

This article has appeared in 10th anniversary bulletin, Norwegian Centre for Telemedicine

Health Informatics and Telemedicine in Norway

by

Jacob Hygen,

**Managing Director, Norwegian Centre for Informatics in Health and Social Care
(KITH)**

When a significant institution as National Centre for Telemedicine celebrates its 10th anniversary, I find this to be an excellent opportunity to summarize the status for the application of modern information technology to health services in Norway. I am honoured to be given this opportunity.

Health services in Norway.

Norway has about 4.5 mill inhabitants. About 35% of the annual Norwegian state budget, or 7-8 % of the gross national budget is spent on health and social care. The health and social care sector in Norway, as in other modern societies, faces significant challenges. Its part of the nations GNP is already substantial, and increasing mean lifetime and falling birth rates will dramatically increase the future burden. Although Norway is better off than many countries, the ratio between people in “productive” age (20-67 years) and elderly people (>67 years) is foreseen to change from today’s approximately 5:1 to approximately 2.5:1 in 2050. A specific Norwegian challenge is the low population density, hence inhabitants might have long travelling distances to medical services, hospitals are scattered and some are small, not all hospitals can contain every medical discipline.

Information technology might give an answer.

”eHealth is the single-most important revolution in healthcare since the advent of modern medicine, vaccines, or even public health measures like sanitation and clean water¹”.

This statement is promising, but also radical, since information technology in contrast to medicine and sanitation, is not an integral part of medical practice. Evidence for the above statement is till now modest, but support is given by drawing parallels to other sectors of society. The penetration of information technology in industry and private services (car industry and banking are prominent examples) has had dramatic effects on quality and productivity, the time might now come to public services. A lesson to be learnt is that significant improvements are not achieved until the achievement of late stages of complex processes going from mechanization of manual routines through improved cooperation and ending with fundamental changes in work distribution and cooperation patterns. The potential is not less in health care, which is extremely information and cooperation intensive, than in the cases made by industry and private services. From a Norwegian perspective, there is an additional attractiveness of applying information technology to health care (compensating for low population density and long travelling distances).

Status for IT applications

The application of information technology in health care can be seen as follows:

¹ From a report to EU Ministerial Conference ”The contribution of ICT to Health”, may 2003. The conference gathered more than 600 politicians, bureaucrats and experts from 34 countries.

An adequate technical infrastructure allows easy and secure many-to-many communication. An agreed information structure secures a common understanding and correct interpretation between the various applications. Standardization and common concepts for information security tie it all together.

Technical infrastructure – the National Health Net

Norway is well underway with the realization of a National Health Net. Each of the five health regions has today its own net, varying in structure and in coverage. During the first half of 2004 the five regional nets will be merged into one integrated national net owned and operated by a dedicated organization. In the first phase, all the hospitals and a large fraction of GPs and private specialists are connected, then pharmacies, central agencies and others are to follow. Many local municipalities (of which Norway has 434) have their own nets, service providers within the municipality can be connected to the health net by a single contact point between the National Health Net and the municipality net.

Information structure – coding, classification, terminology, standards

For 15 years Norway has had a continuous effort in producing a standardised base for IT in health care; coding and classification systems and definition of terms. Also standards for Electronic Health Record systems and for information exchange are defined. The work is to a large extent based on international standards.

The results are published in the meta database Volven (www.volven.no), operated by Norwegian Centre for Health Informatics (KITH). The work till now has been bottom up driven, definitions and standards are developed according to needs. What is missing is an agreed top layer, an overall information structure related to the care process, tying it all together.

Applications – what it is all about

Although, compared to other sectors of society, the health care sector still is in the initial phase of applying information technology, Norway by international comparison is quite advanced in its use, and is rapidly moving. Below, a status for vital applications, as Electronic Health Records (EHR), Picture Archiving and Communication Systems (PACS), information exchange and telemedicine will be given.

EHR – the core of patient information

According to Norwegian legislation, each health care service provider has to keep its own record which can be on digital form, and information between service providers is only to be transferred on a need to know basis.

- “All” GPs and private specialists have EHR systems

With few exceptions, all GPs and private specialists have EHR systems, this has been the situation for some years.

- 80% of hospital patients are covered by EHR

All hospitals have or are introducing EHR systems. Surveys show however large variation in use of the functionality systems, and to some extent parallel paper-based routines, but the situation is rapidly improving.

“Norway rides high with PACS²”

2/3 of the Norwegian hospitals have already acquired PACS systems, and all remaining hospitals are planning to implement PACS within 2005. A special emphasis is put on exchanging digital images between hospitals through the National Health Net, thus allowing cooperation and second opinions as well as rational operation and increased availability of radiology services.

Electronic information exchange

Structured exchange of information via electronic messaging has been given priority for more than a decade. KITH has the responsibility of standardization in this area, and has issued standards for close to 30 different messages. The messages are covering a variety of applications, as referrals and discharge letters, requests and answers for medical services (laboratory and radiology), reports to central authorities, transfer of EHR information, etc. As the communication infrastructure gets in place, and the various parts in the communication processes are implementing applications, the volume of electronic messaging is now rapidly increasing.

Some examples: Medical services are requested electronically on a routine basis. Most hospitals can now (start of 2004) issue electronic discharge letters and approximately 50% of the GPs can receive such letters. Electronic referrals and direct bookings from GPs to the hospitals are in progress.

Telemedicine – excellent health services available to all

A main reason for the Norwegian emphasis on telemedicine is to achieve the above vision in a country with low population density and long travelling distances to nearest hospital or medical expert. Operational solutions are in place in a variety of medical disciplines and care situations. Some examples are:

- Sounds, images and videos recorded by primary care doctor and transmitted to specialist. Examples are stethoscopy, dermatology, ear-nose-throat conditions, examination of optic fundus for diabetes patients
- Telepathology, pathological support of hospitals lacking this capacity
- Teleradiology, as imaging goes digital, support can be given at distance
- Videoconferencing for psychiatry and for cancer care.

National competence centres play an important role

A significant contribution to the Norwegian development in health informatics and telemedicine are given by the national centres in the area:

- KITH – Norwegian Centre for Health Informatics is a limited company established by the Ministries for health and social care and The Association for Municipalities to contribute to the standardized application of IT in the health and social care sector. KITH is developing and contributing to the implementation of standardized terminology and coding systems, secure information exchange and standards for EHR and PACS systems. KITH's main location is in Trondheim.

² Front page in Diagnostic Imaging – Europe, June/July 2003

- NST – Norwegian Centre for Telemedicine is part of the University Hospital in Tromsø and aims at providing research, development and consulting in telemedicine, and to promote the introduction of telemedicine services in practice. Since 2002 NST has been designated by WHO as collaborating centre for telemedicine.
- KoKom is a national centre located in Bergen. The objective of the centre is to act as advisor to government, both centrally and locally (counties and municipalities) on the running of dispatch centres in the health care services. The centre is also a member of the national project committee concerning possible Norwegian acceptance of TETRA as the national standard for radio communication in emergency services.
- The Research Centre for EHR systems is recently established at Norwegian University of Science and Technology (NTNU) in Trondheim, with funding from the Research Council of Norway and the university itself. The objectives of the centre is to perform multidisciplinary research and university level education related to EHR systems

S@mspill 2007 – the governmental strategy for electronic cooperation in health and social care 2004-2007.

The implementation of IT in the health and social care sectors takes place in a complex interaction between authorities and relatively autonomous care providers, mainly in the public sector. Coordination is achieved by national plans. The coordinating agency, which also has been responsible for the planning process, is the Directorate for Health and Social Affairs. These plans are to a limited extent backed by central financing, but can be seen as an agreed agenda for future developments. The two first plans covered the periods 1999-2000 and 2001-2003 respectively. The new plan for the period 2004-2007, named S@mspill 2007 (“samspill” is Norwegian for “cooperation”), has a twin focus:

- Further penetration of electronic cooperation between parties who have started

This focus shall secure a further improvement of information flow between parties who have already started with electronic cooperation.

A major issue is to ensure the operation of the Norwegian Health Net. An organization for the responsible operation is to be established, and the 5 regional and one connecting net shall be further integrated to a uniform net. More parties and services shall be included.

Current status with lacking uniformity in definition of terminology shall be met by a top-down definition of an agreed overall information structure for the health and social care. The information structure will be a reference for further efforts in terminology, coding and classification.

Norway has a strong legislation regarding handling person related information. Information security will be addressed by establishing basic requirements for information security, which communicating partners have to declare their adherence to. Specific attention is also given to widespread implementation of digital signature/PKI (public key infrastructure), where the National Social Security Agency has brought forward a solution available for the whole health care sector.

The EHR system, whether implemented by hospitals, GPs or other care providers, is the key for efficient flow of information. All care providers are required by legislation to document what they do, an extensive implementation of EHR systems amongst all providers is a prerequisite for efficient electronic cooperation. A national strategy addressing this will be established, also including research.

The coordinated effort for developing standards for electronic messaging will continue. Establishing a mechanism for certifying the adherence of software products to existing standards is to be established. Coordinated efforts for implementation of electronic messaging will go on. A specific attention is given to the large scale implementation of electronic booking and referral from GPs to hospitals.

It is an ever increasing challenge for care providing personnel to stay professionally updated, as knowledge in medicine and care is progressing. A national internet site for access to databases, national guidelines and related sources and information shall be established.

- Inclusion of new parties in electronic cooperation.

New groups shall be introduced to and motivated for electronic cooperation. The potential of information technology shall be utilized to meet the increasing demand for cooperation and efficient information flow in care processes in an aging population.

Till now, the main partners in electronic cooperation have been hospitals, GPs, laboratories/ radiology institutes and the National Social Security Agency. The inclusion of new parties are governed by the ambition to establish seamless care processes, including above parties, but also institutions in the municipalities with care responsibility, such as institutions for elderly or disabled people, rehabilitation units, etc. Norwegian municipalities (of which there are 434) vary largely in size and population composition. A key element in this is to establish a programme for care related IT in the municipalities, to ensure a coordinated development across the nation.

The patients and users of health care and social services shall be included, both by providing information services and by electronic cooperation in areas as medical advices, renewal of prescriptions and booking of appointments. One objective is supporting patients and users in taking more responsibility them selves, and to utilize their insight in their own condition to improve the care process.

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