

MedCom - the Danish Healthcare Data Network

The healthcare communication of the future

- Change-over to the Internet – new opportunities for everyone
- MedCom's EPR communication project



MedCom in brief

Increased division of work and specialisation have been characteristic of the healthcare sector over the last few decades. The sector has always involved a number of specialist groups and players with a mutual specialisation. This way of organising work has been accentuated in recent years, partly by substantial specialisation within the individual specialist group. A surgeon, for example, is not just a surgeon but a highly trained specialist in a narrow field of surgery.

Specialisation and division of work increase the need for flexible and effective communication between the players in the healthcare sector. This is of vital importance to technical quality, efficiency and how the patient experiences relationships in nursing, care and treatment.

At the same time, enormous developments have taken place in information technology. Advanced data communications have become prevalent in many sectors, and around 1990 the healthcare sector too started responding to the new opportunities that were being created. The benefits are obvious, but a major task has to be faced, both technically and organisationally, before information technology can be applied to communication between GPs, hospitals, pharmacists, laboratories, national health insurance schemes, local authorities and others.

The first pioneers in the area started with a few specific niches in communication. The next step in development came when the first counties decided to carry out co-ordinated and targeted development of a regional healthcare data network. A need for co-ordination, development and exchange of experience very soon arose in this situation. The objective was to ensure that the regional healthcare data networks together made up a nationwide network. It was against this backdrop that MedCom was established as a project organisation in 1994.

MedCom's own history mirrors the development that has taken place in the area since 1994.

MedCom 1 worked over the period from 1994 to 1996 on the development of communication standards for the most common communication flows between medical practices, hospitals and pharmacies.

MedCom 2, running from 1997 to 1999, broadened the communication between medical practices, hospitals and pharmacies, developed communication standards for the most important communication flows and carried out pilot projects in the areas of the Internet, telemedicine and dentistry.

While MedCom 1 and 2 were projects running for limited periods, a decision was taken in 1999 that MedCom should continue as a permanent organisation. At the same time, it was decided the permanent MedCom should continue to organise its work in the form of projects over limited periods.

MedCom 3, running from 2000 to 2001, has worked towards consolidating the communication between medical practices, hospitals and pharmacies, broadening the communication between

Purpose of MedCom

"The purpose of MedCom is to contribute to the development, testing, dissemination and quality assurance of electronic communication and information in the healthcare sector with a view to supporting coherent treatment, nursing and care."

Defined in 1999, when the MedCom organisation became permanent



IT strategy for the hospital service

The national IT strategy for the hospital service lays down the overall objectives and strategies in the area of information technology. The tasks of MedCom are summed up below in three bullet points:

- EDI communication – continued broadening and quality assurance of existing and new EDI communication flows
- Electronic patient record – development and implementation.
- Change-over to the Internet – development and expansion of the infrastructure in the healthcare data network using Internet technology.

hospitals and local authorities as well as preparing for the change-over to Internet technology, continued broadening of telemedicine solutions and the enhancement of communication in the hospital area.

MedCom 4 is a natural continuation of the previous MedCom projects and is fully in line with the general development in the area of information technology. The focal areas are now the change-over to the Internet, continued broadening and quality assurance of EDI communication and development and implementation of communication to and from electronic patient records.

This brochure describes the vision for MedCom 4.

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Change-over to the Internet - new opportunities for everyone

The establishment of the healthcare data network has meant substantial advances in relation to quality and efficiency in work processes and therefore also in relation to the patients' experience of coherence and continuity in their encounters with the various parties in the health service.

The most essential point in this context, it should be noted, is not the days or hours by which data communication reduces communication time in comparison with the time when internal or external mail by letter was the way in which it was done. To a far greater extent, time and quality can be gained from the fact that the message, once it has been keyed in, is immediately transferred from the sender's computer system to that of the recipient. In addition, all experience has shown that the introduction of information technology has led to work processes being reviewed and the organisation being made more flexible in order to obtain the maximum yield from the new opportunities.

The need for data communication in the healthcare sector was already evident in the infancy of the healthcare data network. Many barriers had to be overcome at the outset, however, primarily in relation to technology and traditions.

The VANS-based healthcare data network

The answer was firstly to standardise the

messages, which could ensure smooth communication between the parties and direct transfer of the messages from one system to another. EDIFACT standards were developed as the form of message for a large number of the most important communication flows, such as discharge summaries, prescriptions, laboratory results etc.

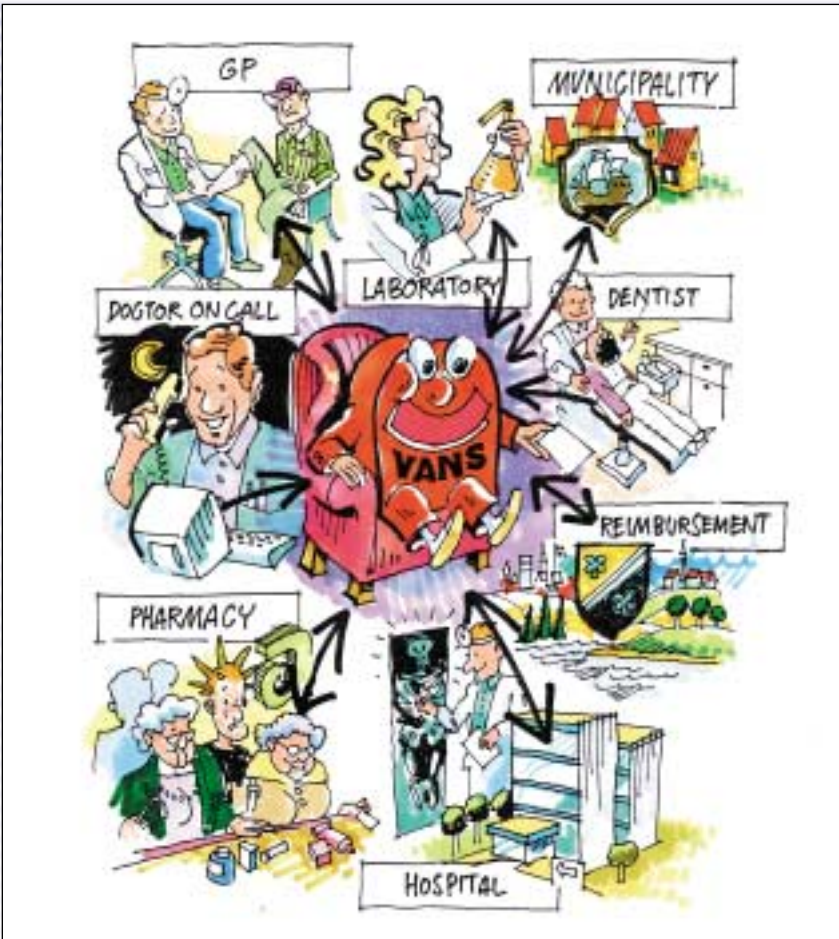
With regard to the infrastructure of the network, everything was in favour of a VANS-based data network, where a VANS provider acts as a contact link between the sender and the recipient. The sender puts his message in a mailbox at the VANS provider, where the recipients can collect it at their convenience. This principle is referred to as push, where the sender pushes his message towards the recipient, in contrast to pull, where the recipient retrieves the information from the sender's system.

When the healthcare data network started, there was no market for software specially developed for such a network. One of the tasks of MedCom was therefore to involve potential software suppliers, establish co-operation with them and the VANS suppliers, define specifications for the suppliers and carry out projects and trial runs with the individual EDIFACT messages. In that way, success was achieved in establishing a set of communication options on the healthcare data network and a range of system solutions for medical practices, hospitals, pharmacies, laboratories etc.

To a considerable extent, the healthcare data network was supported by enthusiasts and pioneers, who saw new opportunities and worked assiduously to put them into practice and disseminate them. The enthusiasts are still exceptionally important to the healthcare data network, where an underlying principle has always been that it is the needs of

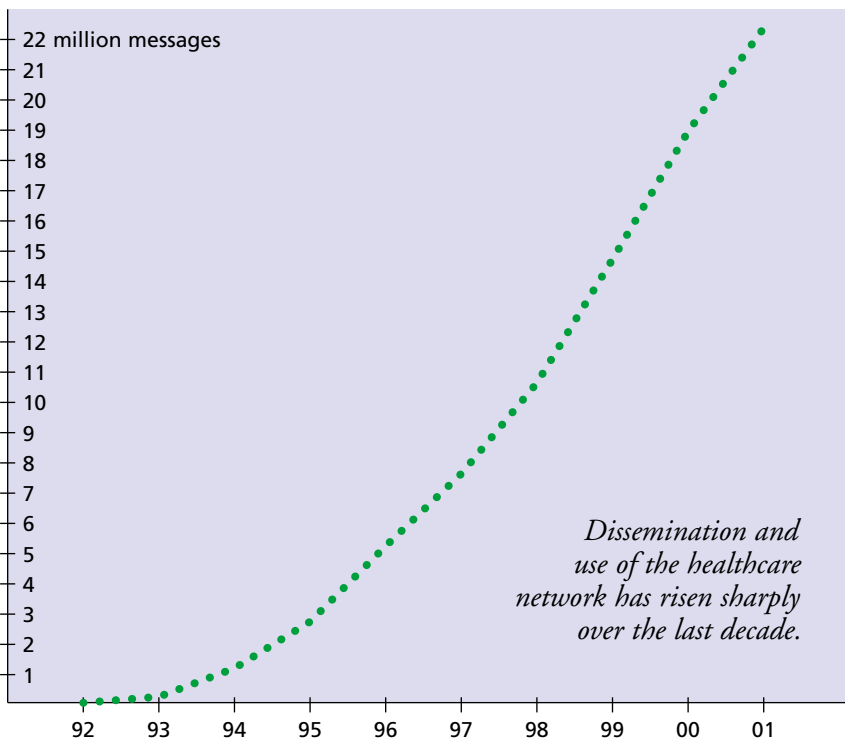
Organisationally, electronic communication has led to great changes and simplifications. The illustration shows the procedure for a discharge summary before and after the healthcare data network.





In the existing healthcare data network, a VANS provider acts as a contact link between the users of the network. The sender deposits his message in a mailbox at the VANS provider, from where the recipients retrieve the message.

Number of EDI messages in the healthcare data network 1992-2001



the user that represent the basis for defining the solution.

General practice was and still is an important hub for many of the most important communication flows. It is the GP who is the patient's firm point of reference and contact with the rest of the healthcare sector. The GP has therefore also had an important role throughout the dissemination of the healthcare data network – and continues to do so. General practice has, however, been closely followed by the other parties in the health service – the data network has become a part of everyday life in the healthcare sector.

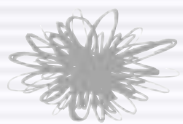
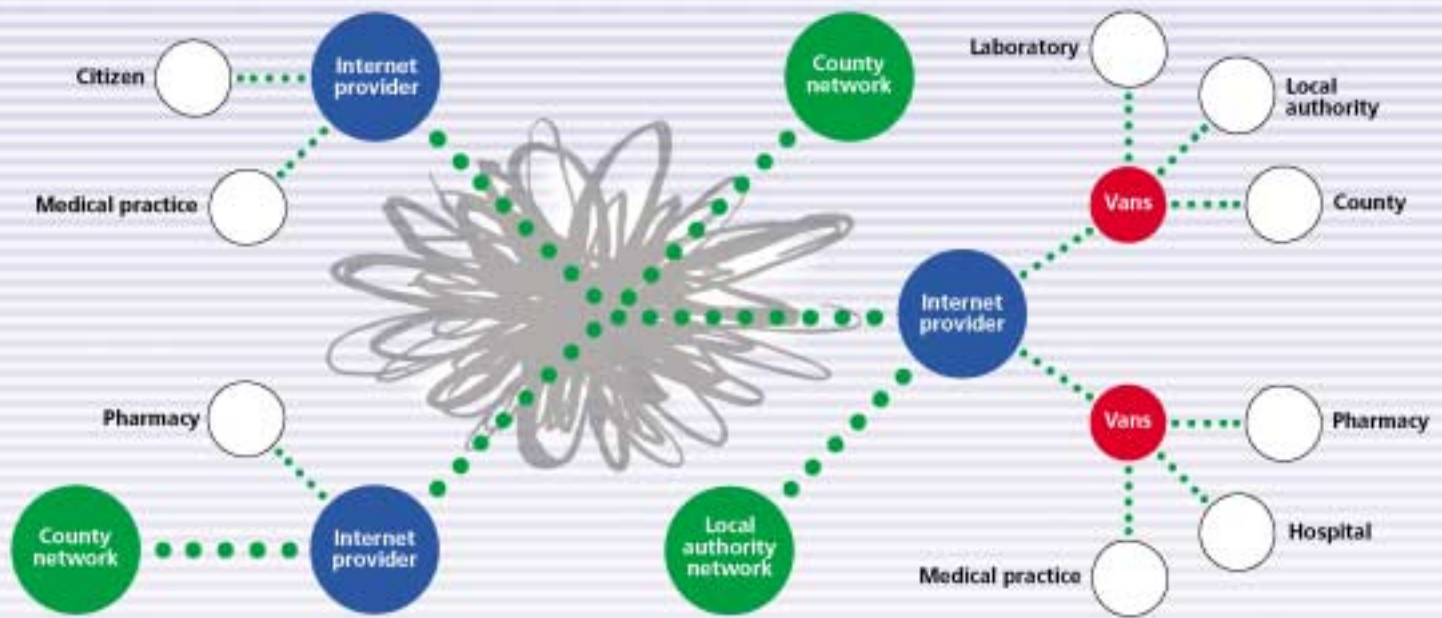
The dissemination in itself goes towards providing the basis for the success of the healthcare data network and is therefore self-reinforcing. Today around 75% of parties in the health service use the healthcare data network. Overall, the project has succeeded to such an extent that at the start of MedCom 4 it is realistic to imagine that the healthcare data network will attain close on 100% spread in 2002, as also expressed in the target for MedCom.

The Internet-based healthcare data network

Alongside the dissemination of the healthcare data network, the Internet has gained ground throughout society. Communication primarily in the form of e-mails and websites has reached a level no-one could have dreamt of just ten years ago.

Neither is the idea of using Internet technology in the healthcare sector anything new. It already happens to a significant extent. Use of the Internet is, however, primarily characterised by different websites offering information to the public about health and illness, such as Netdoktor and Sundhed.dk.

Within the health service, Internet technology is used today to look up triage information and clinical guidelines. The use of e-mails which contain patient information or access to clinical databases is, however, limited by inadequate security in the open Internet.



“The Internet”



VPN Virtual Private Network – encrypted “tunnel” over the Internet.

The diagram shows the new healthcare data network, where healthcare professionals and patients exchange information. The network is based on Internet technology, and is established by joining existing networks together using VPN connections.

This way of using Internet technology is, however, neither a counterpart of the VANS-based healthcare data network nor does it represent full utilisation of the opportunities presented by the Internet.

If Internet technology is to become a counterpart to the VANS-based healthcare data network, it is primarily necessary for it to be possible to pass on the structured EDI message via the Internet technology and to integrate the messages directly into the computer systems taking part in the communication. Using

the technology in this way makes great demands on security, infrastructure, certification, user administration and so on.

On the other hand, the way has also been cleared on that basis for communication facilities which have not been available on the VANS-based network. It is becoming possible, for example, to implement the pull principle in the healthcare data network, where the recipient of information retrieves the information he needs from the recipient’s system. At the same time, images, sound, graphics etc. are becoming some of the forms of information available. Finally, Internet technology opens up the possibility of the group of users in relation to the network being expanded from the health service’s own parties to everyone involved, including the patients.

MedCom’s Internet strategy

In the healthcare data network of the future, it must be possible to:

- communicate securely with users on other connected secure networks
- use the communication facilities of the Internet, including:
 - EDI communication
 - Secure e-mail
 - Web access for example to laboratory results, patient data etc.

Principles for the healthcare data network of the future

Freedom of choice. It is a fundamental principle that the parties in the health service must be free to choose between the VANS-based healthcare data network and the new healthcare data network based on Internet technology. The freedom of choice means that communication has to be ensured across the two networks.

Security and certification. The healthcare data network of the future is established by joining together existing intranets. The healthcare data network of the

future therefore has to meet a number of certification requirements with regard to firewalls, reliability (speed, utilisation statistics), connection with the VANS network, monitoring/traceability. Fundamentally, the individual network must fulfil the security requirement of the Danish Data Protection Agency.

User administration and organisational requirements. The healthcare data network of the future requires common rules with regard to administration of users and legitimate access to the network. In practice it is largely a matter of co-ordinating the counties' administration and control of their own users. There are a number of technological ways of making this administration easier in practice, such as using what are known as Directory Services. The basis for this administration will be the compilation of a nationwide address list, containing all the services provided and users. The address list is established by regularly expanding the National Board of Health's partnership table, which today contains the EDI addresses of the healthcare sector.

User administration and organisational requirements in general depend on whether it is "many-to-many" communication or "many-to-one". "Many-to-many" requires a national address or password control. In "many-to-one" communication, the same address list can be made available as a tool for local address or password control. Whatever the circumstances, great demands will be made on local handling of address information.

In the healthcare network of the future, communication will take place via the Internet and take many different forms.

The infrastructure

The healthcare data network of the future is built up by joining together existing intranets, based on Internet technology. The vision is to open up the possibility of communicating "many-to-many" and "many-to-one" across certified networks.

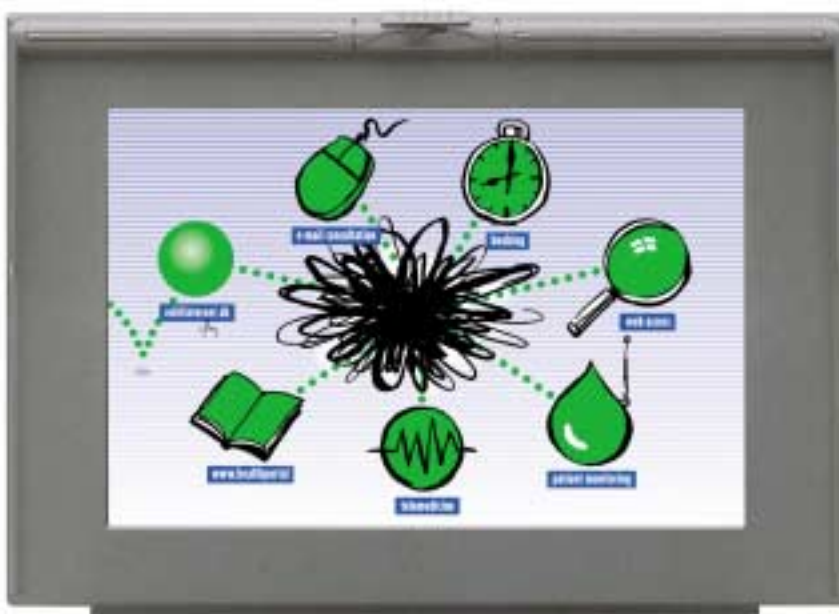
The first phase in the development of the infrastructure will consist in joining together existing IP-based networks. The joining together takes place between public IP networks, organisational networks and private Internet providers with counties, general practitioners and other healthcare parties as customers. A link has to be created at the same time with the VANS network to ensure a smooth transition for EDI communication between the existing and future networks. The individual counties, local authorities, organisations etc. can therefore join the healthcare data network of the future as and when the local intranets are ready to join from a technical point of view.

As the number of connected networks grows, the technical platform for new types of nationwide MedCom projects will be established. This development is essential for the overall aims in the MedCom Internet strategy: to ensure large-scale use of the Internet-based healthcare data network with the focus on tried-and-tested communication flows which are ready for dissemination via standard Internet technology.

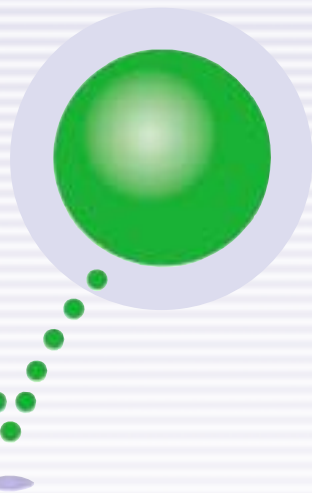
Future MedCom projects are expected to fall within the limits of seven forms of communication:

- **Structured EDI messages**
- **Secure clinical e-mail**
- **Booking**
- **Web access**
- **Patient monitoring**
- **Telemedicine**
- **Healthcare information systems**

The seven forms of communication are described below.



Structured clinical messages



The core service in MedCom projects to date has been the type of clinical messages which can be communicated automatically and integrated between the healthcare sector parties using EDI standards. This specifically means for example prescriptions, laboratory results, discharge letters and so on.

In the future, it is to be possible to pass on the EDI messages via both the VANS-based network and the Internet-based healthcare data network. At the same time, users of the networks are to be able to communicate unimpeded across the two networks.

With regard to Internet technology, the message is sent as e-mail, the structured message being inserted instead of the e-mail text. This happens independently of the chosen syntax, for example EDIFACT or XML.

Here and now, the structured clinical



The existing EDI letters are to be capable of being sent via the Internet in the future.

messages on the Internet-based healthcare data network will be text files, as is the case on the VANS-based network. In the longer term, it will be possible for the EDI files to be supplemented by multimedia files of varying nature.

Interview

A Funen correspondence project

FynCom, the Funen healthcare data network, has opened up the possibility of correspondence in the form of electronic messages, which fall outside the categories of the standard messages known to date.

"At the outset, the new correspondence module is primarily thought of in relation to the handling of referrals and patients being treated in outpatient clinics," says Tove Kaae, a consultant at FynCom.

"But there are many other potential applications.

The correspondence option is closely integrated with the IT solutions as a whole. If the hospital department for example receives a referral which is found to be deficient, the module is used to look for the missing information and on the side of general practice to provide this information. The correspondence module retains its link to the actual referral the whole time.

All patient-related correspondence can proceed in this way.

And it is not solely communication between general practice and hospital departments that is concerned, there is also internal communication between the hospital departments."

Secure clinical e-mail



E-mail communication has clear potential applications in the healthcare sector, including for types of messages which are not used so often and which therefore cannot sustain EDI communication. A communication of this kind can be used when there is no direct need for two-way communication, for example for notifications or non-emergency enquiries. An obvious example is enquiries from patient to doctor or, in other words, e-mail consultations.

In September 2001, a working group under MedCom formulated a series of recommendations with regard to the "Good e-mail consultation".

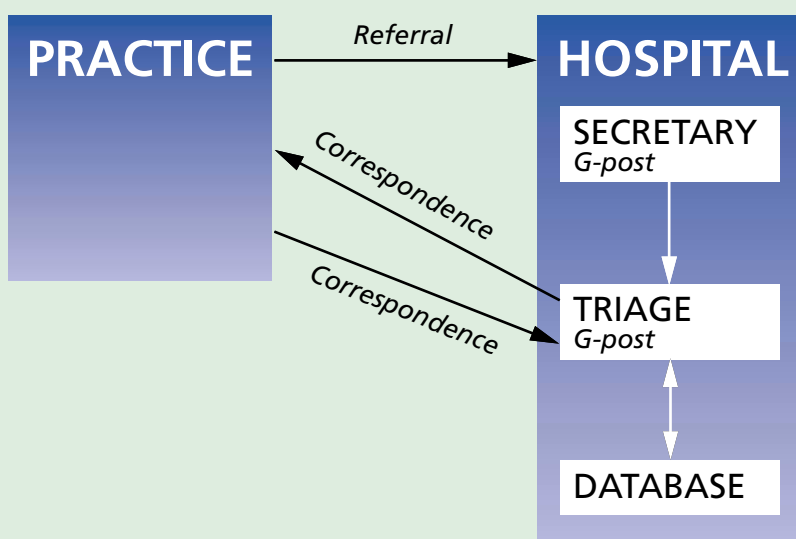
Interview

E-mail consultations in Copenhagen

The way in which telephone consultation takes place today is not as good as it might be for either medical practices or patients. This is the backdrop to an attempt by Copenhagen Local Authority to transfer some of the consultations to e-mail. The trial was started in September 2001 and is running for a period of six months. Participants in the project are the Medical Centre (Lægehuset) at Nørre Farimagsgade 33, Copenhagen Health Administration and the firm A-Data.

"The patients register for the scheme and receive their own password and username," says Hanne Hjortkjær, a GP.

"The patient is then able to direct enquiries to us via www.mitlaegehus.dk, which is the website the medical centre has set up. The enquiry is made on an e-mail form, which gives the triage doctor sufficient information to assess whether the consultation can proceed electronically. All e-mail communication is encrypted. If we consider that the consultation cannot proceed electronically, the patient is given an appointment for an ordinary consultation, or the reply is given by e-mail. E-mail communication is used in the same way to provide the patient with information on test results and so on. That always takes place following prior agreement with the patient."



Direct booking



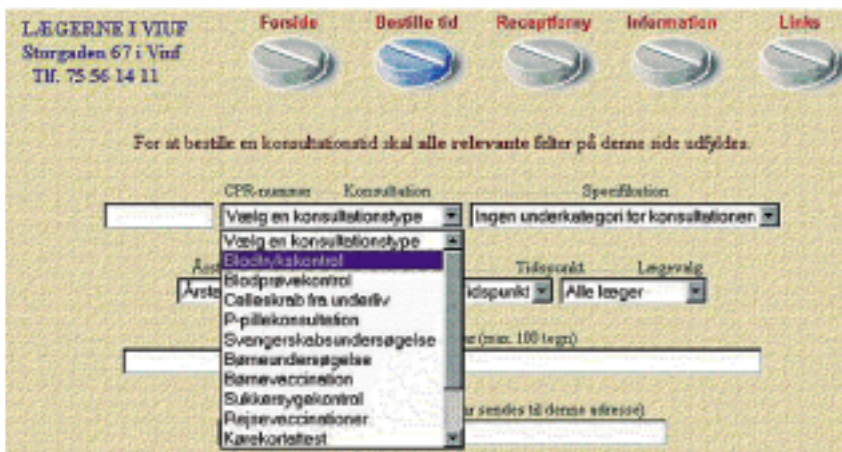
Along the patient's route through the health service, many situations arise in which there is a need to make appointments, for instance when patients need appointments with their doctors, or when doctors refer patients for treatment in the more specialised part of the health service.

Appointments traditionally require two-way communication. Patients have to get through to their doctors by telephone. Doctors have to send referrals, to which the recipients of the referrals have to respond.

The principle of electronic booking is that people who need appointments book them directly in the recipient's computer system. Patients book appointments with their doctors via the Internet and do not have to think about telephone answering hours at the medical practice. Doctors book appointments for their patients and can inform the patients directly whenever the patients have to attend for treatment.

At the medical practice in Viuf, patients can book their own consultation appointments via the Internet. Access is via the medical centre's website.

The most usual forms of booking will be booking by patients at medical practices and booking by medical practices at the more specialised parts of the health service – specialists, hospital departments, radiography departments etc.



Interview

How the patient sees it

"I have gradually made use of the option of electronic communication with my doctor over a period of three years," says Birgitte Aagaard, who lives in Egtved near Vejle.

"In fact, I thought right away that it was a really good idea. Like all other patients, I am familiar with the problem of getting through on the phone in the morning between 8 and 9 o'clock. Now I can book an appointment when it suits me. I go to the doctor's website and indicate during what periods on what days I can come. A short time later I am told what time has been booked for me. It's both quick and simple.

I'm certainly not one of those people who spend all their time on the Internet," she emphasises.

"I'm a user at a modest level, but communication with the medical centre is very simple. One of the reasons I'm so pleased to have this option is that I have a three-year-old boy with asthma. From time to time we have to renew a prescription, and that's done by e-mail too. I send a mail, and a short time later I'm notified that I can collect the medication from the pharmacy. Think how much time I save compared with if I had to attend in person for a consultation!"

Carelink

Patient books via e-mail and Internet

Patients can book their own appointments for consultations with the doctors in Viuf. In practice, this is done by the patient going to the practice's website, choosing an appointment time and keying in the patient's civil registration number (CPR). Then the type of consultation is selected, for example child examination or blood test. The patient selects a date and time and adds any comments.

The clinic's server receives the appointment request and automatically integrates the information into the doctor's system. The doctor or secretary sorts the appointment request. The first spare time meeting the patient's wishes is reserved, and the reservation is automatically transferred to the calendar in the doctor's system. At the same time, notification is sent to the patient by e-mail.

Experience from the trial in Viuf backs up the need to make it possible for appointments to be made in this way. A permanent scheme requires wider availability of the booking facility, however, so that many patients use it.



Swedes going the same way

Sweden too has focused on developing the healthcare data network of the future and on the application of IT in general as a natural tool to be used by everyone working in the healthcare sector.

Carelink is a prime mover in this development and acts as a mediator of information with regard to IT development and as a co-ordinator between different players. Carelink was formed in 2000 by the Federation of Swedish County Councils, the Swedish Association of Local Authorities, the Swedish Private Health and Social Care Employers' Association and Apoteket AB.

Carelink works in particular in five areas:

- Infrastructure
- Co-operating IT products and services
- Information security
- Training and research
- Communication and documentation during the course of treatment
- International co-operation

With regard to infrastructure, it is the intention of Carelink to create a simple IT structure which ensures that all parts of the healthcare sector can work directly together. The model is known as Sjunet, which links a large number of players within the Swedish healthcare sector. Sjunet today links all the Swedish county networks via encrypted VPN connections over the open Internet. The aim is for it to be possible for e-mail, patient administration, record handling, telemedicine etc. to be carried out in complete security and in a way which fulfils the needs of the healthcare sector for internal communication. Electronic communication of a number of standard messages also forms part of the field of work of Carelink.

The development model to a large extent is pilot projects, which are carried out at various places in Sweden. It is Carelink's task on the basis of these projects to provide information and inspiration for everyone connected to Carelink.

As part of IT development, Carelink sees it as one of its important tasks to set up a register of suppliers in the IT area, and in that context to play an active part in the development work together with interested suppliers of IT products and services.

Web access



The basic principle of the healthcare data network today is that the information is sent to a mailbox, from which the recipient can retrieve it. The information is 'pushed' from the recipient according to the push principle. The information may, for example, be a discharge summary from a hospital department to a general practitioner or a referral from a general practitioner to a hospital department.

In some situations, however, the need for information arises unexpectedly. There may, for example, be an emergency admission. The department receiving the patient needs to have access to previous test results. It will be advantageous for the hospital to be able to retrieve information from the sender's computer system according to the pull principle. This will be possible on the Internet-

Notable results at Bispebjerg Hospital

Highly favourable results were obtained in a practical trial with Web access in 1998. The trial was carried out by Bispebjerg Hospital and KPLL (Copenhagen General Practitioners' Laboratory).

Direct access to look-up via a terminal in KPLL's databases was used in the emergency admission of patients to the emergency medical wards of Bispebjerg Hospital during a period in 1998-1999.

One of the main conclusions drawn from the trial was that the option signified a change and improvement in diagnosis or treatment for around one in three patients.



based healthcare data network of the future.

Using Web access, laboratory and X-ray results, both current and historical information can be retrieved and used in diagnosis and treatment. Relevant information will also be available regardless of geography and immediately from the time when the information is available.

In mid-2001, a start was made on a number of projects which involve attempts at communication between hospitals and clinical service, communication internally at the hospitals and communication across county boundaries. The individual web access takes place via a secure connection, either a fixed line or what is known as a VPN connection.

The applicable rules for obtaining information on patients must be respected when accessing patient systems via the Internet.

Experience from the projects carried out already shows that there are great gains to be made for both patients and the health service. Experience also shows, however, that a great organisational effort is required to make the new technology part of daily life.

Patient monitoring



The world of banking is a good example of tasks which previously required the customer to attend in person but can now be accomplished remotely.

In the same way there are many opportunities for the healthcare sector to enter the patient's home, so to speak. This applies particularly, perhaps, to patients with protracted or chronic illnesses, where there is a need to live a life as close to normal as possible and yet with very close and continuous contact between the health service and the patient. The Internet and the healthcare data network of the future have a great deal to offer in this context.



In close contact with blood pressure

Patients with circulatory diseases are generally given medication on the basis of check-ups and blood pressure measurements carried out at regular intervals by their own GPs. It is inconvenient for the patient to have to go to the doctor so often, and for practical reasons the number of check-ups and measurements is limited as far as possible. Experience additionally shows that blood pressure measurements carried out at the doctor's practice are not always entirely dependable. The situation may itself be a factor in raising blood pressure. This may lead to incorrect medication and unnecessary side-effects, such as fluid retention and incontinence.

At B&O Medicom, blood pressure packs are being developed with a sphygmomanometer, a computer and a data transmission system. Patients measure their own blood pressure. The measurements take place in familiar conditions and are therefore more precise. The results are transmitted to the GP, who can adjust the medication on the basis of the measurements.

The hospital comes home

In some cases the desire for efficiency gains and more satisfied patients reaches up to a higher unit. This appears to be the case in a project being carried out at the Karolinska Hospital in Stockholm.

The target group for the project is some of the children who are admitted to the hospital. In many cases the treatment with relatively simple resources can be moved to the child's home. Often it will, indeed, be of great benefit not to have to move the child to an unfamiliar setting.

The condition to be met is that the healthcare personnel are in close contact with the child. The resources required are a flying corps of staff, mobile phones, portable computers and a data network. Today the staff are able to look for information in the patients' electronic records. The aspiration, however, is to develop a mobile electronic record system which can communicate in an integrated manner with other record systems.

Telemedicine



Technological development makes telemedical solutions a realistic option in many contexts within the healthcare sector. The basic principle is that access to advice and a second opinion from a specialist in a given area are made possible by direct electronic mediation of image, graphics, sound and so on. X-ray images are an obvious example. The small hospital with a general surgical function gains direct access to an assessment from the specialist department at the university hospital.

In the same way, general practice can involve a specialist or hospital department in diagnosis and treatment.

In purely technical terms, one party in the communication sends its enquiry as

an e-mail with an attached image, audio or video sequence as a JPG or MPG file. The reply is sent as a structured clinical message in accordance with the MedCom standards.

There are many advantages:

- Improvement in the quality of treatment through direct access to specialist knowledge regardless of geographical distances and without spending unnecessary time.
- The patient is treated at the lowest cost level, and high specialist quality and high patient satisfaction are achieved at the same time.
- The patient has as few contacts with the health service as possible and saves both time and effort for transport, waiting time etc.

Interview

Nordic PET network

PET is an acronym of Positron Emission Topography, and is a modern diagnostic imaging technique which provides new opportunities for diagnosis and checking of treatment in a number of cancer diseases. PET is undergoing rapid international growth.

"This is to a large extent an expert field with few specialists," says Lise Lotte Højgaard of Copenhagen University Hospital (Rigshospitalet).

"The technique is expensive, and it is difficult to describe the images and apply the results correctly in the clinical setting. This problem is reinforced by the fact that many of the patients to be examined have a very specific indication. The frequency is so low that it is impossible to build up local expert know-how and achieve a sufficiently high level of quality.

At the same time there are prospects of a very sharp rise in PET examinations carried out, chiefly as a result of the increasingly widespread use of what is known as the hybrid PET camera. It is anticipated that the camera will also spread to the central hospital level.

Taken together, these development trends mean that PET is suitable as an area of telemedical development. There are PET centres today in Århus and Copenhagen, and elsewhere in the Nordic countries there are centres in Uppsala, Stockholm, Lund and Turku. Good co-operation across these centres supplemented by a solid IT infrastructure out in the regional hospital service is the way forward if the potential of the PET method is to be properly exploited."

Direct connection to the skin specialist

In an area pioneered by the general practitioner Finn Klamer on the island of Mors, a number of successful trials have been held with telemedicine in recent years, for instance in dermatology.

In Ringkjøbing County, a small two-person project has gradually developed into co-operation between 13-15 general practitioners and four dermatologists.

In purely practical terms, a solution has been chosen in which the doctor takes the picture with an ordinary digital camera and sends it as mail via an ISDN or ADSL connection. The patient's data are sent as an EDIFACT message. This message also contains a unique code for the associated image or images.

GPs can use the scheme by forwarding digital images to dermatologists in return for the GP being advised over the telephone by the dermatologist. Although no diagnosis is made, the doctor receives a suggestion for diagnostics and continued treatment.

During the first half of 2001, the skin specialists were involved in a total of 115 telephone consultations.



The dermatologist Erik Foged, who is an active participant in the project, has examined the first 50 images he has received in the trial. 70% of the patients had a well-defined easily identifiable dermatological condition. Among these, it was proposed that three be referred for consultation with a dermatologist for further investigation. 20% had a less common disease, and among these five were referred for consultation with a dermatologist for further investigation. The remaining 10% were enquiries about possible treatment of simple easily identifiable conditions and enquiries about new treatment options for diagnoses familiar to the referring doctor.



Healthcare information and healthcare portal



Many people in the healthcare sector have long had an eye on the Internet as a suitable information medium with regard to external information for citizens and as internal information within the healthcare sector.

External information for the citizens

The websites of the counties and hospitals hold many examples of information for the public on the health service. The same is true of the websites which more and more medical practices are develop-

ing, where the first examples can be seen of patients being able to communicate directly with their doctors via the Internet.

Internal information in the healthcare sector

At the same time, a start has been made in a number of counties on using the Internet as a way of passing on information between staff in the healthcare sector. VISINFO is an example of an information system of this kind which is already used in several counties.

Interview

Vision of a portal

"The vision for the public healthcare portal has two principal target groups – the citizens and the staff in the healthcare sector," says Lars Hagerup, chief of section in the Association of County Councils in Denmark.

"The intention is to make relevant and accurate information available to the citizens via the Internet on how the health service works. There may be many different types of information – waiting times, tips on how to prepare for a particular examination etc.

There is information which will make it easier for the individual to use the healthcare system well, and it obviously works the other way round too: the health service is put to better use. We support this aim at the same time by giving the staff in the healthcare sector access to relevant information in the form of reference works, background information about methods of treatment and so on.

So far, the healthcare portal has been conceived as an information forum, but in the slightly longer term it is also logical to focus on the communication internally in the health service and externally with the citizen. It is clear that the portal work we are involved in has to be closely linked to the healthcare data network. A large part of the communication which is to be made available via the portal is already present here.

The public healthcare portal is a vision, but many elements of it have already been put into effect at regional level. A large proportion of the work will therefore consist in creating the umbrella that brings together the regional information systems and ensures that both citizens and healthcare staff can cross the regions to look for information and communicate directly."



VISINFO chiefly contains information and guidance from hospital departments to the primary healthcare sector on triage, referral, guidance etc. Another example of an information system of this kind is the Viborg portal.

Free choice of hospital makes the need to look for information across the regional information systems a topical issue. In this context it is logical to see the establishment of the infrastructure in the healthcare data network of the future as a short-cut to the healthcare portal of the future.

The healthcare data network of the future is established by linking together existing closed internets in the healthcare sector, for instance certified county networks with healthcare information systems. From here it may also become possible, for example, for a GP to make direct links from his own doctor's system to selected information sources in the healthcare portal against the background of his diagnosis registration. Solutions of this type do, however, necessitate accomplishing a major editorial task in relation to the information placed in the portal. The healthcare data network consequently becomes a secure access route for healthcare professionals to exchange information amongst themselves – an important element in the healthcare data network of the future.

The public healthcare portal

The vision of the public healthcare portal is still on the drawing board. The first building blocks exist, however, in the form of websites and information systems. At the same time, it is logical to imagine the healthcare data network of the future closely related to the public healthcare portal. Expressed in popular terms, the healthcare data network offers the communication paths which will

Department/Hospital	Patient type	Patient	Operation	Total	Remarks
Dep. of Surgery, H. of Funen	Outpatient	4	70	74	Children undergoing surgery at H. of Funen must be over 2 years old
Dep. of Surgery, H. of Funen	Admission	17	0	17	
Dep. of Surgery, H. of Funen	Admission	13	4	17	
Dep. of Surgery, H. of Funen	Admission	2	1	3	
Dep. of Surgery, H. of Funen	Admission	12	12	24	
Dep. of Surgery, H. of Funen	Admission	1	0	1	Operation surgery in the general anesthesia possible, provided patient can tolerate at least for the first 24 hours after surgery
Dep. of Surgery, H. of Funen	Admission	4	2	6	
Dep. of Surgery, H. of Funen	Admission	1	0	1	
Dep. of Surgery, H. of Funen	Admission	0	0	0	

genuinely make the healthcare portal interesting for citizens and healthcare professionals.

The vision of the healthcare portal of the future contains four forms of information and communication:

- information for healthcare professionals
- information to citizens on the health service
- communication between citizens and healthcare professionals
- communication between healthcare professionals

VISINFO is an example of the use of the Internet as a way of passing on information between staff within the healthcare sector.

Many players, many opportunities

MedCom has a central role to play in the development and dissemination of the healthcare data network of the future. Many new facilities will be developed, tested and disseminated under the auspices of MedCom, as was the case with the VANS-based healthcare data network. It is important to emphasise, however, that the diversity of the healthcare data network of the future will only be consolidated by many players in different ways seeing the potential in utilising the opportunities offered by the network within small and large niches.

There are already several examples of both public and private institutions and enterprises starting implementation of

the communication of the future internally in the health service and externally between the health service and the patient.

MedCom wishes to promote this trend and sees it as one of its most important tasks to motivate, inspire and co-ordinate in a way which fosters diversity in the utilisation of the healthcare data network of the future. In relation to this trend, it is also a task for MedCom to ensure an infrastructure which means that communication between everyone who needs and benefits from the facilities of the healthcare data network becomes both painless and secure.

Interview

Almost limitless opportunities

Arne Kverneland, chief of section at the National Board of Health:

"The opportunities presented by the Internet as a tool and aid in the healthcare sector are almost limitless. There is no doubt that the Net in a few years will play a key role in the internal and external communication of the whole sector. Yes, in fact that is already the case! We are initially focusing on the needs for communication that exist among staff in the healthcare sector, and we are in the process of putting many measures into practice.

We have recently utilised Internet technology to give the healthcare professionals far better access to handling the important classification codes. In the same way, we are in the process of putting many other measures into effect, and although the target group is primarily the professionals, the patient naturally comes into the picture as well. The overall aim of the measures taken is to strengthen the healthcare sector in relation to diagnostics and treatment. In the immediate term we obtain the greatest effect by improving internal communication, but in the slightly longer term direct communication with the patient will also be considered.

Application of IT technology in the health service quite clearly revolves around the EPR – the electronic patient record. It is through this that the healthcare professionals are to be able to retrieve, supply, pass on and process information.

The EPR is a task for the county councils, and the counties adopt various system solutions. Here at the National Board of Health, however, we consider it essential that it should be possible to communicate unimpeded across the EPR systems. In practice it has to work as one system, and it will be Internet technology that ties things together."



Interview

New routes to a more open health service

Peter Steenberg, chief architect in CSC-Scandihealth A/S:

"At CSC we are deeply committed to the work of testing out the new ways of communicating. One of the areas we focus on is the open health service of the future, and we carry out projects in which we involve patients in the treatment by giving them new opportunities to communicate with doctors and nurses.

A specific trial right now is concerned with giving parents of children who are admitted as emergency cases to the Paediatric Department at Hvidovre Hospital access to the electronic record via the Internet. We knew beforehand that there was a very strong wish among the parents to have access to records. A preliminary study showed that 76% of the parents had Internet access, and close on 100% of these wanted to utilise the opportunity to look at the record via the Net. It was against this backdrop that we started the trial project. Parents of children admitted as emergency cases are asked whether they want to take part in the trial. If they are interested, they are handed a diskette containing a PKI certificate. Together with the civic registration number (CPR) and a password, the certificate helps to ensure that the parents obtain unique access to information about a given course of treatment.

The department has an electronic patient record in advance, and each time changes take place in the record, a copy in XML format is automatically updated.

We are obviously aware that the record may be difficult to read for the parents. The hospital's management has therefore urged doctors and nurses to write in easy-to-understand Danish, without using too many abbreviations. At the same time, we have added to the system a glossary of the most commonly used terms.

It is still too early to say anything about how those involved assess the new method of communication. Beforehand the doctors were sceptical and the parents positive, but we will naturally undertake a systematic gathering of experience and assessments of the trial from the points of view of both healthcare professionals and patients."

Organisation and security

User control and Web access

The change-over of the healthcare data network to the Internet opens up the possibility of users connected to a computer system on the healthcare data network retrieving data from other computer systems. To date the condition to be met for communication via the healthcare data network has usually been for the sender to have actively decided to make information available to the recipient. Now it is the recipient who actively retrieves the information needed from the information supplier.

The new opportunities offer many benefits, but control of access to data by users across organisations is a difficult challenge. The individual user organisation connected to the healthcare data network typically has to respond to two situations:

- Own users. The organisation has to decide which users are to be allowed to look up in external systems, and which users are to be able to send and receive clinical e-mails.



- External users. The organisation has to decide which web access service it wishes to make available to external users, who is to be given access to this, and how the external users can and will be administered.

How this is viewed depends in the individual case on the specific clinical needs.

Naturally only people with legitimate access may look up in other systems, and naturally only people with a specific communication need are to be able to send and receive the various types of clinical e-mails.

A legitimate need can be defined in the vast majority of cases as a need to obtain or search for information which is relevant to the specific course of treatment. At the same time, it is essential for legitimacy that the information is exchanged with the patient's consent. There may be individual exceptions to this rule, for example if the patient is unconscious.

Control of service providers and recipients of healthcare-related e-mails

One of the great challenges to be faced in the project is to create an overview of who can do what. The National Board of Health's partnership table has to be expanded in this connection.

The partnership table today contains information on who can send and receive the various types of EDIFACT standards. In the future it is also to contain information on who provides what services. It may, for example, be a matter of who can provide a specialist assessment of a skin image, and which departments can receive an "emergency e-mail".

Partnership table

The partnership table is expanded to include secure e-mail and Web access.

- All final recipients of EDI mail – and what types of messages the final recipient may receive.
- All final recipients of secure clinical e-mail – and what types of messages the final recipient may receive.
- All providers of secure Web access – and what types of Web access are provided.

The principle of the partnership table of the future can be illustrated as follows:

Final recipient/ Web provider	Internet address/ "Web address"	EDI-mail			Secure clinical e-mail			Web access		
		DIS01	REF01	RPT01	Emerg-Mail	Elderly-Mail	B-mail	Lab-LookUp	Pat-LookUp	GP-Booking
RecOrg – RecDept – RecName	ModtID@ModtLok.dk www.ModtLok.dk									
Medical Centre, GP Sten Nielsen	41493@5790000138784.dk	●		●						
	sten.nielsen@sikkert.net.dk				●	●	●			
	www.viuf.dk.									
Odense University Hospital, Paediatric Dept. H	4202250@5790000184521.dk	●	●	●						
	Børneafd@ouh.dk				●		●			
	www.AfdH.dk									●
KPLL – Laboratory Web access	www.KPLLLook.dk							●		
	KPLL@KPLL						●			

MedCom's EPR communication project

Electronic patient records (EPR) are being introduced at many hospitals across the country. In practice this is done through EPR projects of varying nature and volume. A list of current EPR projects can be found on pages 30-31.

The question of "integration" and making EPR systems "talk to each other" is very significant in connection with the introduction of EPRs. The MedCom steering group and the EPR steering group of the Association of County Councils in Denmark has therefore decided to start up MedCom's "XML EPR communication project". The aim of the project is to re-use MedCom's standards in the EPR area in XML syntax.

Need for integration

The need for integration of EPR systems is related to the fact that treatment departments in hospitals, where the future EPR systems are to be used, to a very large extent communicate with other departments, other hospitals and the primary sector.

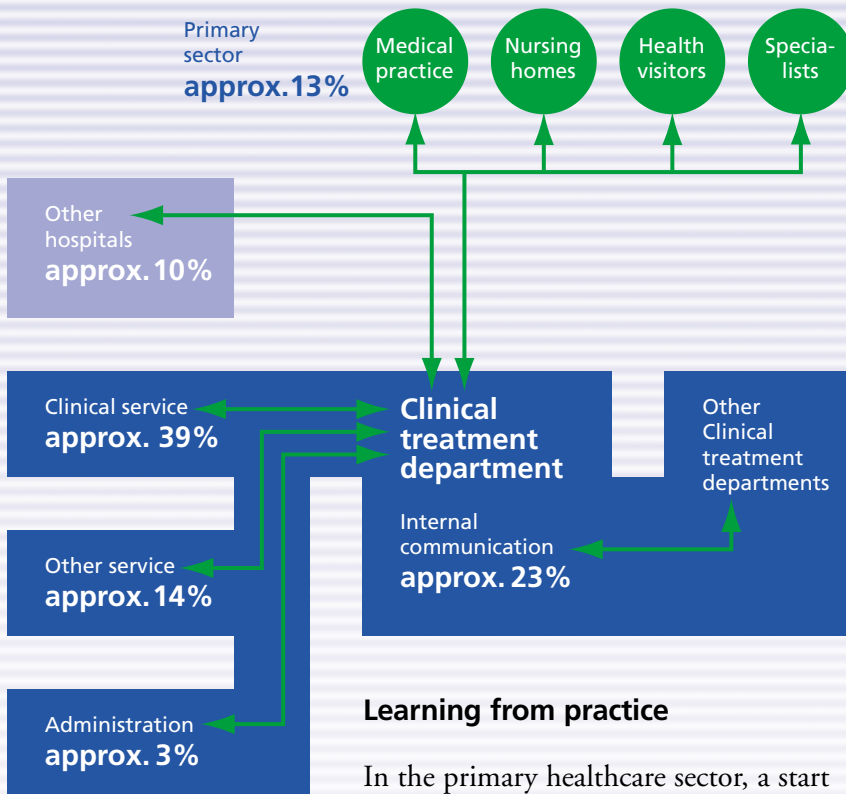
In fact 150-250 contacts are made from the department per hospital bed per week. These relate for example to requests, referrals and results. Many resources are used in this communication, on average around 10% of the total working time at the hospital.

As a result of this busy communication, a large proportion of the existing paper records at the hospital consist of laboratory results, laboratory requests, referrals, discharge summaries, reports and correspondence with other departments, other hospitals and the primary sector. The hospital department is compelled to maintain the old paper record for this communication as long as this information cannot be transferred electronically to an EPR.

In view of this situation, it is essential that the EPR systems are capable of communicating electronically if they are to be capable of being used appropriately in the departments providing treatment.



A very large proportion of the existing paper records at the hospital consist of laboratory results, laboratory requests, referrals, discharge summaries, reports and correspondence with other departments, other hospitals and the primary sector.



An analysis of the communication needs of a treating department shows that there are many communication partners and a significant flow of messages to co-operating partners in both the secondary and primary sectors.

Learning from practice

In the primary healthcare sector, a start was made on making the IT systems coherent as long ago as the early nineties. A major element in this context was and is MedCom's EDIFACT standards for a large number of the most important communication flows.

MedCom's standardised messages have now been implemented in 50 IT systems, including 15 doctor's systems, 9 hospital services, 12 laboratory systems and 4 pharmacy systems. That means almost all the IT systems used in the healthcare sector today.

The communication is used today by three-quarters of the healthcare sector, altogether more than 2,500 different organisations. All hospitals, all pharmacies, all laboratories and 1,800 general practices take part in the communication. In addition, 400 specialists, physiotherapists and the local authority health visitor service are also gradually on the way to participating in the electronic communication via the healthcare data network.

Today, around two million messages a month are exchanged, or just over 60% of the total communication in the primary sector. Calculations show that the net effect of this is to release resources of the order of DKK 500 million a year.

Similarities in communication

There are wide differences in the work at a hospital department and in a medical practice. Purely in terms of communication, however, the differences are small. In both cases the distribution of work is based on a treatment unit, which to a large extent draws on services from clinical service departments and refers to other treatment centres.

Around 85% of the external communication of a hospital department is of the "request/results" or "referral/report" type – entirely as with GPs and specialists:

- Approx. 39% of the external communication of hospital departments is communication with the interdisciplinary service departments – with laboratories, radiography departments etc. in the form of laboratory results, X-ray descriptions etc.
- Approx. 13% is communication with the primary sector in the form of discharge letters, outpatient memos etc.
- Approx. 10% is communication with other hospitals in the form of referrals and discharge summaries.
- Approx. 23% is communication with other treating departments, in the form of referrals, reports etc.

The XML EPR communication project

The XML EPR communication project

- As MedCom I – with 26 letter types, 36 IT systems and 425 “interfaces”.
- In co-operation with interested counties and suppliers.
- Longer time frame and in more “pools” – is to follow EPR implementation by counties.
- Uses XML internally at the hospital.
- Re-uses MedCom’s standards for radiography, laboratories, advices, home care, referrals, discharge summaries and correspondence, but only after a healthcare adaptation to the hospital area.
- Implements SST’s ‘Patientstamdata og Medicin’ (‘Patient Master Data and Medicine’).
- Permanent test centre – provides “plug and play”.
- Requires unambiguous announcements – and clear support from all parties.

A very large proportion of the external communication of hospital departments can be exchanged in a form which means that they can be integrated directly into other computer systems. An obvious solution is to utilise the experience from general practice by re-using MedCom’s standards in the EPR area. A laboratory result is the same, whether it is sent to a GP or to a department providing treatment at the same hospital. The same applies to most of the just under 30

types of messages which are used for communication between the primary and secondary sectors today.

Another major factor is that most of the IT suppliers in the healthcare sector have already adapted their data contents so that they are able to integrate the information which is formulated in accordance with MedCom’s standards.

The same does not, however, apply to the EPR systems. It is nevertheless obvious that work must be done to ensure that these systems learn to speak the same language as all the other IT systems in the healthcare sector.

This is the background to the “XML EPR project”. The overall purpose of the project is to organise the MedCom standards for 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.

As the project title indicates, the intention is to change over from EDIFACT to the modern XML syntax for hospital internal communication.

	No. of systems	Interfaces per system	Interfaces total
EPR systems	8	32	242
PAS systems	5	15	75
Radiography systems	8	6	48
Laboratory systems	3	4	12
Blood-bank systems	4	4	16
Pathology systems	4	4	16
Microbiology systems	4	4	16
Total	36	69	425

County EPR strategies

The individual counties apply different strategies for the introduction of EPRs. Whatever strategy the individual county chooses, it will be necessary to imple-

ment exactly the same MedCom standards for communication with the outside world.

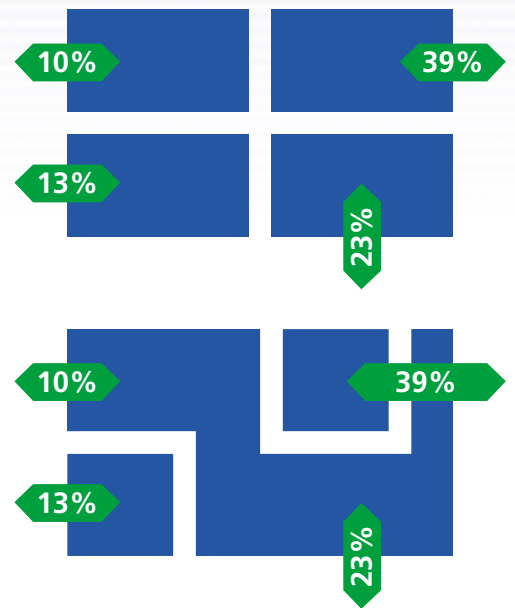
The classic strategy

Some counties implement EPR systems on the basis of what may be termed the classic strategy. This means that the same method is applied as when otherwise introducing IT systems in the hospital. The county buys one or more EPR systems and implements the systems in one department after another.



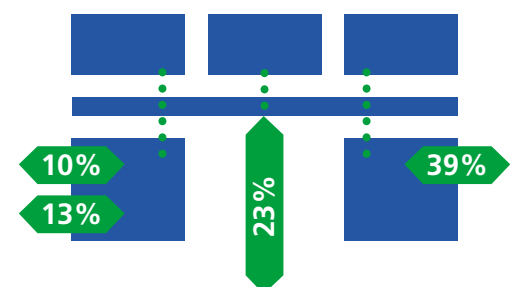
Component strategy

Other counties have chosen a component strategy. They develop components for their future EPR systems, for example a medicine module. This component is implemented in the relevant departments. The next component is then tackled and so on.



Middleware strategy

Some counties have chosen a middleware strategy, where the introduction of EPR systems is based on what may be termed an integration machine. This is intended to ensure integration of the individual parts of the EPR system and other systems.



Edifact, XML and HL7

MedCom's standards for the communication between the primary and secondary sectors utilises the syntax known as EDIFACT. The plan is to use the XML syntax for the internal hospital communication. But what does it entail, what kind of syntax is it, and what is the difference?

EDI – an overall concept

The abbreviation EDI stands for Electronic Data Interchange and designates automatic exchange of data between IT systems. EDI is the overall concept for integration between IT systems.

Before it is possible to exchange integrated data, in other words carry out EDI communication, syntax must be laid down in the form of a common language, which all participating IT systems must use in order to be able to communicate. In reality there are three options with regard to syntax: EDIFACT, HL7 and XML.

EDIFACT:

The completely dominant syntax at world level is the EDIFACT standard, ISO 9735.

EDIFACT stands for "Electronic Data Interchange for Administration, Commerce and Transport". The EDIFACT syntax is developed under the auspices of the UN and is used by thousands of firms in commerce, finance, transport and all other sectors.

The EDIFACT homepage is www.unece.org/trade/untidd/

HL7:

The American "Health Level 7" is a widely used syntax in the healthcare sector. Today, HL7 is used to a very great extent for internal communication at hospitals, and therefore in reality by all IT suppliers to the hospital sector in the United States and on a smaller scale in individual European countries.

HL7's homepage is www.HL7.org



XML:

The XML syntax – eXtensible Markup Language – has been heavily marketed in recent years as the syntax of the future, not least by Microsoft.

Unlike EDIFACT and HL7, however, XML is not a standard for the medical content of data exchange. XML is exclusively a standard for the exchange of “data” in general in the same way as a “comma-separated” file is.

Unlike the two oldest standards, EDIFACT and HL7, both of which date back to 1987, the XML syntax is easy to understand. Nor is there much doubt that XML will become the syntax of the future for data exchange. Both EDIFACT and HL7 are therefore in the process of drawing up “parallel documentation” of their standards in XML. A decision has been taken in Denmark that XML is generally to be used for public exchange formats.

MedCom’s full listing for patient ID and name in EDIFACT, HL7 and XML:

In the EDIFACT syntax, data is placed between “pluses” and “colons”.

In the HL7 syntax, data is placed between “vertical bars” and “carets”.

In the XML syntax, data is placed between “tag names” surrounded by < and </.

EDIFACT:

PNA+PAT+PatCpr+++SU:PatEnavn+FO:PatFnavn’

PNA+PAT+1405602165:CPR:IM+++SU:Jensen+FO:Henrik’

HL7:

PIDI1|PatCpr|PatFnavn^PatEnavn<cr>

PIDI1|1405602165^CPR^IM|Henrik^Jensen<cr>

XML:

```
<Patient>
<PatCpr></PatCpr>
<PatFnavn></PatFnavn>
<PatEnavn></PatEnavn>
<Patient>
```

```
<Patient>
<PatCpr>1405602165</PatCpr>
<PatFnavn>Henrik</PatFnavn>
<PatEnavn>Jensen</PatEnavn>
<Patient>
```

What's the problem?

In pure communication terms, EDIFACT, XML and HL7 are the same, all three are designed to be able to communicate anything at all. But syntax is not enough. It is one thing to use a particular syntax, but is something entirely different to use it for exchanging data.

If two different IT systems are to be able to communicate, it is necessary for the information, the data, which is exchanged to be understood completely identically by both systems.

If one system for an electronic patient record (EPR) distinguishes between the terms “Acute”, “Subacute” and “Elective”, this system cannot communicate with an EPR system which only distinguishes between “Acute” and “Elective”. It is quite simply impossible to exchange information between two IT systems unless the two systems understand the information to be exchanged in the same way.

This limitation exists regardless of the technique otherwise used, i.e. platform, standards, models, “integration machine” or what solution elements are otherwise discussed in the integration debate.

The essential point is that the end applications, i.e. the EPR systems in both hospitals and medical practices and the IT systems they are to be integrated with, understand and use the information in the same way. What syntax or what technique is used is of lesser significance.

That was the case ten years ago, it is the case today and it will also be the case in ten years' time. There is nothing even advanced IT technology can do to alter this.

And it has great consequences. For example, it will never be possible to integrate all data between two different IT systems. It will be necessary for all data in the two IT systems to be identical, and it is well known that data in two systems are quite different. Fortunately – because that is, in fact, the reason why we have different IT systems to choose between. And there has never been any problem in exchanging data between the same type of IT systems, i.e. IT systems with the same data.

A practical example can illustrate the problem.

In the healthcare sector, it will never be possible to send a record in a way which ensures that it is integrated in the recipient's EPR system. This is just as well. The recipient will normally decline receiving a whole record, whether the recipient is a hospital department or a medical practice. The recipient needs a targeted notification clearly formulated from the healthcare point of view, which describes briefly and precisely the patient's status and what subsequent examination or treatment the hospital is expecting.

Conversely, a doctor who is to send a message will hardly dare to assume that the recipient will find the relevant information in the complete record. The sender will therefore be compelled to formulate a specific message with the necessary information.



The answer is specific messages with fixed, defined content

Targeted referrals, reports, outpatient memos, laboratory results, X-ray descriptions etc. have always been used frequently in the health service. And there are many good reasons for continuing with them.

A very large proportion of this communication can be exchanged using MedCom's standards.

A laboratory result is the same whether it is sent to a GP or to a department providing treatment in the same hospital. The same applies to most of the other types of messages used in the primary sector.

In addition, most of the IT suppliers in the healthcare sector have already adapted their data contents so that they understand the information communicated in the same way. The most important condition is therefore met for the exchange of integrated information. The answer is to apply MedCom's standards.

Electronic patient records in Denmark

The development and implementation of electronic patient records (EPR) in the hospital service is regarded as a strategic concern for the whole health service. The opportunities offered by information technology in directly supporting healthcare work in the form of EPR systems that work smoothly are expected to provide a fundamental improvement in the prospects for:

Creating unity and continuity in the individual patient progressions, as a result of better co-ordination of healthcare activities.

Creating better documentation for the existence, composition and quality of healthcare services.

Better information to patients and better dialogue between patients and their relatives and health service staff.

These expectations and many others are formulated in a number of recommendations and strategic analyses published over the last five years. This has resulted in the National IT Strategy for the Health Service 2001-2002. The EPR plays a key role in this.

IT systems in context

The EPR debate at times gives the impression that there is no coherence between the IT systems in the healthcare sector. This is not correct.

In fact, there is better coherence between the IT systems in the healthcare sector than in all other sectors in Denmark, and the total quantity of integrated communication in the healthcare sector exceeds the quantity of integrated communication in all other sectors put together. No other country in Europe has established a coherent healthcare data network even approaching the size of the Danish one, in either relative or absolute terms.

But we lack the EPR systems to go with it. There is no reason to wait, as MedCom's standards can be re-used in the EPR area.

Status of EPR in 2001



EPR observatory

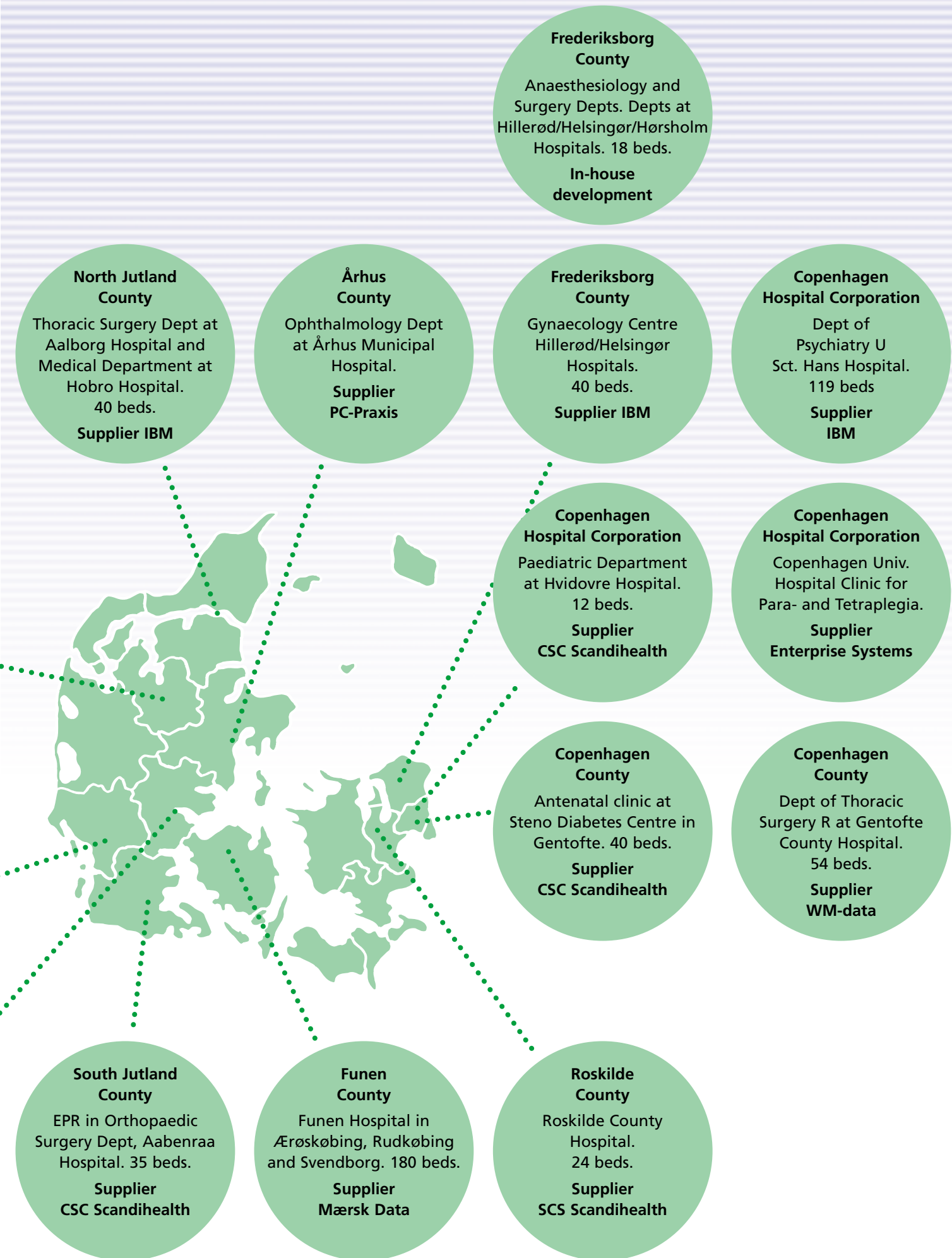
The EPR observatory is backed by Aalborg University, the Centre for Health Telematics, DSI Danish Hospital Institute and MED-IQ, all of which are participants in the Virtual Centre for Health Informatics, V-CHI. The Centre is an umbrella organisation for a number of organisations working actively on research and development in health telematics.

The EPR Observatory is conducting a national experience-gathering exercise on the dissemination and use of electronic patients records in the Danish hospital service over the period 2001-2002.

It is apparent from the EPR Observatory status report from 2001 that most of the identified EPR projects are at department level. Two EPR projects are managed at county level.

An overview of major EPR projects in Denmark as at 1 July 2001 is shown here.





The data consultant - troubleshooter and IT intermediary

The data consultant scheme is a service scheme with general practice as its primary target group and with the overall aim of strengthening use of computers for quality development and communication.

The scheme was introduced on a trial basis in Funen County in the period 1998 to 2000. It has since been decided that the scheme is to become permanent here. During the course of 2001, data consultants were similarly appointed in the Counties of Vejle, Viborg, Frederiksborg, Copenhagen and North Jutland.



Opportunities and requirements

The background to the data consultant scheme is primarily the vast opportunities in relation to the healthcare sector which information technology has to offer.

Information technology almost by definition represents access to large quantities of information both in the user's own computer system and through data networks in other computer systems. The fact that GPs have made use of electronic records for many years is a significant factor. The records consequently contain important data which can be used directly in diagnosis, treatment and

Counties with a data consultant scheme at 1 November 2001.

care. At the same time, it is data which can be used for quality development and research. The individual GPs therefore have great opportunities to analyse their own practices using the stored data.

Communication is another of the major areas in which information technology is leading to changes. It is an area which in itself contains a whole range of tools and facilities which in various ways can strengthen patient treatment.

Aims of the data consultant scheme in Funen County

- To strengthen quality development work in the individual medical practice and at the individual GP, partly by using data extraction in medical practices.
- To pass the centrally registered key figures on directly to the individual medical practice.
- To strengthen use of computers in general practice and in particular use of electronic communication to attain greater coherence in patient treatment in the exchange of necessary data in the progression of a patient.

Many conditions have to be met before information technology can be fully utilised. The technology itself at first glance appears to be the most important factor. In practice, however, it is just as much a matter of the users' and potential users' awareness of the opportunities and their knowledge, experience and attitudes in relation to computers. This is where the data consultant scheme comes in.

The Funen trial

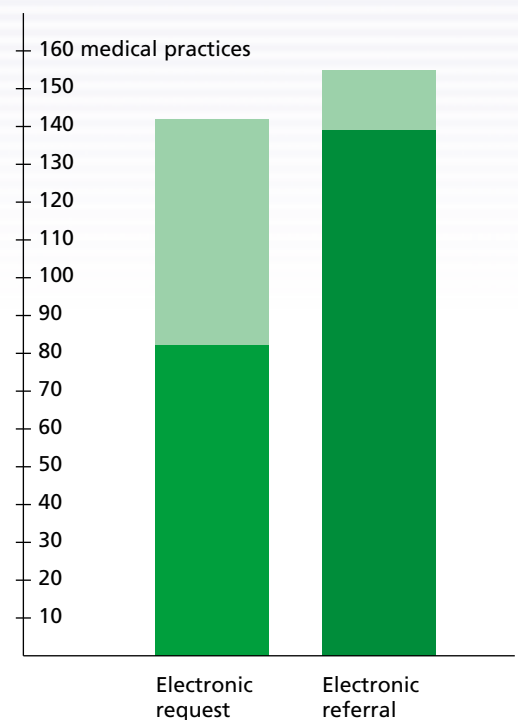
In May 2000, the Funen data consultant scheme took stock after a two-year trial. The main conclusions drawn were that the data consultant scheme meets a great need in general practice, that the scheme can make a great contribution towards removing problems in and demystifying computer use for both quality development and communication.

The exercise has a marked effect in relation to the medical practices where computer systems have already been introduced, but also in relation to those medical practices considering investing in computers. With regard to the latter, the data consultant has proved to be the impartial adviser many GPs need when they take the final decision on introducing computers in their practices.

The Funen data consultant was appointed on 1 November 1998, and one of the first initiatives was a questionnaire-based survey of general practices on Funen. All medical practices received a questionnaire, and 160 or 85% replied. Of these, 118 were positive about the data consultant scheme beforehand, and 67 wanted to have a visit as soon as possible.

Purely from the point of view of computer use, the situation was analysed as at 1 November 2001. 165 medical practices on Funen use electronic record systems.

13 different record systems are in use. 159 medical practices receive discharge summaries and laboratory results electronically. 155 medical practices are able to send electronic referrals. 139 make use of this option. 142 medical practices are able to send electronic requests to the Institute of Pathology. 82 practices make use of this option. 34 medical practices send bills via EDIFACT to the health insurance scheme. 121 medical practices make use of VisInfo – a healthcare information system which primarily contains information from hospital departments to general practice.



142 Funen medical practices are able to send electronic requests to the Institute of Pathology. 82 practices make use of this option. 155 Funen medical practices are able to send electronic referrals. 139 make use of this option.



The data consultant in practice

General practice has various opportunities for utilising the data consultant. The most important of these are the hotline, consultant visits, participation in quality development projects and courses.

Project co-operation, quality development projects. The data consultant is a natural participant in many contexts in which application of computers is on the agenda. This applies to projects in relation to the healthcare data network and in research and quality development projects, where there is a need to take data from general practice as a basis. The experience from Funen is that co-operation with various projects directly or indirectly concerned with computer use is a strength of the data consultant

scheme. A specific example of this type of projects has been a diabetes project with the collection of data from general practices.

Hotline. Medical practices can contact the data consultant in Funen County directly via FynCom's hotline function. FynCom, the Funen healthcare data network, has had this service function from the outset, giving the users an opportunity to raise any question relating to electronic communication.

Consultant visit. Medical practices can request a visit by the data consultant, and many make use of this option. It is up to the medical practice to decide what topics are to be brought up for discussion during the visit. The Funen experience is that many of them wish to discuss computing problems or purchase of new computer equipment. Almost all wish to discuss the opportunities for extracting data from their medical systems for quality development work.

There is also great interest in having the new opportunities offered by the doctor's system for the communication of referrals, requests and bills. A sharp increase in the use of communication options has been a clear effect of the visits.

Some of the consultant visits go to medical practices which have not yet procured computer equipment. The effect here has been that a relatively large number of medical practices have decided to purchase computers and be linked up to the healthcare data network.

Courses. In co-operation with the system suppliers, the data consultant offers courses in use of computers for users of the individual systems. The courses mean that the information reaches more medical practices at a time, and that there is an opportunity to

“The data consultant scheme has proved to be the icebreaking scheme, capable of motivating and inspiring continued dissemination and development of the use of computers in quality development in general practice.”

establish a forum for the exchange of experience between the users.

Co-operation with suppliers. The data consultant scheme to a large extent operates in co-operation with the suppliers of the individual doctor’s systems. In many contexts the data consultant becomes the contact link between supplier and user, and both parties make use of the knowledge and experience the data consultant gathers about the systems and the prospects for applying and developing them.

From trial to permanent scheme

The conclusion drawn at the end of the two-year trial period of the data consultant scheme was that the scheme should be made permanent and with the same provisions for general practice as during the trial scheme.

The combination of the various provisions and above all the nature of the most open offer on computer servicing had proved to be highly appropriate.

Alongside the implementation of the data consultant scheme trial in Funen County, a large number of counties have decided to take up the idea by introducing schemes which are largely identical to the Funen data consultant scheme.

Data consultant scheme and interested parties

The county. The data consultant scheme supports the great potential for quality development which is present in general practice. The scheme contributes to ensuring that quality follow-up in general practice becomes part of everyday life. At the same time, the scheme promotes electronic communication between general practice and the hospitals, and therefore helps to create greater coherence and continuity in patient treatment. By jointly financing the scheme, the county gains an opportunity to impose binding requirements on the users.

The GPs. The GPs gain access through the data consultant scheme to a computer service and impartial advice which is not provided elsewhere. Medical practices are introduced to new functions relating to data extraction and communication etc.

The quality development committee. The activity of the data consultant is of great benefit to the quality development work, which under the scheme can be based on the individual doctor’s own everyday activity.

Who can do what now?

Viborg County



Vejle County



North Jutland County



Ringkjøbing County



Funen County



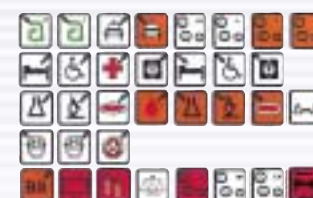
South Jutland County



Roskilde County



Århus County



Status in counties

The overview shows which counties are able to communicate which EDI messages.



White icon shows that the message is in use.



Red icon means that the message is not yet used in the county.

EPI top

The table on the right shows the number of messages in October 2001.

Status in counties			Hospitals			Doctors/pharmacies		
%	No.	County	Disch. summ.	Lab. results	To local author.	Doctor's letters	Lab. req.	Referrals
65.11	1	Viborg County	23201	33025	0	1353	301	1636
63.68	2	Funen County	51906	64866	6683	985	2072	6191
61.40	3	Vejle County	32546	28540	0	610	2107	4250
58.47	4	South Jutland County	26715	30497	0	330	0	2081
56.33	5	North Jutland County	34256	60756	1079	1098	0	2032
48.86	6	Roskilde County	13748	18083	2161	198	1	1829
47.25	7	Ringkjøbing County	14838	16078	0	600	0	5
44.79	8	Århus County	50570	46039	0	2125	0	2219
42.97	9	West Zealand County	18350	25873	1046	307	0	57
41.77	10	H:S*	13786	25596	22475	991	0	46
41.43	11	Bornholm County	4084	3385	0	85	0	0
37.30	12	Frederiksborg County	4350	25351	0	305	1129	-4
35.98	13	Storstrøm County	10192	15878	2042	443	0	785
35.46	14	Ribe County	26	22043	0	77	0	40
19.97	15	Copenhagen County	7027	49	0	707	0	72
65.84	A	KPLL		46319			0	
58.96	B	Statens Serum Institut		29792			0	
33.37	C	Medi-Lab		1022			0	
Total messages DK			305595	493192	35486	10214	5610	21239
TOTAL number								

* Copenhagen Hospital Corporation

Key to symbols

Row 1: Prescription from on-call GP service, prescription from GP, on-call GP service discharge summary, on-call GP service referral, on-call GP service bill, GP bill, dentist bill, pharmacy bill.

Row 2: Inpatient discharge summary, outpatient discharge summary, casualty discharge summary, image diagnostic discharge summary, referral admission, referral outpatients, referral image diagnostics.

Row 3: Clinical chemistry results, pathology results, clinical microbiology results, clinical immunology results, clinical chemistry request, pathology request, clinical microbiology request, clinical chemistry results between counties.

Row 4: Specialist referral, specialist discharge summary, physiotherapy discharge summary.

Row 5: Booking results, correspondence message, KKA PRODAT analysis repertoire, negative acknowledgement, physiotherapist bill, specialist bill, national laboratory bill, local authority advice.

West Zealand County



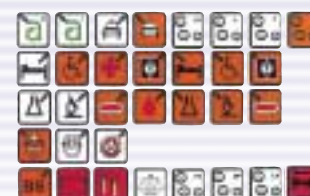
Bornholm County



Storstrøm County



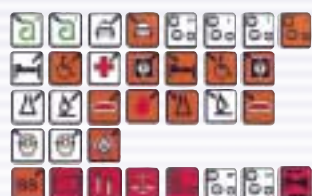
Copenhagen County



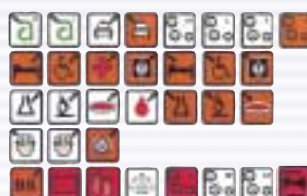
H:S*



Frederiksborg County



Ribe County



National laboratories



		On-call GP services			Dentists	Specialists			Physiotherapists			Loc.auth.
Bills	Pre-script.	Memos	Pre-script.	Bills	Bills	Letters	Refer-rals	Bills	Letters	Refer-rals	Bills	To hos-pitals
262	54976	6014	1715	372	8	2266	33	5	66	0	0	0
303	89779	22048	3149	529	119	6038	64	8	130	0	0	0
264	70769	14833	3077	453	52	3119	58	13	10	0	0	0
181	57690	12279	1704	343	10	3930	47	12	12	0	0	0
340	109999	25017	4391	616	44	5141	76	15	35	0	2	41
166	37290	11476	2270	293	29	2020	3	5	50	0	0	84
156	44580	3215	1464	373	13	1874	110	11	154	0	0	0
181	117939	26735	4916	739	0	3982	24	4	99	0	0	0
178	51137	6352	1877	456	21	2336	41	8	145	0	0	98
34	46586	9320	4877	815	95	14882	11	35	35	0	0	2704
5	11219	1739	105	0	0	278	0	0	5	0	0	0
328	49051	9611	2963	444	93	3146	16	18	9	0	0	0
161	43160	12298	1325	312	0	1949	34	6	0	0	0	199
140	39442	5312	1852	321	14	1640	6	5	58	0	0	0
591	57842	15101	3913	671	138	9211	2	45	49	0	0	0
2												
14												
13												
3319	881459	181350	39598	6737	636	61812	525	190	857	0	2	3126
												2,050,947

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The healthcare communication of the future



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