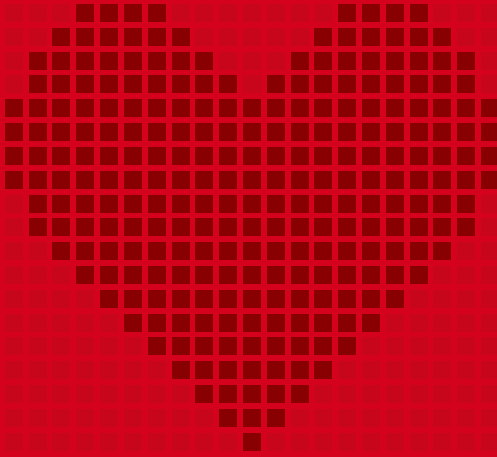


eHealth in Denmark

eHealth as a part of a coherent
Danish health care system



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A Vision for eHealth in Denmark

The vision for the health care system in Denmark is to provide coherent clinical pathways through the various parts of the health care system, focusing on the needs of patients and high quality of treatment.

One of the main prerequisites for establishing a coherent and cooperating health care system is to ensure that all health care professionals dealing with a patient have easy access to relevant patient information where and when it is needed. This strengthens the base for decision making and enhances patient safety.

Digitalisation is the key element in achieving this goal by giving health care professionals access to data and examination results across the entire health sector. eHealth is also vital for leveraging secure, efficient work processes, high productivity and high standards of health care delivery.

There is an extensive need for digital solutions in the health care system. In the coming years, growing numbers of senior citizens and the introduction of new treatments will increase the pressure on health sector resources. In addition, both patients and the health care system can benefit from empowering patients to manage their own health by providing better access to their own health data and by the use of telemedicine and home-monitoring technologies.

As this brochure aims to illustrate, Denmark has come a long way already. Several international studies rank Denmark among the leading countries when it comes to uptake of ICT solutions in the health care sector.

The ambition in the coming years is to integrate and streamline the way patient data are accessed and shared across the health care system, in order to make all relevant data accessible when needed and to accelerate the implementation of thoroughly tested solutions across the entire health service.

The brochure contains an introduction to existing and future Danish eHealth solutions that connect the Danish health care system and the context in which they have been established. In addition, the brochure touches upon the prerequisites for working with eHealth in Denmark, including the governance setup and descriptions of the main stakeholders.

We hope you will find the information interesting.

Astrid Krag

Danish Minister
of Health

Bent Hansen

President of
Danish Regions

Erik Nielsen

Chairman of Local
Government Denmark



Denmark is among the frontrunners

"The SIMPHS research has identified Denmark, together with England and Scotland, as leaders in terms of mainstreaming telehealth in Europe under the combination of demand side factors, high eHealth deployment, good governance models and in terms of engagement of key stakeholders in tiers of care and the value chain."

*Strategic Monitor on Personal Health Systems (SIMPHS)
European Commission,
JRC IPTS, March 2012*

"Denmark Leads the Way in Digital Care"

*New York Times,
January 11, 2010*

"In Denmark's Electronic Health Records Program, a Lesson for the U.S."

*Time Magazine,
April 16, 2009*

Why eHealth?

Well functioning eHealth solutions hold the potential to benefit citizens, patients and health care professionals in several ways:

- **Improved flexibility and effective ways of organising treatment, leading to improved quality and safety in treatment and care.**
- **Enabling more individualised treatment by empowering patients and involving them in their own treatment.**
- **Better working conditions for employees in the health and welfare sectors by improving workflows and reducing time spent on gathering information about a patient from other parts of the health care sector. This allows doctors and nurses to devote more time to patients.**

Furthermore, eHealth contributes to better use of the resources allocated to health care by making analyses and assessments easier to execute on the basis of the various data on activity and expenditures that eHealth solutions are gathering.

Today, eHealth is very commonly used throughout the whole Danish health service and supports many work processes, including processes that reach across organisations and sectors.

But as new technologies emerge, the field still holds great potential to contribute to the development of a more modern and efficient way of delivering health care.

For this reason, it is the ambition to implement and integrate thoroughly tested solutions more speedily in the coming years, with better coordination across the entire health service to further harvest the benefits from eHealth across the whole of the health care system.



"Our analysis of available literature and data indicates that three countries – Denmark, Finland, and Sweden – are definitively ahead of the United States and most other countries in moving forward with their health IT systems. These three Nordic countries have nearly universal usage of electronic health records (EHRs) among primary care providers, high rates of adoption of EHRs in hospitals, widespread use of health IT applications, including the ability to order tests and prescribe medicine electronically, advanced telehealth programs, and portals that provide online access to health information."

*Information Technology and
Innovation Foundation 2009,
"Explaining International
IT Application Leadership"*

"From the data collected for this study, Denmark, the Netherlands, Finland, Sweden and the UK emerge as the European frontrunners in eHealth use by General Practitioners."

*Benchmarking ICT Use among
General Practitioners in Europe,
European Commission April 2008*

The Danish health care system at a glance

The layout of the Danish health care system and the Danish political system forms an important basis for the work on eHealth in Denmark.

Health care in Denmark is based on two main principles:

- **Free and equal access to public health care.** This includes general and specialised practitioner services and all public hospital services. Private co-payment includes dentists and out-of-hospital medicines and aides.
- **Universal coverage.** All residents in Denmark are entitled to public health care benefits in kind.

The public health care system is organised in two main sectors: primary health care and the hospital sector.

The **primary health care sector** deals with general health problems and care and consists primarily of general practitioners, practising specialists, practising dentists, physiotherapists and home nursing.

Primary health care also includes preventive health schemes, public health care and child dental care.

The general practitioners occupy a central position in the Danish health care system as the patients' primary point of entry to health services. The general practitioner ensures that the patient is given the right treatment and is referred to the right professionals in the health service. The general practitioner is thus the coordinator and the person with professional responsibility for referring patients to hospitals, specialists and other professionals.

	Denmark	OECD average
Number of doctors (pr. 1,000 inhabitants)	3.4	3.1
Number of beds at public hospitals (pr. 1,000 inhabitants)	3.5	4.9
Life expectancy	79.0	79.5

Source: OECD (2009)

The **hospital sector** deals with medical conditions that require specialised treatment, equipment and intensive care.

As a rule, a general practitioner must refer the patient to a hospital for medical examination and treatment unless it is a question of an accident or acute illness. It will normally also be necessary to be referred by a general practitioner for treatment by a specialist.

Since 1993 patients have had the right to choose between all public somatic public hospitals for treatment. Since 2002, so-called extended free choice has given patients the right to choose publicly financed treatment at a private hospital if waiting times at public hospitals are too long.

Public health expenditures

	Denmark	OECD average
Total expenditure (USD pr. capita)	4,348	3,233
GDP percentage	11.5	9.6

Public expenditure constitutes approx. 84 per cent of total health expenditure. Private health care expenditure mainly covers out of pocket expenditures for pharmaceuticals and dentistry.

The state imposes a health care contribution tax for financing the majority of regional and local health care expenditure. This tax is 7 per cent on taxable income.

Source: OECD (2009)



Political and administrative levels in the health care sector

Like Denmark as a whole, the health care sector has three political and administrative levels: the state, the five regions and 98 municipalities.

The health care service is organised in such a way that responsibility for the services provided is placed at the lowest possible administrative level. Services can thus be provided as close to the users as possible.

National level

The task of the state in health care provision is to initiate, coordinate and advise on national health policy at a general level.

The Ministry of Health, in its capacity of principal health authority, is responsible for drawing up overall national health policies and legislation on health care.

The Ministry also draws up guidelines for general planning within the health sector and operation of the health care service.

Regional level

The five regions in Denmark are run by elected boards and are the main service providers in the Danish health care system. Their responsibilities include:

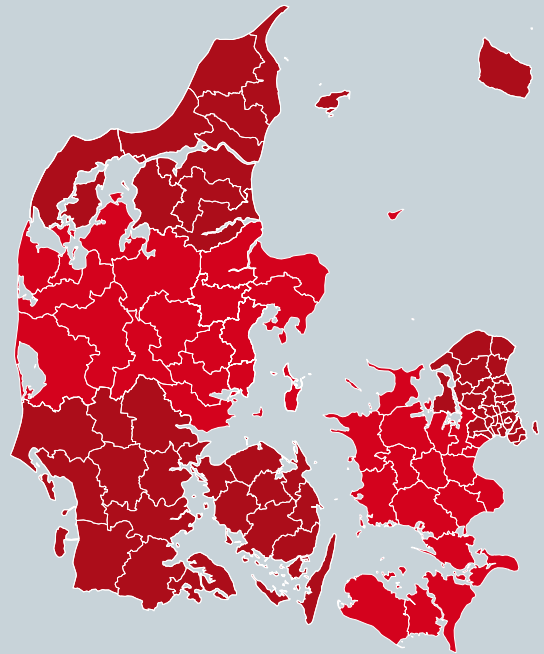
- All hospital and psychiatric treatment
- Parts of the primary health care system:
 - General practitioners (family doctors)
 - Private practising specialists
 - Dental services for adults
 - Physiotherapy

The regions do not collect taxes. Instead, the regional health care services are financed through a block grant from the state, a state activity-related subsidy and a municipal contribution.

5 regions



98 municipalities



Local level

The 98 municipalities are the local administrative bodies with an average of approx. 57,000 inhabitants. The municipalities are responsible for a number of tasks including social services, primary schools and care for the elderly. In the field of health, the municipalities are responsible for:

- Home nursing and homes for elderly people with care facilities and associated care staff
- Public and school health care
- Child dental treatment
- General disease prevention
- Rehabilitation

The municipalities finance approx. 20 per cent of the total expenditure on health care in the regions. The payment consists of an activity-related contribution depending on the citizen's use of hospitals. The purpose of the local contributions is to encourage the municipalities to initiate efficient preventive measures for their citizens with regard to health issues.



Major investments in new hospitals

In the coming years, the regions are to implement significant changes in the hospital structure in Denmark. Between 2010 and 2020, more than 5 billion euros will be invested in large new hospitals and expansion of already existing hospitals. This will result in a renewal of approx. 1/3 of all hospital square meters in Denmark.

A total of 16 new hospitals are being designed and planned. These hospital investments will lead to a modern, up-to-date hospital structure, where acute and highly specialised treatment will be centralised at fewer locations.

The plans also include large-scale investment in ICT and appliances. For this reason, a substantial amount has been dedicated to investments in equipment and technology, which will be realised during the next 10 years.

Current Danish eHealth solutions

As the previous chapter describes, health care services in Denmark are shared among various sectors and organisations.

In order to ensure coherent health care delivery, a number of current eHealth solutions contribute to connecting the Danish health care system digitally.

MedCom messages – digital exchange of health data

MedCom was established in 1994 with the purpose of developing nationwide communication standards for the most common messages between public hospitals and general practitioners as well as private companies linked to the health care sector, e.g. pharmacies.

The messages cover the most frequent text-based clinical messages in the Danish health care, e.g. discharge letters, referrals, lab test orders, e-prescriptions and reimbursement from public health insurance.

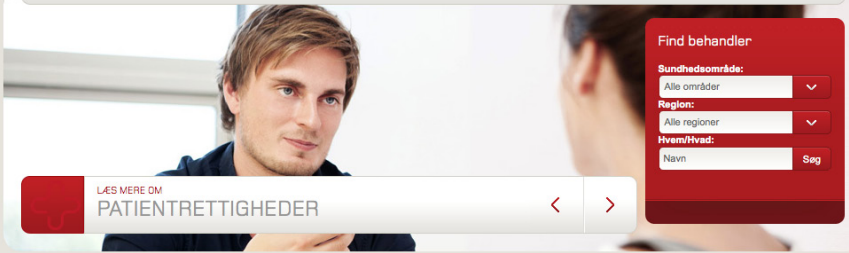
From a rather slow start with less than 4,000 documents in the first year, the exchange of health care documents is now almost fully electronic with more than 60 million messages sent in 2011. In reality practically all frequent documents in the health care sector are transferred electronically between health care professionals.

Type of message	% digital
Discharge letters from hospitals to GPs	99
Referrals from GPs to hospitals	81
Lab results from laboratories to GPs	99
Lab test orders from GPs to laboratories	99
e-Prescriptions from GPs to pharmacies	85
Reimbursement from GPs to public health insurance	99
Notifications of admission / Notifications of discharge from hospitals to municipalities	98
Rehabilitation plans from hospitals to municipalities	80

Source: MedCom

The focus is now on digitalising a number of messages sent between hospitals and home nursing in municipalities, including discharge letters and home nursing plans. These messages are expected to be fully digitalised by the end of 2012.

- > Sygdom
- > Sundhed og livsstil
- > Valg af læge og sygehus
- > Bliv donor
- > Medicin
- > Patientrettigheder
- > Sundhedsvæsenet



FIND EN BEHANDLER
som passer dig

SE DIN JOURNAL
fra sygehuset

SYGDOMME FRA A-Z
Så op i Patienthåndbogen

DINE KONSULTATIONER
og lægebesøg

Programmet for børnevaccination

Børnevaccinationsprogrammet er et tilbud om gratis vaccination af alle børn under 18 år.

> Børnevaccinationsprogrammet

Patientoplevelser på sygehuse

Læs bl.a. om patienternes samlede indtryk af de danske sygehuse

> Patientoplevelser

Læs mere om sundhed og livsstil

Lidt for tung?
Test dit BMI og læs mere om sundhed og livsstil

> Sundhed og livsstil

Find sygehuse, psykiatri og kommuner

> Oversigt over sundhedsvæsenet

Sundhed.dk – the official web portal of the public health services

Sundhed.dk ("health".dk) is the official Danish health website providing access to information for citizens, patients and health care professionals.

Sundhed.dk for the patient

- In a secure part of the website, the patient has access to personal health data on treatments and notes from hospital records, information about medicine and about visits to the GP etc.
- Access to various e-services including making appointments with GPs, prescription renewals and electronic communication with the GP.
- Access to information on waiting times at all public hospitals and ratings of hospitals in terms of patient-experienced quality and service.
- Patient networks give the patient the possibility to discuss their own disease, treatment etc. with other patients with a similar diagnosis, especially relevant for patients with a chronic disease.
- Access to sundhed.dk's handbook for patients, which consists of 3.000 articles with information on diseases and treatment



Sundhed.dk for the health care

- The main entry for access to existing patient data that is not already accessible in the health care professional's own EHR system. This typically includes access to data in **e-Journalen** and **the Shared Medication Record**. Every access is logged with information on time of access and the name of the health care professional's organisation.
- Access to the professional version of sundhed.dk's handbook for physicians, covering a wide range of health care with articles, guidelines, educational programmes, tests, video animations etc.

In the coming years, sundhed.dk aims to support the overall trend in health care delivery in terms of changes in the relationship between health care professionals and patients with respect to supporting the patient's management of a healthy lifestyle, disease prevention and a stronger connection between treatment and the patient's own efforts. One example would be to give the patient the possibility to register various health data directly in the web portal.



Hanne, 38 years of age

Hanne has an appointment with her GP to receive the results of a routine smear examination. The results indicate a risk of cancer, and she is electronically referred for examination at the hospital.

Hanne is anxious about whether the hospital she has been referred to is good enough, so she checks figures on patient satisfaction and quality in care on sundhed.dk. She also realises that she hasn’t remembered all the information that the GP gave her, so she looks up the handbook for patients on sundhed.dk, which contains 3,000 articles with information on diseases and treatment.

Hanne has the surgery, and through cell analysis that is confirmed when she visits her GP she is informed that the cells were cancer cells. Afterwards, she starts chemotherapy treatment at the hospital.

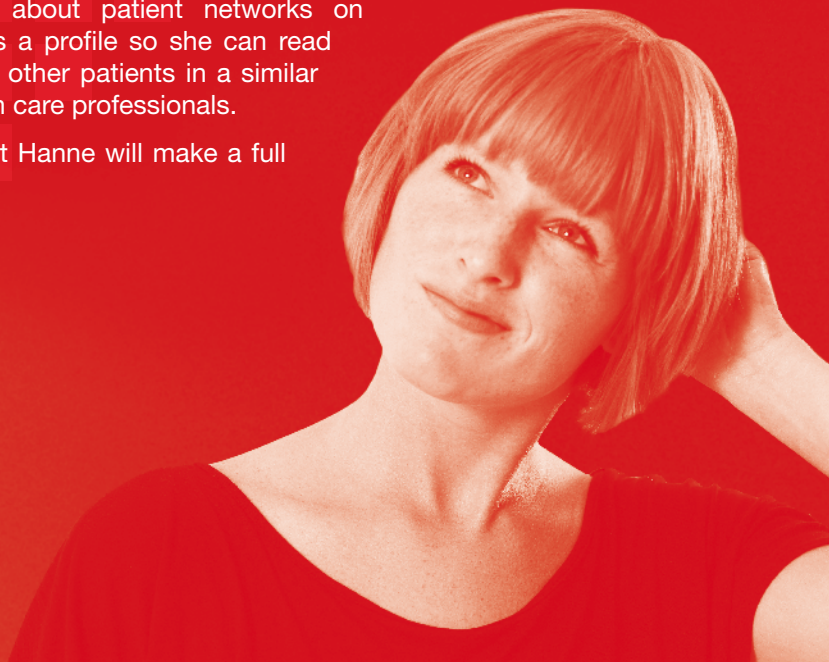
At a later visit to the GP, the doctor consults e-Journalen and the Shared Medication Record in the part of sundhed.dk dedicated to health care professionals in order to read Hanne’s medical record in the hospital EHR system and to see what kind of medicine the hospital has prescribed for her.

During the treatment, she discusses her situation with her sister. She doubts whether she has understood everything that has been said at the hospital. By using e-Journalen on sundhed.dk, she also gets access to her own medical record from the hospital. Furthermore, she consults the patient information in sundhed.dk’s handbook for physicians to understand all the medical terms.

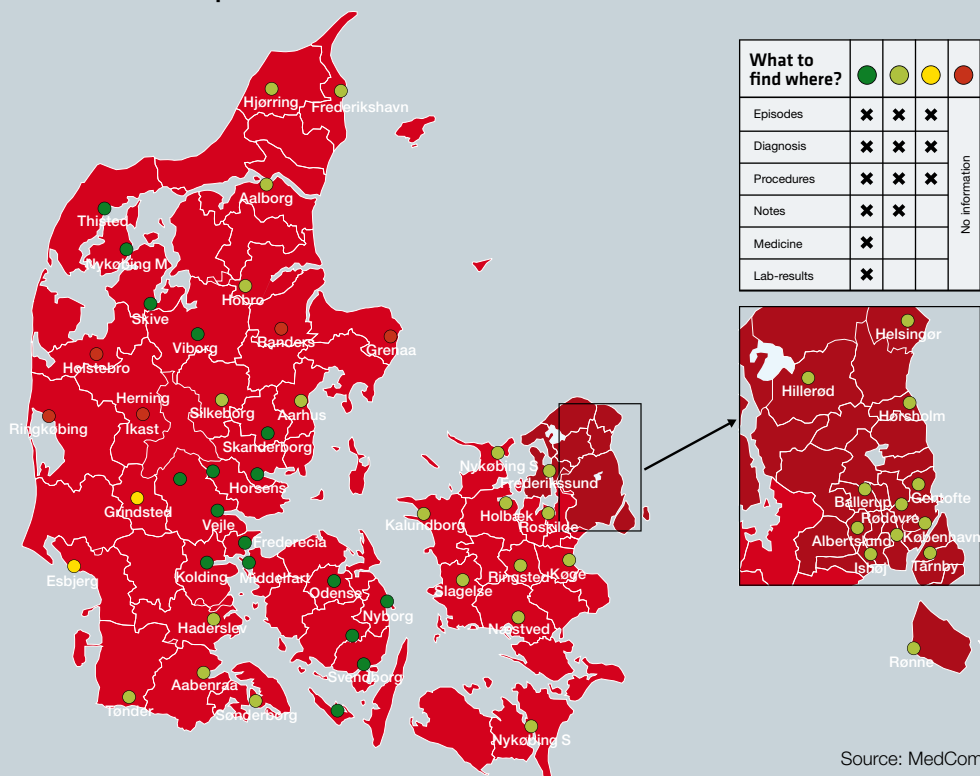
She also feels the need to talk other patients in the same situation. She is told about patient networks on sundhed.dk and creates a profile so she can read and reply to posts from other patients in a similar situation and from health care professionals.

Everything indicates that Hanne will make a full recovery.

Based on a fictional story



Accessible data in the e-Journalen system across Danish hospitals



“e-Journalen” – digital access to electronic medical records at hospitals

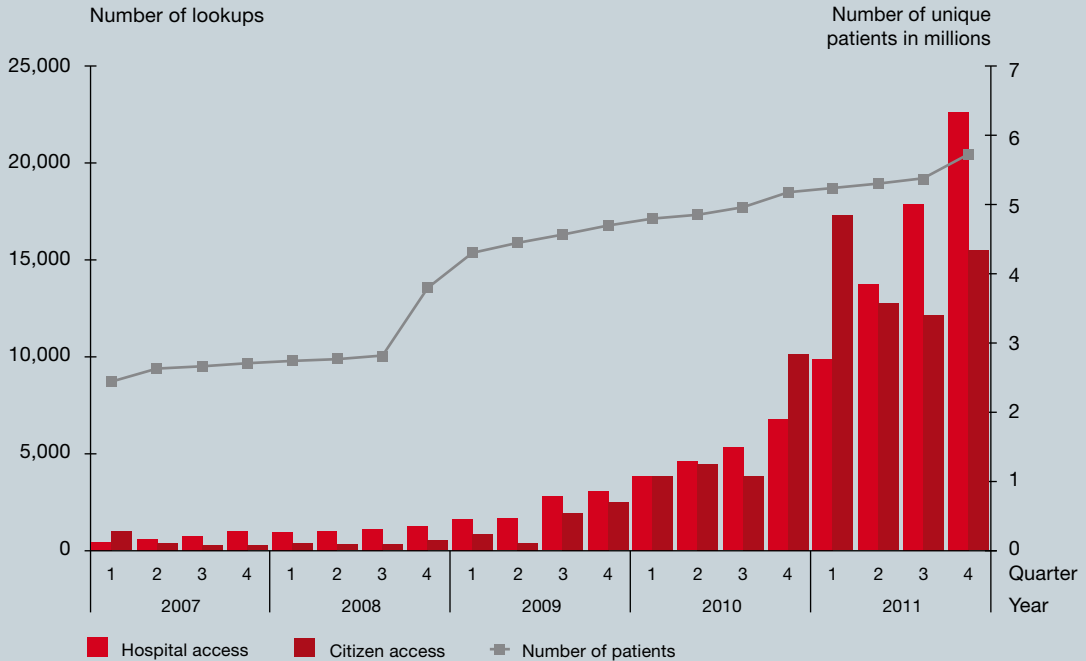
The **e-Journalen** (“e-record”) system gives patients and health care professionals digital access to information on diagnoses, treatments and notes from EHR systems in all public hospitals. 30–40 per cent of the hospitals also provide access to information on medicine and sample results from laboratories.

By the end of 2011, the system contained health data on more than 85 per cent of the Danish population.

Clinicians at hospitals have access to **e-Journalen** directly through the hospital's EHR system, while GPs can access the system through **sundhed.dk**. Furthermore, patients can also gain access to their own data via **sundhed.dk**.

Use of the system has increased steadily since its introduction in 2007. In 2011, the system had more than 1.2 million entries, primarily by hospital physicians and patients.

Use of the e-Journalen system 2007-2011



Source: MedCom

The **e-Journalen** has benefited Danish health care in several ways:

- Increased patient safety and improved patient treatment by providing a more solid ground for decision making as doctors have better access to existing patient data.
- Connection of various EHR systems used at the Danish public hospitals in a cost-effective and pragmatic way.
- Supported the exchange of patient data between hospital departments more cost-effectively. Prior to the **e-Journalen** system, information was often delivered by ordinary mail or fax.

Furthermore, the e-Journalen has contributed to openness in the health sector by providing the patient with easy access to own health data. This has created a stronger base for involving and activating the patient in relation to his or her treatment as well as increased patient empowerment.



Erna, 70 years of age

Erna has had diabetes for many years. Due to the illness, she has been having some trouble with ulcers on her legs and feet.

For this reason, she has to go for regular checkups at the hospital 50 kilometres away from her home. She has to use half a day on each visit – sometimes even more if the doctor is late.

The last time she went to the hospital, the doctor told her that it is possible to avoid some of the hospital visits if a home nurse from her own municipality takes pictures of Erna’s ulcers and forwards them to the hospital. Erna finds the idea interesting and agrees to try it out.

A few days later, the home nurse, who has been specially trained, visits Erna for the first time. The nurse uses her mobile phone to take a picture of Erna’s ulcers and the picture is digitally transferred to a database.

At the hospital, the doctor examines the photos of Erna’s ulcers. He makes sure that the repair is progressing as expected and lets the nurse know that Erna doesn’t have to go to the hospital for the next visit.

Half a year later, the ulcer has returned. By checking the pictures sent by the home nurse, the doctor concludes that a change in the treatment is necessary. He calls Erna to the hospital. The doctor prescribes a different kind of ointment.

A few weeks later, Erna’s ulcer has almost disappeared.

Based on a fictional story



Projects currently being implemented

At present, two significant projects are being implemented in order to further digitally connect the Danish health system.

The Shared Medication Record – a digital overview of a patient’s current medication

Lack of full knowledge about a patient’s medication often leads to medication errors and hospital admissions.

The incomplete knowledge is often due to the fact that the main source of information on the patient’s medication typically is the patient him or herself. As a patient, it can be difficult to remember all currently prescribed medication as well as the correct name of the medicine. As a consequence, the clinician often receives incorrect or incomplete information. This can potentially be harmful to the patient.

To counter this problem, **The Shared Medication Record** (“Fælles Medicinkort”) is being implemented across the Danish health system. The system consists of a central database containing information on all Danish citizens’ medicine dispensed during the previous two years as well as an updated list of every patient’s current medication.

Once the implementation is completed, citizens, doctors, emergency physicians and other health care professionals will have digital access to updated information on the patient’s prescribed medication.

Access is established through local EHR systems at hospitals and in private practices or via **sundhed.dk**. The patient can also access the shared medication record through **sundhed.dk**.



The Shared Medication Record will contribute to a number of benefits including:

- All health care professionals involved in the treatment of a patient will have digital access to up-to-date information on the patient's current medication.
- Increased likelihood of correct medication across the various parts of the health care sector.
- A reduction in the need for the patient to remember details about their own medication.
- Easier handling of medication information between health care professionals. Previously, information about a patient's medication from the patient's GP was often collected from hospitals by phone or fax.

The project will be fully implemented at all Danish hospitals before the end of 2012.



Telemedicine in Denmark

The use of telemedicine is becoming more widespread in the Danish regions and municipalities. After a rather large number of minor 'stand alone' projects, mainly by local entrepreneurs, the health care system is now moving into a phase where large-scale projects involving telemedicine are being initiated.

Two examples are COPD and diabetic ulcer projects, often conducted in close cooperation between municipal home nursing and hospitals. The projects show promising results and are an indication of the breakthrough in the use of telemedicine that is expected to take place in the coming years.

Most telemedicine projects in Denmark are centred around three main themes:

Long-distance monitoring: These projects cover a wide range of initiatives where the patient's health status is monitored at a distance, often from the patient's home. The projects include self-reported monitoring of chronic diseases and assisted telemedicine, where the patient, assisted by a nurse, conducts tests under video supervision by the specialist at the hospital. The purpose is to prevent visits to the hospital. This benefits patients and reduces costs.

Projects involving video conferencing: The aim of these projects is to support communication either between health professionals (from GP or municipal nurse to hospital or between hospitals), or between patients and health professionals. Video conferencing has been used in the municipalities to strengthen the dialogue between municipalities and medical wards at hospitals and in staff training and supervision. Secondly, municipalities and hospitals can use video conferencing to obtain second opinions from specialists.

Digital exchange of photos: The most widespread use of this technology has been the exchange of photos of diabetic ulcers for examination purposes between home nurses in municipalities and specialists at hospitals. In some parts of the country, using telemedicine for ulcer examination is already part of the daily routine, whereas others are piloting the technology. It is broadly accepted that the solution can be beneficial with respect to both quality and costs.

The National Patient Index and the National Health Record

Today, patient data are stored digitally in various databases across the health care sector. However, health care professionals and patients often lack digital access to this information.

The ambition in the two connected projects "The National Patient Index" and the "National Health Record" is to give health care professionals and patients easy access to data on the patient when needed by creating a digital overview of existing health data.

The National Patient Index is an infrastructure project that makes it possible to search for existing data on a patient in the data sources that are integrated into the index. Furthermore, it contains a number of security measures to ensure secure use of the system.

Initially, **The National Patient Index** will provide access to the following data sources:

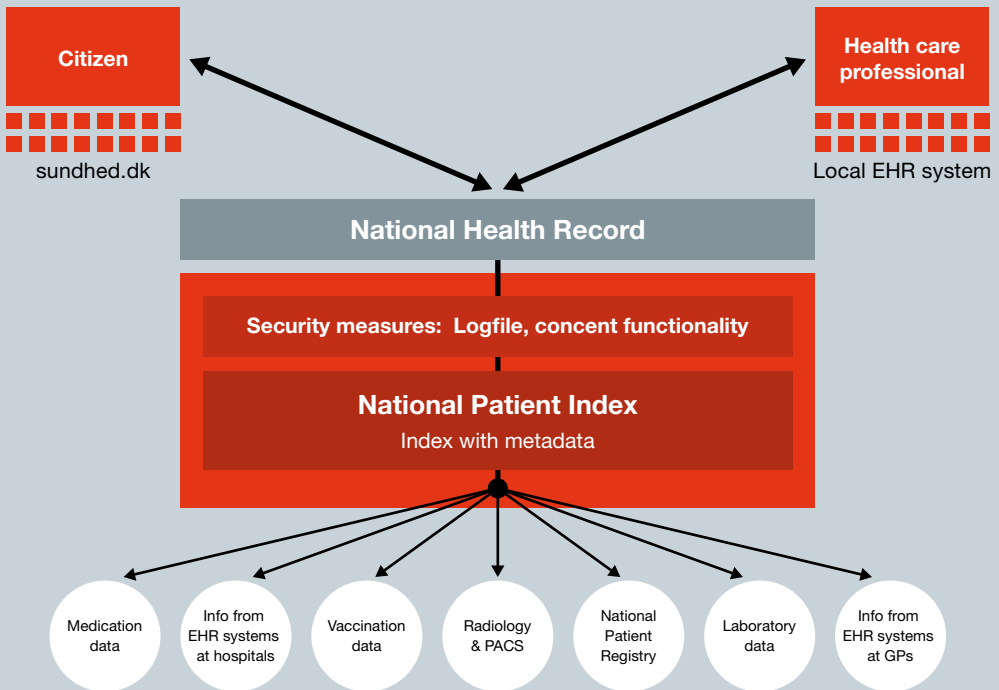
- Medication data from **The Shared Medication Record**.
- Information from EHR systems at hospitals and from EHR systems at GPs.
- Data from laboratories.
- Data on vaccinations from the Danish Vaccination Register.
- Material from an interregional radiology information system/ picture archiving communication system.
- Data from the national patient register containing data on all hospital admissions, both ambulatory and hospitalisation.

Additional data sources are expected to be added in the coming years.

At the same time, **The Regional eHealth Organisation** (RSI – see below) is establishing a **National Health Record**, which is an expansion of the current **e-Journalen** system (see above). The National Health Record will display data from the data sources in The National Patient Index in a coherent and intelligent user interface.

The system is planned to be fully implemented in the clinical work stations at all public hospitals by the end of 2013. The patient will have access via sundhed.dk.

The National Patient Index and the National Health Record



Source: National Board of eHealth and sundhed.dk

By establishing **The National Patient Index** and **The National Health Record**, clinicians and patients will have access to a more complete overview of existing patient data. This will benefit health care professionals and patients in several ways by providing:

- A clinical tool that enables digital sharing of data across borders and sectors in the health care system.
- A tool for gaining digital access to patient data not already stored in local EHR systems.
- Support in decision-making in relation to referral, elucidation and treatment of a patient.
- Giving citizens access to a broader range of own health data thereby establishing a foundation for improved dialogue, better insight in their own health condition and improved possibility for active involvement in their own treatment.

Denmark – a leader with telehealth deployment in Europe

The Strategic Intelligence Monitor on Personal Health Systems research on “Integrated Personal Health and Care Services” (IPHS) in Europe has identified Denmark as one of the leading European countries that have succeeded in taking telehealth initiatives beyond the pilot stage, into de facto mainstreaming in care pathways.

The analysis of five Danish best cases has helped IPTS identify key elements for successful mainstreaming which other EU countries could learn from.

- **Governance & funding mechanisms**

Pilots and projects in Europe tend to stumble in terms of securing long-term funding and sustainability. The availability of funding has been key to enable mainstreaming in Denmark. In addition, an integrated governance model, engaging all stakeholders, combined with the adaptation of the legal framework, have also contributed to the decisions on mainstreaming.

- **Care re-organisation**

Successful telehealth implementation requires re-organisation of care. The already existing very good relationships between primary, hospital and social care have greatly contributed to such a re-organisation in Denmark, thereby making way for enhanced telehealth deployment.

- **Incentives**

Incentives in all tiers of care need to be aligned if telehealth is to succeed. Denmark is one of the pioneers having introduced specific Diagnosis Related Groups (DRG) for some telehealth services.

- **eHealth deployment**

High levels of eHealth deployment become a major asset and enabler of integrated complex solutions like telehealth and care delivery, while at the same time stimulating innovation in the implementation of interoperable solutions. Denmark through the pioneering work of MedCom since the 1990s has managed to create the digital infrastructure that underpins scalable eHealth deployment.

The SIMPHS findings on the Danish case and comparisons with other countries and regions of Europe enable the wider eHealth community to draw important lessons.

While many European countries are still struggling to overcome barriers, the Danish experience shows that these barriers if managed properly can be turned into drivers. This gives hope that European healthcare systems, with the support of ICTs, can adapt to meet the challenges of our ageing societies.

*Strategic Monitor on Personal Health Systems (SIMPHS)
European Commission, JRC IPTS, March 2012*

Governance model and main stakeholders

A core feature in the field of eHealth is to ensure widespread implementation of eHealth solutions in order to fully reap the benefits.

For this reason, the final chapter is dedicated to a description of the main stakeholders in the field of eHealth in Denmark and the governance setup in which they operate.

Division of labour and responsibilities

For many years the development of eHealth in Denmark has been based on cooperation between all involved parties: the government, the regions, the municipalities etc.

This has brought the development to a level where nearly all basic information between the various sectors has been digitalised and where a large number of eHealth solutions, including various EHR systems, have been introduced in almost all parts of the health system.

In recent years, efforts have been concentrated on integrating and streamlining the way patient data are accessed and shared across the health system to make all relevant patient data accessible when needed.

In order to achieve more coordinated and speedy development, in June 2010 the Danish Regions and the Danish Government agreed on a number of changes in the organisational setup in the field of eHealth.

The main focus of the agreement is to ensure a clearer division of labour between all parties involved including the Ministry of Health and the five regions. The agreement states that the Ministry is responsible for overall development and national coordination and prioritisation. Within this framework, the regions are responsible for investments in and the implementation of specific eHealth solutions.

As a part of the agreement, a board has been established to advise the health minister. The advisory board consists of representatives from the government, the regions and the municipalities. The role of the board is to coordinate and follow the overall strategy and development within eHealth, to initiate new national eHealth projects etc.

Furthermore, the agreement contains a number of milestones for the development within eHealth till the end of 2013. The milestones include:



- An ambitious plan for the integration and consolidation of the EHR systems that have been introduced at public hospitals over the years. In 2007 there were 27 different EHR systems in use across all public hospitals. This will be reduced to five coherent EHR landscapes (one in each of the five Danish regions) before the end of 2013.
- The establishment of **The National Patient Index**, which will give all health care professionals access to an overview of all relevant existing data on a patient irrespective of where in the health care system the data are stored. This system is planned to be integrated in EHR systems at hospitals before the end of 2013.

The agreement, moreover, states that investments in eHealth systems must be financed by the party that benefits from the investment.

Prerequisites for eHealth in Denmark

A number of favourable prerequisites generate a solid basis for working with eHealth solutions in the Danish health care system.

Ranking of Denmark in ICT indicators

	2006	2007	2008	2009	2010
World Economic Forum: Networked Readiness Index	1	1	1	1	3
The Economist Intelligence Unit: Digital Economy Rankings	1	1	5	1	2
OECD: Broadband Growth and Policies	1	1	1	2	N/A
IDC: Information Society Index	1	1	1	1	1

Source: Agency for the Digitalisation

An ICT-ready society

The use of ICT is an integrated part of Danish society. Denmark is among the leading nations in the world according to a number of international indicators on the use of ICT, digitalisation of the public sector etc.

Additionally, the Danish population are among the most ICT ready in Europe. According to a recent Eurostat study, 78 per cent use the Internet on a daily or almost daily basis and 90 per cent of Danish households have internet access.

A unique personal identifier

A digital identification system is a central prerequisite for ensuring verification of patients in various ICT solutions across the health care sector.

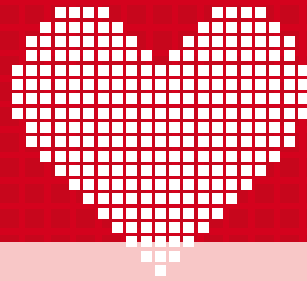
The Danish personal identifier, also known as the civil registration number, is a unique personal identification number that each Danish

citizen is provided with at birth. The system was introduced in 1968. Every citizen in Denmark can be identified by the use of this system and it is used for identification in all areas, i.e. taxation, social services, banking, health care etc.

To enable online verification (eID) on various websites, a Danish digital signature was introduced in 2003. The signature is linked to the personal identification number.

In 2010, the system was expanded to the "NemID" ("Easy"-ID) system, which is a common secure login solution that can be used on all public websites in Denmark and for Internet banking.

A Danish citizen can use the NemID from any computer, both in Denmark and abroad. For this reason, the system consists of a two-factor authentication solution based on a pin code and a key card with single use codes.



A long tradition of health registries and databases

Denmark has a long tradition of thorough monitoring and registration of patients who have been in contact with the health sector. Some databases have been maintained for more than 30 years.

The Ministry of Health is responsible for maintaining a number of databases on health statistics including the general health of the population as well as morbidity and mortality. Information concerning the organisation and finances of the health care sector is also registered.

Additionally, Danish databases on clinical quality contain information on the performance of the health care system. The databases are all defined to a certain area of disease or a medical procedure e.g. breast cancer, heart failure and chronic obstructive lung disease. A network of more than 50 national databases has been established containing information on more than 60 different areas of disease.

The Danish personal identifier makes it possible to trace patients across the various databases, which creates unique possibilities for research and development.

The Danish Health Data Network for secure data exchange

The Danish Health Data Network (DHDN) gives the entire health sector in Denmark the possibility of offering their services to all the connected organisations through one secure digital connection.

The philosophy behind DHDN is that the parties in the health sector will have all their communication needs met via the same network connection. This makes the network

the electronic exchange point for all communication across the health care system, regardless of whether the users belong to the public or private sector.

Other than providing backbone network services for the Danish health care sector, DHDN is also used in various international projects with connections to Norway, Sweden, Estonia, Lithuania, Germany and Spain.

DHDN also delivers video conferencing services to all connected organisations in order to minimize the problems in communicating between different video conferencing platforms.

Danish legislation concerning eHealth

Danish legislation governing eHealth is relatively accommodating compared to other countries. Doctors, dentists, midwives, nurses, home nurse assistants, radiographers and paramedics all have the possibility to digitally obtain health data on a patient – irrespective of whether the data are historical or current.

However, it is a requirement that the information is necessary for the current treatment of a patient, and only information relevant for the treatment can be obtained.

All public hospitals must keep a log file of the health care professionals who have accessed a patient's data. As part of security measures, random samples can be taken of the employee's access to files in the EHR systems in order to avoid misuse of the system.

Furthermore, a patient can deny health care professionals access to information on the patient's health data at any time. In other words, the patients have control over their own health data.



Interpretation via video conferencing in all Danish Hospitals

Approx. 150,000 interpretations are carried out in Danish hospitals and at GPs every year. The process concerning the interpretation is frequently time-consuming and inflexible. The health care professional has to make sure that the interpreter and the patient are present and ready at the same time, and the health care professional can be late due to delays at the hospital. For this reason, the interpreter sometimes has to leave early if another appointment has been scheduled.

Since 2010, a project concerning the use of interpreters via video conferencing has been undergoing implementation in all public Danish hospitals. Interpretation through video conferencing equipment contributes to more efficient use of the interpreter, as the video link will be established only when the health care professional and the patient are ready. Additionally, the interpreter does not have to spend time travelling to and from the hospital.

It also contributes to more flexible access to interpretation services, especially in situations where acute treatment is necessary, thereby potentially leading to higher quality in treatment and greater patient satisfaction.

Ministry of Health

According to Danish health legislation, the Minister of Health has the right to formulate specific requirements about the use of ICT in the Danish health care system, including requirements concerning standardisation, use of common infrastructure etc.

The Ministry of Health is responsible for effectuating the intentions of the law. This implies ensuring enhanced overall national coordination of the development of eHealth throughout the Danish health care sector.

This task is being carried out in close collaboration with all relevant parties in order to manage the processes leading to the establishment of uniform rules and frameworks for eHealth in Denmark.



STATENS SERUM INSTITUT
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HEALTH DATA AND
DISEASE CONTROL



NATIONAL
SUNDHEDS-IT
NATIONAL BOARD OF E-HEALTH

To handle the responsibilities, the Danish National Board of eHealth was established in 2011 as an agency under the ministry. The agency is responsible for:

- Developing and maintaining a national catalogue of ICT standards to be used in the Danish health care system. The catalogue contains more than 400 standards primarily based on standardisations that have been laid down internationally.
- Consolidating national health registries and systems to ensure more efficient operation and development.
- Improving national services provided to the various parts of the health care system, including access to real-time data for financial and quality control, standardising external interfaces for reporting health data etc.
- Implementing specific intersectoral initiatives within eHealth such as the Shared Medication Record and the National Patient Index as agreed in annual budget agreements and based on politically determined targets and milestones.



Danish Regions

The five regions have formed an interest organisation, Danish Regions, which coordinates the common interests of the regions at national level.

This concerns i.a. negotiating the annual financial framework for the regions with the government as well as agreements with the private practising sector including GPs and dentists.

The regions are working on improving the quality of the Danish health care system. The fundamental idea is that improved quality of treatment benefits both the patients and the economy because patients avoid longer stays in hospital as well as re-admissions. ICT is viewed as a key enabler in this work.

eHealth is an integrated part of all hospitals' business and work processes, thus supporting the overall goals of the hospital sector. The benefits achieved by implementing eHealth should be seen as an integral part of the organisation as such and cannot be separated from the core business.

The Regional eHealth Organisation (Regionernes Sundheds-IT organisation – RSI) was established in 2010 to accelerate and coordinate the implementation of eHealth across the five regions.

RSI is managed by board members from all five regions and Danish Regions. All projects are carried out with one of the regions as the main principal.

RSI has formulated 24 ambitious goals for eHealth development, all of which have specific deadlines. Examples of the goals are:

- **Single sign-on to all major ICT systems at all hospitals before the end of 2013.**
- **Electronic overview boards on all major emergency wards before the end of 2011.**
- **Digital exchange of X-rays between all hospitals before the end of 2012.**
- **Citizens' access to own data in the e-Journalen system before the end of 2010 as a part of a combined patient empowerment strategy.**

The cooperation within RSI has already come a long way. Currently (February 2012), 13 of the 24 goals have been reached and new goals are being formulated.

The Danish e-Government Strategy 2011–2015: “The digital path to future welfare”

In 2011, the government, Local Government Denmark and Danish Regions agreed on a new strategy for the continued work of digitalising the public sector in Denmark. The strategy includes a number of ambitious goals for digital communication between citizens and the public sector.

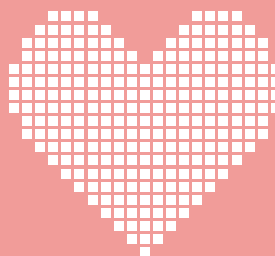
Today, citizens can already handle most of their communication needs with the public sector online. Most Danish citizens check their tax returns on the Danish Tax and Customs Administration’s website. Students sort out their grants online. New parents can check the rules for maternity and paternity leave on Borger.dk (“Citizen”.dk – The National Citizen Portal).

To further increase the use of e-government solutions, the strategy states that by 2015, it will be mandatory for citizens to use digital solutions to communicate in writing with the public sector. Once printed forms and letters have been phased out, all citizens will have to use online self-service solutions.

As of 2014, all citizens will have their own digital letter box for correspondence with the public sector. This means that instead of being confined to office hours, citizens will be able to correspond with the public sector when it suits them.

Furthermore, the strategy also focuses on the continued implementation of the “nemSMS” system, which will allow hospitals to send text message reminders to patients about upcoming appointments etc.

Source: Agency for Digitalisation





Local Government Denmark

Local Government Denmark (LGDK) is the association of municipalities in Denmark. The mission of LGDK is to safeguard the common interests of the municipalities, assist the individual municipality with consultancy services and also ensure that the local authorities are provided with relevant, up-to-date information. In addition, LGDK is the employers' association of the municipalities and the negotiation party in relation to local officials' trade unions.

Being responsible for the majority of welfare services in Denmark, the municipalities work with e-solutions on a broad range of welfare areas such as eHealth, e-care and e-learning. To ensure synergy and coordination between the municipal e-initiatives, LGDK's board has adopted a joint municipal digital strategy for 2010–2015. The strategy comprises 32 e-projects covering the work span of Danish municipalities.

LGDK is a partner in major Danish eHealth ventures such as **MedCom** and **sundhed.dk** and is represented on the health minister's national advisory board on eHealth.





MedCom

MedCom was established in 1994 as a publicly financed non-profit joint venture between public authorities, organisations and private companies connected with the Danish health care sector. In 1999, it was decided to make MedCom a permanent organisation with the following purpose:

“MedCom shall contribute to the development, testing, implementation and quality assurance of electronic communication with the purpose of supporting “the good patient flow”.

The profile and purpose of MedCom was further sharpened in 2011:

“MedCom is continued with a base in the politically set goals and milestones regarding cross-sectional communication and with an unambiguous role as executing organisation. MedCom solves issues concerning efficient health care delivery and the gradual expansion of the national eHealth infrastructure necessary for secure and connected access to relevant data and messages across regions, municipalities and general practitioners”.

MedCom hence focuses on national implementation projects concerning support for the clinical cooperation between general practitioners, public hospitals, private hospitals, specialised treatment, the municipal health sector, laboratories and pharmacies, including telemedicine.

MedCom is owned and financed by the Ministry of Health, Danish Regions and Local Government Denmark.

Sundhed.dk

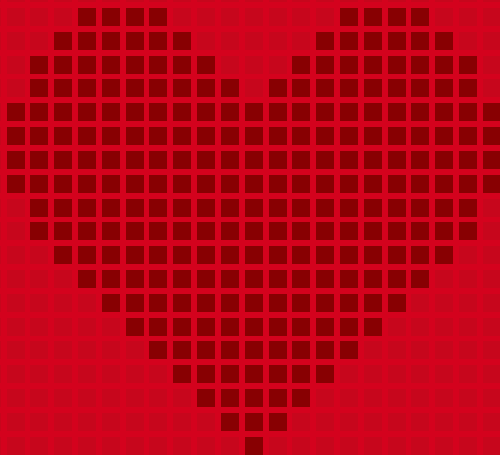
Sundhed.dk supports the digitalisation of the health sector and matches the national and regional milestones and goals set by the Ministry of Health and RSI.

The foundation for sundhed.dk was established in 2003 in order to provide a common digital entry to reliable information about health and the Danish health system and at the same time create an opportunity to provide health care professionals with access to improved ways of communicating digitally between each other and with patients.

The partners behind sundhed.dk are Danish Regions, the Ministry of Health and Local Government Denmark.

The organisation has an annual budget of approximately 8 million euros and a staff of approx. 40.





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