basis, but telemedicine projects include ultrasound examinations in obstetrics, psychiatric consultations, emergency medicine for seafarers, and pathology. Telemedicine in Iceland is also viewed as an effort towards equal access to health services in the rural parts of the country. A new plan for development of telemedicine will be launched during 2004.

The health net is intended to include many components, e.g. admissions and discharges, billing certificates, prescriptions and their renewal, requests for laboratory tests and results, requests for specialist consultations and replies, and information on any ongoing treatment. Also, information will be transferred between institutions on the best available treatment and scientific research. It is expected that the individual companies or enterprises that develop the individual projects will be implementing the work on a routine basis.

There is already an IT-based system for pharmacies that includes orders on the web and electronic prescriptions for hospital pharmacies. Prescriptions are sent by EDI to the social security insurance for financial processing.

Electronic health record systems have been introduced in Iceland. A new system for electronic health records is used in nearly all health care

institutions in the country, and a major step has been taken towards an electronic journal. Work with integration has also begun to make these systems work as a unit to enhance communication within and between health care centres and hospitals. The Ministry of Health and Social Security has taken initiatives to define the standards that all electronic health records must meet to be used in the health care system.

The Accident Register includes all accidents reported by various institutions, e.g. hospitals, health care centres, police, and insurance companies, but no central registration has existed. The Icelandic Accident Monitoring Project provides information to serve as a research tool and enables the development of strategic accident prevention. By collecting accident data in a centralised data bank, it co-ordinates accident registration on a nation-wide level. These data will subsequently be processed and disseminated. Registration of injuries and property damage is attached to registration of the accident itself. Certain data in the register will be transferred or reported through web interface to the Directorate of Health. All sensitive data, e.g. social security numbers and automobile registration plates are encrypted.

### *Finland*

In the first phase of e-Health implementation in Finland the main target is to develop the national infrastructure and tools for health professionals, focusing on access to necessary information and on the provision of e-consultations. In the next phase applications for citizens will get the priority.

Widely used information and advice services for citizens are already available (e.g. for patients having diabetes, allergy, asthma, psychiatric problems or alcoholism) developed and provided primarily through non-profit associations. At national level the e-prescription pilot is one of the major e-services for citizens. Some private GP-stations have also e-booking services for customers. During the coming 2-3 years the following applications are expected to grow further:

- general health information and advice portals
- portals for personal advice
- e-education services (e.g. for diabetes and asthma)
- disease management portals

The possibility for citizens to access both their own medication history and EHRs will also be explored.

Currently, Electronic Patient Records (EPRs) are in use in over 90% of primary health centres, as well as in approximately 60 of secondary care units. On the level of hospital care, a variety of systems are in use: departmental systems, like radiology information systems (RIS), pathol-

ogy information systems, laboratory information systems (LIS); diagnostic systems, like decision support and knowledge based systems and hospital management systems like accounting, resource management and booking systems.

Hospital regions, in collaboration with the software industry, have developed regional health information systems which integrate all legacy systems operating within a region. Five regional systems are in use supporting access to distributed patient records. Several other regional systems have a more limited approach, offering the possibility to share laboratory results or images. Telemedicine systems, like systems for teleconsultation are widely used, especially in Lapland. Electrical referrals and care summaries are widely used between primary health care centres and secondary care hospitals. First private health care stations have also started to send e-referrals to university hospitals.

There are a growing number of clinical tools for analysis used at home by patients themselves. Self-measured results can be sent via Internet or GSM links to the patient's family physician. Applications supporting independent living are typically targeted towards patients having asthma, diabetes, or high blood pressure.

### *Norway*

Most physicians in primary care use electronic health records. Initially they were used as stand-alone systems, but increasingly they have been used for communication with, e.g. hospitals, laboratories, pharmacies, and health care authorities.

In 2002, around 80 percent of the hospital beds in Norway were covered by EHR systems. Today only 2 of 80 hospitals do not have EHR. At a regional level, most hospitals have the same systems, improving the possibilities for electronic message exchange and sharing of common information sources. For security and legislative reasons, the health authority in Mid-Norway selected to have a common EHR installation at one location in the region, but with separate databases for each hospital.

In community care, the vendors claim to have sold EHR licenses that cover 90 percent of the Norwegian inhabitants. These systems are mostly used for administrative purposes, but the amount of health-related information is increasing.

A national EHR standard was released in 2001. This standard mainly covers issues related to architecture, archiving, and security. Requirement specifications for health stations and health care in primary schools, and another requirement specification for community care, are based on this standard. The standard and the requirement specification are developed by KITH.

A new version of the EHR standard will be available in 2005. The regional health authorities will also develop a national requirement specifi-

cation for EHR in hospitals and for some specific areas, e.g. psychiatry. However, the basis will be the national standard, and KITH and NSEP (Norwegian Centre for EHR) at the University Trondheim (NTNU) will be central actors in this process. NSEP was established in 2003 by the Research Council of Norway (NFR) and the ICT and Health Programme. NSEP is expected to play a major role in this area in coming years.

NORA (in the late 1980s) was the first EHR research project. The National Institute of Public Health, with support from the vendor Norsk Data and NFR, ran the project. Some of the ideas from NORA have been implemented in the Doculive system from Siemens. Although the use of EHR is widespread in Norway, the need for more research in this field is evident. The universities and NST have initiated activities, e.g. the KVALIS project and ELVIRA.

The widespread use of EHR takes time, according to a recent report<sup>61</sup>, because only part of the information that clinicians need is available electronically and search functionality is limited. Today, it is mainly used as a documentation tool and is not part of the treatment process. Furthermore, the introduction of electronic records has not been followed by organisational changes, and education has often been insufficient to make use of the full potential.

Initiatives on referrals and discharge summaries have yielded results. A report from 2003<sup>62</sup> states that the programme for these activities has focused on establishing collaboration between various projects, developing guidelines and recommendations, and initiating organisational processes. All hospitals in regions North, Middle, and West send discharge summaries. Around 50 percent of health practices send discharge summaries.

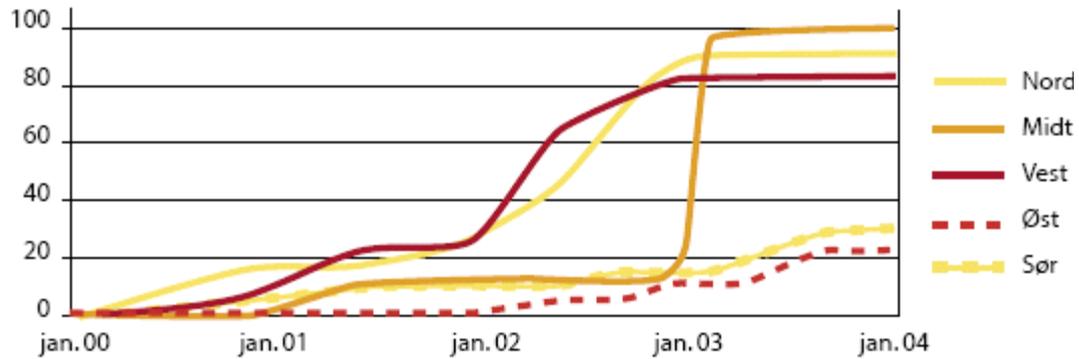
The development of electronic referrals increases, but is not established as a regular activity in all regions. All regions have pilot projects on referrals. The assessment of eNorway from June 2004 shows that electronic referrals have increased substantially in hospitals in recent years.

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<sup>61</sup> KITH, "Statusbeskrivelse, elektronisk samhandling", KITH Rapport F03-2003

<sup>62</sup> KITH, "Statusbeskrivelse, elektronisk samhandling", KITH Rapport F03-2003

Electronic referrals in hospitals, percent



Source: Tilstandsrapport eNorge

The Norwegian Medical Association (DNLF) initiated the ELIN project. The project aims at giving GPs throughout Norway easy access to the same standardised messages. The project has committed the vendors to provide 11 standardised messages for GPs. KITH plays a central role in this project, providing standards and testing message implementation.

Also in Norway, videoconferencing is used as a tool to co-operate for seamless care. One example is a project to establish a network in telepsychiatry. The aim is to develop and implement a model for using telemedicine to improve co-operation between the different levels in the public health service by using video conferences (VC). Levels in this particular case are: the University Hospital in Northern Norway, the District Psychiatric Centre, and the health workers in the consumer's local communities. Because of long travel distances from the rural areas, the active use of VC can improve service to patients, GPs, and local health workers. The aim is to let specialists assist patients, their families, and rural-based health professionals, including GPs, both during in- and outpatient treatment.

By using VC, psychiatrists, psychologists, and nurses in a hospital can evaluate a patient's condition before and after hospitalisation and adjust treatment accordingly.

Another crucial area of electronic communication concerns x-rays. Digital x-ray services represent a substantial share of the investment in this sector. Yearly, 3.2 million x-ray examinations are performed, and each examination results in several images. The large volume of examinations and x-rays makes a digital system more practical than paper copies. Two thirds of Norwegian hospitals have already acquired PACS systems, and the remaining hospitals are planning to implement PACS in 2005.

Special emphasis is placed on exchanging digital images between hospitals through the Norwegian Health Net. This allows co-operation and second opinions as well as rational operation and increased availability of radiology services. Standardisation is required to communicate between the different systems. Hence, the Directorate of Health and Social affairs has suggested that a national project involving all regional health companies on these issues should be supported. The project will also include the organisational development required to analyse the benefits, security aspects, and cost-benefit.

Automatic supportive techniques are one use of telemedicine that can ease the everyday life of chronically ill. The Norwegian Centre for Telemedicine (NST) is running a project with wireless and automatic transfer of blood glucose data, especially for children and adolescents with type 1 diabetes. The project will test if it is technically feasible to implement a system for wireless transfer of blood glucose data, based on existing blood glucose meters and mobile phones. In addition, the project will evaluate user satisfaction among the children and their families. After a test period of four months, the project will be evaluated (even at a conceptual level). It will then be decided if NST will continue research in the field of automated patient-worn-sensors and supportive systems.

#### *Web-based health information*

This information has increased significantly in recent years. The Internet is a powerful tool to strengthen the status of the patient. Often, however, the quality of the websites is not assured. The EU commission has therefore launched requirements for websites offering health information and services. Quality should be assured in terms of transparency, references, and topicality.

The net services offered by Finnish municipalities for social services include substantial information, are fairly sophisticated, and are often interactive. At the regional level, there are also telemedicine applications and continuing education for personnel. Health care organisations have also intensified their development and collaboration efforts. A challenge in Finland for the coming years is to develop national web-based health services. This development project is part of the realisation of eEurope in Finland.

Most hospitals in Finland have enabled access to knowledge bases located outside the hospital Intranet, but for security reasons there are limitations regarding where one can open the connection. All physicians can buy and use the CD-based "GP's Handbook" in their daily practice.

The Finnish Medical Science Association (Duodecim) has a new portal for health professionals. This portal makes it possible for health professionals to access both national and international knowledge bases. Most hospitals and many health care stations will also provide access to

this portal in the near future. Another field is formal education on the net. In Sweden, Netuniversity was established in March 2002. This institution offers IT-based courses from several universities in Sweden. Information about courses is given on a website [www.netuniversity.se](http://www.netuniversity.se). The amount of students at the Netuniversity has increased with 40 per cent between 2001 and 2002.

An increasing number of courses within health related areas are offered as IT-based education by Netuniversity. In 2002 around 160 courses (of total 1300) within these subjects, compared to 220 courses (of total 2040) courses in 2003<sup>63</sup>. Most of the courses 70 per cent are continued education and 90 per cent in the fall 2003 was part time studies.

A wide range of actors provides health-related information for citizens over the Internet. These include public bodies, private enterprises, and non-governmental organisations.

Many counties in Sweden, e.g. Stockholm and Östergötland, offer web-based information, and this is an area that is developing rapidly. On these websites, patients can contact the health care organisations, e.g. to renew prescriptions and make appointments.

Another example on a website for health information is "Infomedica.se"

The website is managed by an editorial staff and is owned and operated by the Swedish county councils and the Swedish pharmacy chain Apoteket AB. Infomedica is not driven by commercial interests, but by the county councils' responsibility to provide citizens with reliable information about health and medical services.

Infomedica informs visitors about diseases and injuries, signs and symptoms, drugs, dental care, diagnosis and treatment, health promotion, and child health care. Visitors also find information about patient rights and patient organisations. Using a feature called "Ask the Doctor", visitors can place an anonymous question to a physician panel and receive a personal answer within seven days, free of charge. Physicians, nurses, pharmacists, laboratory staff, and other writers throughout Sweden produce the documents, which are edited and refined by the editorial staff. Another website, that was recognised in the eEurope award for eHealth 2004, is "Pure Quality Life" (<http://www.pql.se>) which provides neuro-cognitive exercises aimed at decreasing stress.

In Denmark "Sundhedsportalen" was launched in 2003 as a collaborative project between the Danish Regions (Association of County Councils in Denmark), the Ministry of the Interior and Health, the City of Copenhagen, the Municipality of Frederiksberg, the Copenhagen Hospital Cooperation (HS), and the Danish National Association of Local Authorities. Information on the portal is intended to be available to citizens and health personnel. It provides guidance and information about pharmaceu-

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<sup>63</sup> Nätuniversitetet, "Nätburna programutbildningar inom vård, medicin, hälsa och omsorg", 2003

ticals and, in the future, patients will be able to view their electronic health record.

The Health Portal is intended to give targeted access to the overall National Health Service, meeting the information and communication needs of users and enabling them to find information about their own possibilities and treatment. At the same time, it is argued that the Health Portal must follow the Danish principle that health care problems in the National Health Service be solved (to the extent possible) at the primary treatment level. Moreover, the Health Portal is intended to facilitate communications between the parties involved in the National Health Service. In this context, a crucial success criterion will be for the Health Portal to be viewed as a tool – a tool capable of being integrated into clinical work to allow health professionals to solve tasks supported by the Portal in a quicker and/or improved manner.

Members of the public/patients may only access their own data following individual authentication via digital signature. Health care professionals may access patient data having obtained the relevant consent and local authentication.

A Health Portal should support a coherent patient treatment process across the parties involved in the National Health Service, including supporting patient opportunities for attending to their own health care and their own treatment situation, supporting patient opportunities for contacting the relevant health care professionals, and supporting transfer procedures between health care professionals involved in the patient treatment process.

As a first step, the pregnancy and prenatal process was chosen to be a pilot project in the establishment of the Health Portal. Here, the Health Portal allows the pregnant woman, her GP, the midwife, and the obstetrics department to share the woman's personal medical records.

A project connected to the health portal is "Personlig Elektronisk Medicinprofil", PEM. Within this structure all information about the patient is collected and can be reached by the patient through the health portal "Sundhedsportalen". The patient reaches his/her medication profile with a digital signature. Hospitals prescriptions of medicines will be included in the future. Another aim is to make the information accessible to home care.

In Norway, work is under way to provide web-based health information for citizens and personnel in the health sector. In the first phase, the Norwegian Health Library will give users access to medical knowledge databases as Cochrane and Clinical Evidence and medical publications. The Department of Guidelines, Priorities and Quality in the Directorate of Health and Social Affairs owns the project, and the Norwegian Centre for Health Services (Kunnskapssenteret) will manage the project. The National Health library will be available from 2005.

Practice-related Electronic Knowledge (PEK) is a sub-project of the National Health Library focusing on providing easy access to clinical guidelines for nurses and clinicians. The project includes surveys of related national and international systems. KITH and NST have been involved in this process. Some of the Norwegian information sources currently available include the Norwegian electronic handbook for GPs, the PPS system for nurses, drug handbooks, and the drug interaction database. These systems provide only part of the information needed, and they have poor to no integration with the EHR systems. The Doudecim work in Finland and Prodigy in England provided the project with useful input. User needs have been documented in studies from the Norwegian Nurses Association and NSEP. A national working group has developed a requirement specification for a PEK tool based on the input from the surveys and documentation of the user needs.

The Norwegian Centre for Telemedicine (NST) is developing a national learning portal on the web called "helseutdanning.no". The intent is to consolidate all net-based education/courses about health. On this website it will be possible to join courses relevant for professionals, patients, and relatives. Videoconferencing, different types of multimedia applications, and interactivity tools will be integrated into this Internet-based service.

After the project period, this is to become a national service administered by NST. Those who want to contribute with relevant courses and who want help to produce courses can receive support from NST. The aim of "helseutdanning.no" is to make knowledge more readily available to health professionals, patients, and relatives. The aim is to help these groups find all information about health education.

Furthermore, the reform to give citizens to the right to choose the hospital in which they want to be treated can be facilitated by web-based information. Free Hospital Choice Norway (<http://www.sykehusvalg.net>) is a website developed by the Norwegian Government to allow patients to do just this. It provides full details of available medical specialities and specialists, details of waiting lists, and information on individual hospital performance.

### *Conclusions*

IT applications and information flows can be characterized into:

- Administrative support and Electronic Health Records/ Electronic Patient Records
- Telemedicine, such as consultations and clinical rounds
- E-messaging, such as e-prescriptions and e-referrals
- Web based health information
- E-education

- Knowledge databases such as quality- and outcome registers

The Nordic countries are at the edge of development, and well ahead of the European average. Some countries have a large scale use of the net for certain services, e.g. Denmark where e-prescriptions are widely used. In general, however, many applications are in project form and not yet used on large scale.

There is a potential to diffuse good examples between the Nordic countries and to find counterparts to exchange experiences. Several aspects of the applications are of interest, and technological, organisational, and economic questions are all of importance. Networking actors in each country have an important role for disseminating information and exchanging ideas. This process is a continuing activity since the area is rapidly advancing.

## Nordic Co-operation in Health Care Services

The Nordic level of co-operation is important for the development of health care services. The countries have many features in common, which build a ground for beneficial co-operation and exchange of experiences.

One important initiative is *The Nordic Healthcare Network*. Today, Denmark, Norway, and Sweden each have national health care networks. The challenge is to create a solution, which would make Internet technology available to health care professionals across different networks, while making it safe to transmit person-sensitive data. The networks connect secure local or regional networks into a large single network, reusing as much of the existing equipment and infrastructure as possible.

During 2003, the three network administrators have been involved in the technical network group to develop a technical solution that can connect the three networks and thereby create one large Nordic Healthcare Network (NHN). An important step was taken in May 2004 when a test connection between the Danish and the Swedish networks was established. Later in the summer and autumn of 2004 Norway will also be connected.

This technical idea is basically the same as in the national networks, i.e. there must be a central point at the core of the network to handle connections among the different networks. The administrators responsible for security are given the necessary tools to handle the traffic and ensure that national regulations on data security and protection are met.

The work to establish the final technical solution for a central Nordic connection point has started and is expected to be finished around 2005. The central connection point will be established based on the results from the test connection between Denmark and Sweden, but at least the following principles will be applied:

All interested parties in the health sector can be connected to the NHN, thus enabling exchange of information between network systems, providing health care personnel with access to the network services, and enabling them to use the network in connection with web references etc.

Patient information, administrative, pedagogical, and technical support systems as well as essential collaborators with special association to the health sector can be connected upon specific approval.

The security will be built on three levels:

- The networks will be connected over the open Internet with encrypted VPN tunnels (Virtual Private Network) to a central connection point (a HUB or router complex).
- Connection to the central point gives no access to other networks before an agreement between the responsible network owners has been signed. At the central connection point, a web-based agreement system will be established handling the opening and closing of connections.
- Access to any application or web-service in the network will be built on User-ID and Password or PKI solutions.

The technical connection of the networks are:

- The NHN will give official RIPE IP addresses to the participants. The local IP structure can thereby be maintained.
- The central connection point will adjust to the local network, which allows the reuse of existing firewalls and router equipment.

The network will be able to handle the following kinds of communication:

- Web-references, e.g. to radiology service reports and laboratory entries
- EDI mail
- WEB services based on SOAP and other standard Internet protocols
- Telemedicine collaboration services
- Videoconference

The financial, legal, and organisational challenges of establishing and running the NHN will initially be handled within the framework of the Nordic eHealth project. During the project period the three national networks owners will jointly form a non-profit organisation (a Management Agency) that will own and run the central connection point of the NHN.

After the project period it will be necessary to establish a permanent organisation that can run, maintain, and develop the Nordic Healthcare Network. This organisation must have the resources, legal foundation, and technical capacity needed to maintain the network. It will also be necessary to create a legal entity that can handle the requests for connec-

tion from other partners and set-up rules, standards, and guidelines for the network. This organisation will be the owner of the network and hold the contract with the vendor that runs the network.

There are also several other examples of Nordic co-operation:

*The Nordic Centre for Classifications in Health Care* was established by the Nordic Council of Ministers, and is responsible for collaboration between the Nordic countries and international representation of these countries in the field of health care classifications. The Centre is an official collaborating centre in the WHO-FIC network (World Health Organization Family of International Classifications), and plays an active role in the development and maintenance of the WHO-FIC classifications, notably ICD-10 (The International Statistical Classification of Diseases and Related Health Problems, 10<sup>th</sup> Revision) and the recently released ICF (International Classification of Functioning, Disability and Health). In addition, the Centre is responsible to maintain and update the NOMESCO Classification of Surgical Procedures (NCSP), developed by the Nordic Medico-Statistical Committee, and the Nordic Classification of External Causes of Injury (NCECI). The Centre is also responsible for the maintenance and development of the NordDRG-system, which is a case-mix system used by the Nordic countries to assess activity and form a basis for reimbursement in the national hospital systems. The University of Uppsala in Sweden hosts the Nordic Centre. The national actors in Centre activities are: the National Board of Health (DK), STAKES (SF), Landlæknisæmbettið (Isl), KITH (Norway), and the National Board of Health and Welfare (S)

*Harmonisation of EHR architecture (HC Interest)*. The project was executed in 2001/2002 and supported by Nordic Council of Ministers and national authorities with participation from KITH (N), MedCom (DK), Aalborg University (DK), and Sahlgrenska University Hospital (S). This project has created a first basis for interoperable Electronic Health Care Records in the Nordic countries. The long-term aim is that the information in different EHR systems can be communicated and re-used. HC Interest has proposed key components of a Nordic EHR architecture and analysed Nordic terminology needs. This has enabled the development of operational EHR messages that have been tried in a pilot project. EHR plays a central role in the IT strategies in the Nordic countries, and HC Interest provides input to these strategies. It is widely accepted that exchange of experiences and standardisation must extend beyond the national level. There is also a common interest in making the Nordic market for EHR less fragmented and thus more attractive for the software industry.

*University summer course in Health Informatics (SUMIT)* were held 2000–2002, organised by the universities of Aalborg (DK) and Trondheim (N), KITH(N), and Carelink(S).

*Collaborative Network of Nordic eHealth Competence Centres* with participation from Carelink (S), MedCom (DK), KITH (N), STAKES (SF), and Ministry of Health/University Hospital of Reykjavik (ISL). The network aims at exchanging views and experiences regarding national developments for IT in health and social care. Special subgroups are active regarding health nets and PKI, and initiatives for common projects are taken. The network has been active since 2001.

*Nordic Telemedicine Association (NTA)*. The organisation has existed informally for some years, but was formally established in 2003. The goal of the Nordic Telemedicine Association is to facilitate Nordic co-operation and co-operation between Nordic countries and internationally in the field of telemedicine and telecare. The association has an official journal, *Journal of Telemedicine and Telecare*. A main task has been organising a bi-annual Nordic telemedicine conference in Copenhagen (2002), Tromsø (2002), and Uppsala (2004). NTA is supported by the Nordic Council of Ministers.

Another conference, *The Scandinavian eHealth conference*, has been organised in Arendal (N) in 2003 and 2004, by Agder Regional college (N), University of Asalborg (DK), and associated partners.

*Nordic Medico-statistical Committee and the Nordic Social Statistics Committee* are both permanent committees financed by the Nordic Council of Ministers. However, information and knowledge regarding the use and development of IT in the social and health sector is insufficient in the Nordic countries. The existing national information regarding these subjects is sporadic. Most of the data is regional, and suitable indicators have not been developed. Developing IT indicators in the social and health sector would improve the possibilities for benchmarking progress in this field.

In addition there are two relatively large projects, one of which has received Interreg funding and the other is evaluated by EU eTen programme.

*The project Baltic eHealth (2004–2007)* is a result of above co-operation and has achieved Interreg support. The project will connect national and regional health nets in the Baltic Sea Region and demonstrate clinical electronic co-operation in radiology and ultrasound services. Participating countries are Denmark, Sweden, Norway, Estonia, and Lithuania, and the project is run by the Danish Centre for Health Telematics, Carelink, KITH, Norwegian Centre for Telemedicine, Danish Centre for Rural Research and Development, and one clinical partner in each of the five participating countries. The project period is September 2004–August 2007, and co-funding comes from the Baltic Sea Region Interreg IIIB Programme.

The background to this project is that most rural areas in the Baltic Sea Region suffer from a lack of specialised health care professionals. This problem is expected to grow in the future and, if unattended, will

lead to a situation where citizens in rural areas will receive a lower standard of health care than people living in cities. Baltic eHealth addresses this problem by promoting eHealth as a tool to provide access to highly specialised health care services for the rural citizen. The aim is to convince political decision makers that eHealth is an effective and easily implemented solution to the above-described problem, and to promote and facilitate the large scale and daily use of many different eHealth services in all rural areas.

By establishing the Nordic Healthcare Network, most technical obstacles for previous eHealth initiatives have been eliminated. The eHealth services in two clinical pilots are intended to demonstrate to decision makers that eHealth has a positive effect on the accessibility of health care for citizens in rural areas. A goal is that by the end of the project period, the infrastructure, tools, guidelines, and business plan presented in Baltic eHealth will be used in at least five new eHealth services not already included in Baltic eHealth, and that this number will increase in the long term.

Another project involving co-operation between the Nordic countries is the NorMa project. The vision of this project is to create a Nordic (and later European) market for eHealth services supported by the Nordic Healthcare Network (NHN). By creating a Nordic market, the Nordic model for applying eHealth services could be disseminated in other European countries. The Nordic region is at the forefront in this area. The development of a trans-national eHealth market is under way in Denmark, Norway, and Sweden, based on the nation-wide health care networks currently being connected to the NHN. The first step in developing such a market is to conduct a market validation of eHealth services in the Nordic countries, and this is the objective of NorMa. A market analysis will be undertaken to analyse the shortages and surplus of health care services and needs of potential buyers. Furthermore, guidelines on removing legal and financial barriers for eHealth services will be presented, and two eHealth service pilots building on the NHN will be implemented and evaluated. The existence of NHN brings opportunities for other countries to learn from the experience in the Nordic countries.

Participating countries are Denmark, Sweden, and Norway. The partners involved are the Danish Centre for Health Telematics, Carelink, KITH, Norwegian Centre for Telemedicine, University of Southern Denmark (Dept. of Marketing), University of Aalborg (Dept. of Development and Planning), and seven clinical partners.

### *Conclusions*

The development of services on a Nordic Health net has major potential benefits, one being the benefit of a larger market. The national markets for these services are small, and a larger Nordic market could increase

efficiency. A vigorous supplier industry is a prerequisite for further progress in the efficient application of IT in the health and social care sectors. EHR or PACS represent complex systems coping with complex environments, hence dependent on a market of sufficient size to be able to meet all customer needs.

Since most health and social care services in the Nordic countries are publicly financed and organised, buying power is in relatively few hands. This creates a certain risk for impairing the market dynamics.

Culture, legislation, and the organisation of services in the Nordic countries have more similarities than differences. This, together with the two considerations mentioned above, would favour opening the Nordic market by increasing co-operation in standardisation, concept development, and related issues. In many respects, the Nordic nations are front runners in health informatics. A functioning Nordic market can also form a home market for an export-oriented Nordic health informatics systems industry.



# Concluding Remarks and Recommendations

## IT in the Health and Social Sectors

The topics studied in this report represent areas of high activity and political interest. A strong political will has contributed to the Nordic countries being at the forefront in international terms. However, the Nordic countries also share common challenges. An enormous effort is required before the technology can communicate fully, the laws and regulations are established, and perhaps most important, the actors in the health sector and between the sectors involved are collaborating to the extent needed to fully realise the benefits of IT.

### *Learn from other Nordic countries*

The Nordic countries have more similarities than differences regarding culture, traditions, and the organisation of health services. However, they vary somewhat in how far they have come in the use of IT in the health sector, and there are opportunities for mutual learning. To fully exploit this potential, indicators should be developed that enable one to follow, assess, and evaluate progress in the countries in a compatible way. This would provide useful information, both about one's own achievements and from whom lessons can be learned. To some extent indicators have been developed at the European level, but still crucial consistent information is not developed that can give an overview on the status of the countries.

Below an attempt has been made to present a comparable overview of the use of IT in the health sector. However, this information is presented with reservations for weaknesses in comparability since good, compatible indicators are not yet available. Many important fields are not covered in the table, due to lack of comparable indicators, such as for example the status of the use of telemedicine and resources spent on IT. Furthermore, the statistics used by the countries are not always comparable. The table below should therefore be seen only as a starting point of a process for developing indicators giving an overview of the use of IT in health and social care.

**Status for use of IT in health sector**

	<b>Denmark</b>	<b>Finland</b>	<b>Iceland</b>	<b>Norway</b>	<b>Sweden</b>
<b>% of population using online government services, 2002</b>	54	49	NA <sup>64</sup>	55	57
<b>National strategy for IT in health care</b>	“National strategy for Information Technology in the Health Care system 2003-2007”	Within programme for the information society	Within “Re-sources to serve everyone”	“Te@work 2007” (S@mspill 2007)	Does not exist at national level
<b>Strategic focus</b>	Shared information, coordinated EHR, services on health portal, connect municipalities, security	Communication for seamless care, home care, health portal, EHR, security	National health net, EHR, security	Increase electronic cooperation, inclusion of new parties, security	Common infrastructure, services on Sjunet, cooperation for seamless care, security
<b>Coordinating body</b>	The Danish Centre for Health Telematics, MedCom, National Board of Health	Ministry of Social Affairs and Health /STAKES	Ministry of Health and Social Security.	KITH, Directorate for Health and Social Affairs	Carelink, National Board of Health and Welfare
<b>Communication</b>	National health net	Regional health nets	National health net by 2006	National health net	National health net
<b>Security in health and social services</b>	Public certificate, OCES, National Board of Health assist actors	National Guidelines in 2004-05 with PKI-solutions for health care	Plans for developing PKI-solutions for health care	New legislation, digital signature, PKI-solution developed for health sector	Implementation of SITHS (PKI-solutions for health care)
<b>Web based public health information</b>	“Sundhedsportalen” plans for more services con-	Regional websites, Duodecim for professionals	Plans in strategy for portal within	Work is going on, “helseutdanning,no” “sykehus-	“Infomedica”, regional websites

<sup>64</sup> Iceland is not included in the referred study, but another study also referred to in this report concludes that internet as a tool for interaction with public authorities is most frequently used in Sweden and Iceland.

	nected to this portal		eGov-ernment By 2004	valg.net”	
<b>EHR in primary care</b>	90 percent of GP	Most health care centers, interoperable EHR by 2007	“Intro-duced”	“Almost all in primary care”	Around 95 percent in primary care
<b>e-prescriptions in primary care</b>	Over 70 percent	Pilot project within 4 regions	“Wide-spread”	Relatively low, receives increased attention	National average 27%, but large variations

*Learn from health services*

Activities in all of these areas are well established in the health sector. Other social services, however, have not progressed as far. Hence, there is a potential for the social sector to use the lessons learned in the health sector:

The “sow-harvest” problems need to be solved. The problem where the investment costs are undertaken by one agency, while benefits arise in another will not solve itself, and creates an obstacle against further development. Financial e-enablers reduce short-sightedness and suboptimisation.

IT offers new opportunities for collaboration that would benefit citizens, but that collaboration has proven to be difficult in practice. Breaking down traditional boundaries is not simply a matter of technology, but also involves culture, traditions, and power. A co-ordinating body or a structural framework can play a role in overcoming these obstacles.

It is important to focus on the right goal. Improved services for citizens and increased efficiency are the goals, not digitalisation itself. Administrative reforms to increase efficiency are necessary, but not sufficient, and a top-down approach in large bureaucracies may create a risk for simply digitalising existing services. Activities should start where there is a need for improved services, and the roles and benefits of IT should be integrated in the reforms.

**Ways of Organising Development**

The decentralised systems of the Nordic countries make it essential to have co-ordinating actors. The benefits from investing in communication arise when the development is co-ordinated. A more centralised process does not, however, necessarily imply that all communication should be

co-ordinated. One of the tasks is to identify the crucial information flows that need to be communicated between the actors.

The process of increasing IT in the health and social sectors can benefit from a strong co-ordinating actor. The organisation of activities varies between the countries studied. Some take the form of local projects, while others are large national programmes covering all aspects of using the new technology. Local projects may serve as inspiration and good examples for others. However, larger-scale use of the applications, and the subsequent organisational changes, need co-ordinated programmes that address technical, economic, and organisational issues.

## The Way Forward

The Nordic countries can learn from each other when developing initiatives for IT in the health care and social sectors. The social sector can learn both from the experiences in other Nordic countries and from the health sector. There is a need to exchange lessons, experiences, ideas, and applications within the social sector. Co-ordinating actors such as NOPUS (Nordiska Utbildningsprogrammet för Utveckling av Social Service) could play an important role in the development of IT in the social sector. In the health sector, the Collaborative Network of Nordic eHealth Competence Centres is a group which has taken on the task of exchanging information about applications, barriers, and solutions from a multi-dimensional perspective.

Nordic co-operation in developing the use of IT can be expected to increase. The Nordic countries have reached a stage where the national level of development in this field is being extended to a Nordic level. The Nordic health care network opens new opportunities for a Nordic market for health services, which will further enhance the need for Nordic collaboration. A Nordic market will be beneficial for citizens and will enable a more efficient market structure for these services. To reap the benefits of this development, a suitable organisational structure with the appropriate resources, legal foundation, skills, and capacity is needed.

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# Contacted persons:

## Denmark

Morten Hein, Head of section, Ministry of Social Affairs

Susann Duedal Pedersen, Health Informatics, National Board of Health

Claus Flemming Nielsen, Project leader, Local Government Denmark

Birgit Jæger, Associate Professor, Roskilde University

Christina E. Wanscher, Project leader, Danish Centre for Health Telematics

Claus Duedal Pedersen, Project leader, Danish Centre for Health Telematics

## Iceland

Sigrídur Jónsdóttir, Social services, Reykjavík

## Sweden

Maria Häll, Strategic Group for IT, Ministry of Industry, Employment and Communication

Daniel Forslund, Ministry of Health and Social Affairs

Ann Hedberg Balkå, Federation of County Councils

Kim Judson, Director, NOPUS

Göran Petersson, Netuniversity

Åsa Schwieler, Project leader, Carelink

KG Nerander, Project leader, Carelink

## Finland

Martti Lähteinen, Head of Section, Ministry of Social Affairs and Health

Heli Sahala, Association of Finish Local and Regional Authorities

Anna-Liisa Salminen, Development Manager, STAKES

Kauko Hartikainen, Senior Advisor, STAKES

Erja Saarinen, Editor, e-consultation project, STAKES

Mika Gissler, Development Manager, STAKES

## Norway

Ellen Strålberg, Senior Adviser, Directorate for Health and Social Affairs, Department for IT-strategy and statistics

Kristian Skauli, Directorate for Health and Social Affairs, Department for IT-strategy and statistics

Kai Ove Nauen, senior Adviser, Ministry of Labour and Government Administration

Erik Aakre, Ministry of Labour and Government Administration

Mads Hansen-Møller, Statistics Norway

Per Christian Lindeberg, Project leader, Norwegian Centre for Telemedicine

Per Malmberg, consultant, Ramböll Management

# Working group, Nordic Collaboration Network

**Sweden, study coordinator:** Lotta Holm Sjögren, Project Manager, Carelink

**Denmark:** Henning Voss, Project Manager, Danish Centre for Health Telematics

**Iceland:** Benedikt Benediktsson, Ministry of Health

**Finland:** Pekka Ruotsalainen, Research Professor, STAKES

**Norway:** Vigdis Heimly, Development Manager, KITH