

# MedCom

- the Danish Health Care Data Network



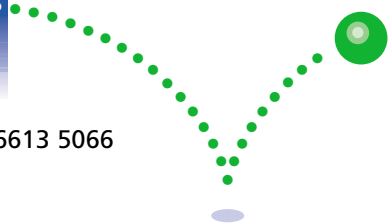
## A Danish health care data network in two years

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The National Board of Health  
The Association of  
County Councils in Denmark  
Copenhagen Hospital  
Corporation  
The Danish Medical Association  
The Danish  
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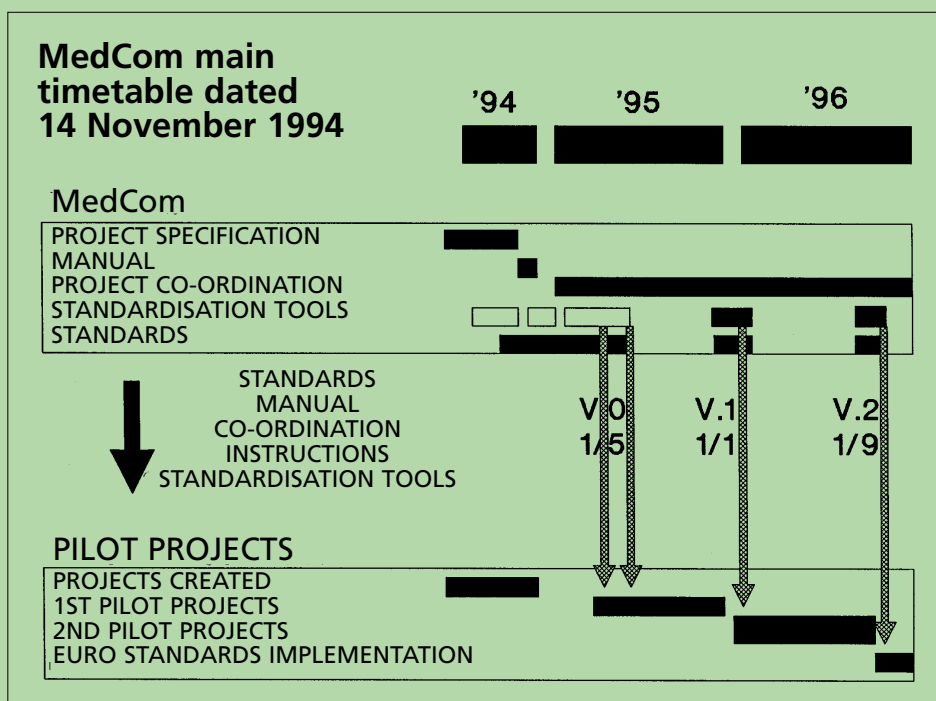


# The MedCom project

*The modern health service is characterised by pronounced and increasing specialisation and division of labour between the parties in the health sector: hospitals, general practitioners, pharmacies, etc.*

*Consequently there is intensive, routine communication of everyday messages between the parties in the form of prescriptions, laboratory and X-ray results, referrals, discharge letters, etc. In total around 30 million routine messages are sent every year and these make up around 90% of the daily structured communication to and from general practitioners. The total direct costs in connection with this communication are estimated at approx. DKK 1 billion a year.*

*Accurate, fast and secure communication of these messages has therefore not only become crucial for costs, better quality and patient service in the health care sector overall, but is also essential for the creation of a coherent health care sector.*



MedCom performed its task in the period from May 1994 to December 1996 and was run in two phases:

**In the first phase of the project** the common EDIFACT standards for communication were elaborated, along with various tools to assist in the standardisation work (EDITUTOR, EDI-MANAGER and EDI-CODES) together with a project handbook. The handbook gave the project participants general and specific information about the content and techniques of the project. **In the second phase of the project 25 regional pilot projects were started**, which together involved all of MedCom's messages. 29 different IT systems supplied by 24 different IT suppliers - 80% of all the IT systems in the Danish health care sector - took part.

For practical reasons the pilot projects were divided into two groups: **1st pilot projects**, in which the com-

munication in question was tried out for the first time, and **2nd pilot projects**, involving "the rest" of the system suppliers. The 1st pilot projects were carried out in the period from 1 March 1995 to 1 May 1996 and the 2nd pilot projects in the subsequent period up to 1 October 1996.

## Purpose

The purpose of MedCom was to establish over a two-year period a sustainable, coherent health care data network comprising the most frequently occurring messages in the health care sector and based on international EDIFACT standards. The project involved building up a standardised market for electronic communication (EDI) in which the individual system suppliers

# From local trials to a nationwide network

During the second phase of the project MedCom acted as an "umbrella organisation" which co-ordinated the regional pilot projects, the suppliers' technical standards, etc. In this period experience from the pilot projects was accumulated in "version revisions" of the standards used. "Version 0.0" was the starting point, which was used for the first time in the first pilot projects. Based on this experience "version 1.0" was issued on 1 February 1996 for use in the 2nd pilot projects and the final "version 2.0" of 10 December 1996 contains all experience gained - and is the permanent standard for use in Denmark in future.

The last three months of the project were used to bring together experience from the 2nd pilot projects and for drawing up the final standard, "version 2.0". The internationalisation of the temporary standards ("version 0.0" and "version 1.0") has been postponed until February 1997, after which the actual dissemination and use of MedCom's standards can begin.

During the 1990s data communication has seriously made its entry into the Danish health care sector.

The first trial was carried out at the beginning of the decade. Today - five years later - a nationwide health care data network has been established in which communication is based on international standards. A whole range of software providers have become capable of delivering system solutions to the various users of the health care data network thanks to the development work.



developed and marketed communication modules capable of communicating with each other via one or more VANS suppliers.

The project comprised the following messages:

- Prescriptions from general practitioners to pharmacies.
- Results from clinical chemistry, pathology and microbiology laboratories to general practitioners.
- Discharge letters from hospitals to general practitioners.

- Referrals from general practitioners to hospitals.
- X-ray results from radiology departments to general practitioners.
- Reimbursement from general practitioners and pharmacists to the national health insurance.
- Laboratory requisitions from general practitioners to clinical chemistry, pathology and microbiology laboratories.
- X-ray requests from general practitioners to radiology departments.

- Booking of examinations from general practitioners to hospitals in local pilot projects.

The messages mentioned were implemented widely in 1995 and 1996 in 25 pilot projects in various places in Denmark - however, the booking project has been postponed until MedCom II, and the transition from the existing Danish "standard prescription" to the European "MED-PRE standard" will be carried out in a project under the auspices of the Danish Pharmaceutical Association.

# How did it go?

## Target achievement: 81%

*“An EDI project, similar to any other project, is considered successful if it is completed on time, within budget and the end-product does the job without sacrificing quality.”*

*C. Bentley: “A guide to structured project management”*

### Did we complete on time?

Yes, apart from the fact that the implementation of “version 2.0” will not take place until February ‘97. However, the booking project was not delivered and neither were formalised test procedures used in connection with conclusion of the pilot projects. Nor did we implement a “dissemination project” for the old standards - for it emerged that

the use of these grew explosively nonetheless. On the other hand, we achieved the “CoCo project” and a time measurement project for prescriptions.

### Were we within budget?

Yes, there is approx. DKK 500,000 left of the DKK 15 million.

### Does the end-product do the job?

Yes, 81% of the planned communication modules were developed and tested in everyday operations - 92% on the hospitals side and 74% on the practitioners side.

### Was the quality adequate?

Within the context of MedCom adequate quality means that the standards are good and precise enough

to be used “in practice” as a single communication standard for communication “from Gedser to Skagen” - or from Land’s End to John O’Groats as we would say in Britain. That means between the communication parties, without local modifications.

Quality has been the crux of the matter in MedCom and was more difficult than expected. After the introduction of “consensus data lists” and the implementation of the round of experience gathering after the 2nd pilot projects, the standards are now described in such detail and so accurately and precisely that the overwhelming opinion is that MedCom’s standards can indeed be used “from Gedser to Skagen”.

## It is necessary to develop 175 “communications interfaces” in order for all IT systems in the Danish health care sector to be able to communicate all messages “from everyone to everyone”.

The table shows that a total of 175 “interfaces” must be developed in Denmark if all the IT systems are to be able to communicate all of MedCom’s messages to everyone else.

76 “interfaces” were developed in MedCom, equivalent to 43%. Thus 99 “interfaces” remain to be developed before everyone can communicate everything. The greatest number of messages by far will be communicated by the practitioners’ systems, and hence they have the greatest “development burden” in building up a health care data network. These suppliers are to develop 132 “interfaces” of the total 175 within the context of MedCom.

On the hospitals side, it is the major suppliers in particular which partici-

pated in MedCom and by far the majority of all users on the hospitals and laboratories side are covered by these suppliers today. On the practi-

tioners’ side it is estimated that the 76 “interfaces” cover a good third of all practices which have introduced a medical record system.

Total IT systems in Denmark	Required communications interfaces	Planned according to project specification of 14.11.94	Actually developed in MedCom’s pilot projects	Target achievement in %
5 Hospital systems	10	9	8	89
5 Lab. systems	10	9	6	67
3 X-ray systems	6	6	6	100
3 Pathology systems	6	5	6	120
2 Microbiology systems	4	3	2	67
3 National health insurance systems	3	3	3	100
4 Pharmacy systems	4	1	2	200
12 Practitioners’ systems	132	58	43	74
<b>37 Systems in total</b>	<b>175</b>	<b>94</b>	<b>76</b>	<b>81</b>

## What did it cost?

MedCom's central budget is DKK 15 million - paid 1/3 by the state, 1/3 by the hospital owners and 1/3 by private organisations and firms.

Of the DKK 15m, DKK 14.2 million has been spent as follows:

Expected account for MedCom. (Forecast as at 25.10.96)	
	1000 kr.
Wages and salaries	3288
Office, travel, IT	1442
Consultants	701
Standardisation	3097
EDI group	1105
Information and meetings	824
EU participation	1378
Pilot projects	2270
Other	117
<b>Total</b>	<b>14222</b>

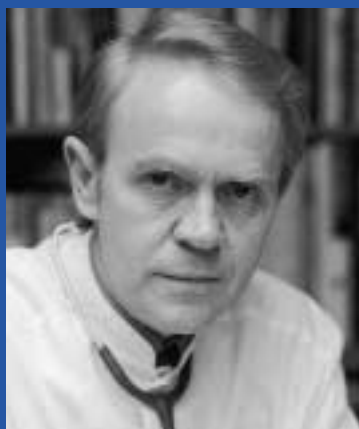
The account estimate is based on accounts up to 25.10.96 and expected spending in the remaining period up to 31.12.96.

In addition to the costs financed centrally, both the pilot projects (in other words, the counties) and the IT suppliers made considerable investments which were not financed centrally. These costs vary greatly from one pilot project to another and from company to company, but if the costs of these parties are estimated at between DKK 100,000 and 200,000 per pilot project for the counties and between DKK 20,000 and 50,000 per "interface" developed for the suppliers, total investments by all parties in MedCom

*continued on page 6*

This successful establishment of the health care data network was carried out through wide involvement of Danish expertise and joint financing by the state, the county councils, the institutions and organisations in the health care sector and suppliers of information technology.

The health care data network has already been taken into use in many parts of the health care sector and the ground has been prepared for many others to get connected and enjoy the benefits of electronic communication. This applies not only within the Danish health care sector but also at international level, where there is very great interest in the Danish handling of the health care sector's communication needs.



### Like I dreamed of

"It has been a fantastic experience working with the new technology," says GP Finn Klamer.

"It's actually difficult to describe how fundamentally my work has changed. The consultations are entirely different compared to how they were before. I have much more time to look after the patients. The nature of the

work is like I dreamed of being able to realise one day when I was younger. I get greater job satisfaction and I can warmly recommend the information technology and the health care data network with a clear conscience."

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comprise between DKK 19m and 24m (including MedCom's original budget of DKK 15m).

These investments are to be recouped through the use of MedCom's standards.

In the Danish Hospital Institute's evaluation of the FynCom project in everyday operation through 1994 it was calculated that on average 3.35 minutes are saved in a clinical hospital department in the dispatch of one discharge letter and 5.1 minutes in GP's practice. A further 1.2 minutes are saved in the dispatch of a prescription and 3.7 minutes in the receipt of results from a laboratory. The time statements are roughly the same as the time savings calculated on the basis of the "Odder project" in Århus County in 1993. On the basis of the FynCom evaluation, it can also be estimated that the total operating and investment costs amount to around DKK 2 per message in total for both recipient and sender. The aim of MedCom II is for 75% of all messages in the primary health care sector to be transferred using MedCom's standards in the year 2000 - equivalent to around 23 million messages annually.

If we assume a low average time saving, e.g. 4 minutes per message for both recipient and sender combined, the 23 million messages will mean the annual release of resources in the health care sector worth around DKK 250 million - solely caused by time savings. In addition, there are postage savings and clinical, security and service improvements. This is the context in which MedCom should be seen.

## EDI-manager, EDI-tutor and EDI-codes

In order to reinforce and quality-assure the standardisation work MedCom started the development of three "standardisation tools": "EDI-MANAGER", "EDI-TUTOR" and "EDI-CODES". All the tools will be developed further in MedCom II.

### EDI-manager

MedCom's EDI-MANAGER is an EDI converter and a communications program specially designed for the needs of the health care sector, for use in doctors' surgeries and pharmacies. The system is updated on an ongoing basis with MedCom's standards, can cope with several parallel versions and handles automatic acknowledgement and recording of communications in accordance with the prescription requirements of the Danish National Board of Health. In addition, a "minimal" syntax check is carried out in accordance with the official UN standard.

EDI-MANAGER is supplied by Komunedata I/S under the name "EDI-MANAGER" and by Dan Net under the name "EDI-CARE®". MedCom granted the pilot projects an earmarked sum to assist in the purchase of these, amounting to DKK 700,000 in total.

### EDI-tutor

EDI-TUTOR is a simulator which enables the system houses to communicate within themselves - they can send and receive MedCom's standards which are stored in EDI-TUTOR. EDI-TUTOR is designed to facilitate development, trouble-

IT - en vej til  
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Sundhed

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MedCom  
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Fyn, så ble

jekt bygger på det fyn  
edb-forsøg FynCom  
blev prøvet startet

shooting, testing of own systems and version management of the developed communications modules. EDI-TUTOR is supplied by both Dan Net (EDI-TUTOR) and Komunedata (EDI-TEST-TJENESTE). Both products are free to those suppliers participating in MedCom or in the Danish National Board of Health's prescription test. Dan Net acts as the EDI-TUTOR secretariat and receives, quality-assures and distributes the test messages.

### EDI-codes

EDI-CODES has the task of promoting and supporting the use of common nationwide classifications and of elaborating an electronic form of distribution. EDI-CODES are main-

bedre service  
et

MORGENAVISEN JYLLANDS-POSTEN

KONTOR OG EDB

dheds-EDB  
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br i Dannet, et fælles IBM- gehuse og den offentlige ad- Men der er også  
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tained and distributed by the EDI secretariat placed in the National Board of Health. They include the ICD 10 classification system, the TAC drugs classification system and the surgery and treatment classification system, radiological procedures and the hospital classification system. In the future the National Board of Health hopes to expand the distribution system to be carried out electronically via the network. MedCom has financed the work to the tune of DKK 300,000 in total, including paying for the use of the codes in MedCom's pilot projects.

## Great need

The data network is meeting a great need for communication in the health care sector.

Information and messages are frequently exchanged between the parties of the health sector in conjunction with the treatment of patients. The need for communications is increasing still further in view of increasing specialisation within the sector.

As a result, there is intensive communication of everyday messages in the form of prescriptions, laboratory and X-ray results, referrals, discharge letters, etc. It is estimated that around 100,000 - 200,000 of these types of messages are sent every single day - and the total direct costs connected with this communication alone are estimated at around DKK 1 billion a year.

Another major trend in the health care sector over the past ten years or so has been the widespread introduction of IT in the health care sector - e.g. the hospitals' patient administration systems, laboratory systems and general practitioners' medical record systems.



### The time is ripe

The status of the health care data network around the country is that some counties are going under way, others are in the process of joining whilst yet others have not even started yet.

"The time is ripe - even for the last counties," says Per Grinsted, general practitioner and practice co-ordinator. "In the course of

time so much positive experience has been achieved with electronic communication that there shouldn't be that much to weigh up any more. Moreover, hardware and software which are ready to use have now been developed."

# MedCom's pilot projects

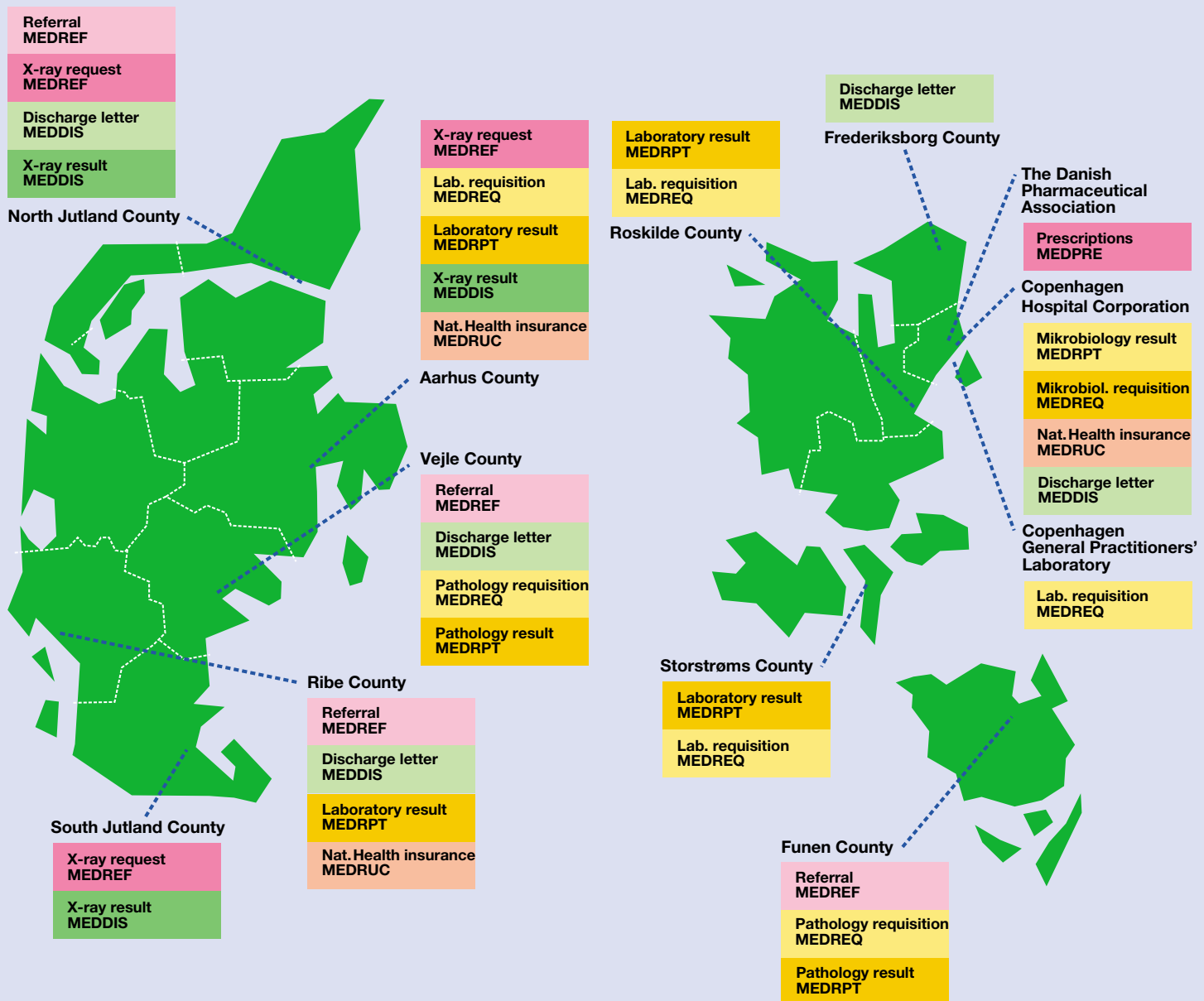
## - the actual health care data network

It is of great importance that electronic communication is used to a considerable extent if it is to be economic and suitable for all parties. A number of regional pilot projects have therefore been implemented in which communication of the messages in question has been implemented in pilot projects which together involve the major IT suppliers to the Danish health care

sector. Only then were the standards able to be tested and modified, and only then was an extent of communication which would make it economic for all parties in the short term able to be secured.

The pilot projects were carried out as local regional projects, in exactly the same way as in most previous Danish EDI trials to date (the Ama-

ger project, FynCom, the Odder project and KLAP). Seen in this context, MedCom has acted as an "umbrella organisation" which has supplied the local pilot projects with standards, instructions and co-ordination whilst, otherwise, they have been independently managed and, as a starting point, locally financed.



# Noticeable advantages

## Terms of the pilot projects

According to the co-operation agreement entered into between MedCom and the pilot projects, the individual projects shall:

- be independently managed and financed
- carry out their own project organisation and appoint a project manager
- themselves make agreements and conclude contracts with participants and software houses
- apply MedCom's standards
- use acknowledgements (positive CONTRL is always sent on error-free receipt) - but this has not been able to be maintained in practice
- follow the timetable and report milestones
- participate very constructively in national co-ordination
- receive DKK 50,000 from MedCom per pilot project carried out.

Many of the parties in the health care sector have their own IT systems, but until a few years ago the systems could not communicate with each other. Thousands of messages were therefore printed out on paper, sent by post and typed into a new system. It is a way of working which takes time, costs resources and results in a great risk of errors.

Electronic communication is fast, saves resources and minimises the risk of errors. The message is keyed in only once. It is transferred within seconds and is immediately ready for further processing in the recipient's IT system.

The users of the network achieve economic and time rationalisation gains whilst, at the same time, the quality of the work is improved.

In the final event the patient notices the advantages in the form of better quality, service and coherence in the treatment of sickness.



## Advantages for the patient

Tove Kaae, senior consultant at Odense University Hospital, has no doubts that the health care data network provides great advantages for the individual patient:

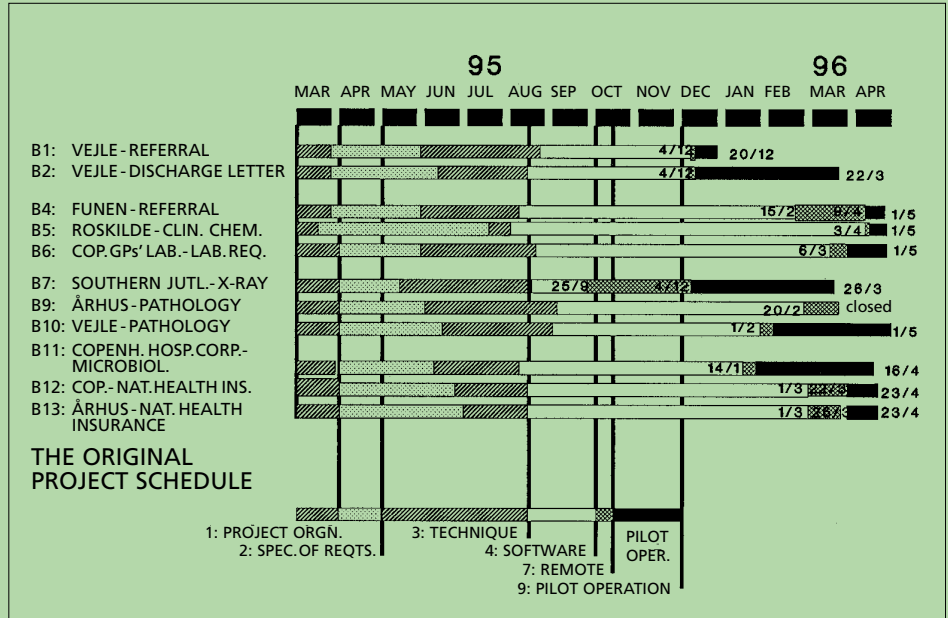
"Their own GP will be informed much more quickly than before of the treatment they have had in hospital. The same applies to

laboratory tests. There is less potential for mistakes because the same data doesn't have to be keyed in time and time again and because the communication standards used ensure that the document is completed with the relevant information."

## MedCom's 1st pilot projects - how did it go?

There is a great difference between implementing a pilot project in which the EDIFACT message concerned is introduced in Denmark for the first time, and subsequent projects in which other places and other suppliers implement the EDIFACT message. For this reason the pilot projects were divided into two groups, with the 1st pilot projects being one project for each of the chosen European messages (PRE-CEN standards) in which the message was tried out in Denmark for the first time.

MedCom's 11 1st pilot projects were originally to have been completed at the end of '95, but only three pilot projects managed to start pilot

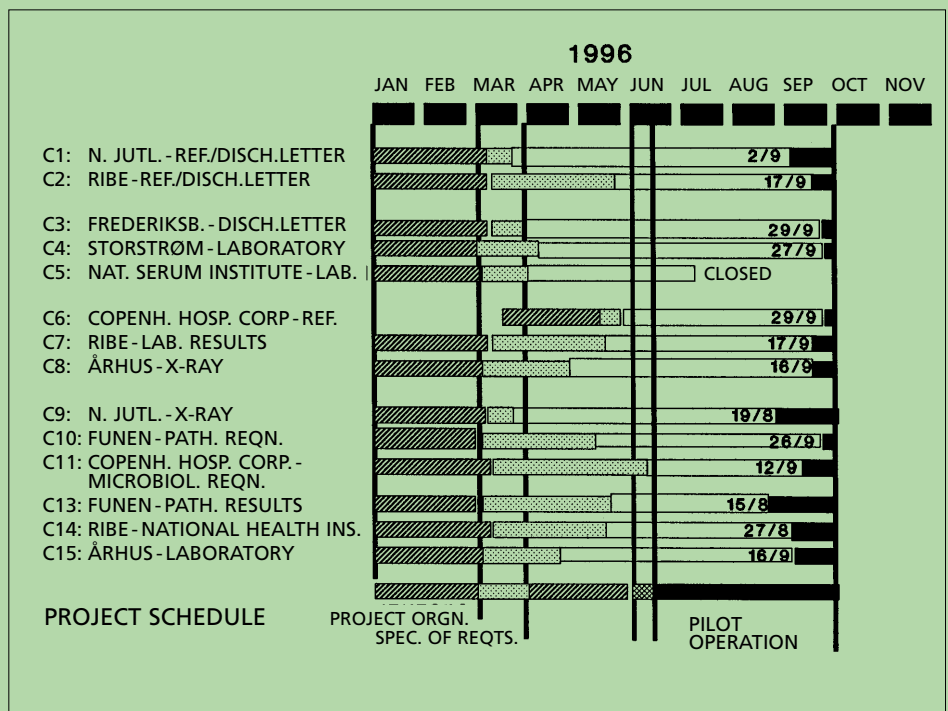


operation within the period and hence a "1st contingency plan" was drawn up which would mean the start-up of pilot operation in all the pilot projects in January '96 - or, in

the case of a few, not until February. When it became clear in mid-February that the "1st contingency plan" could not be met either, a "2nd contingency plan" was drawn up in-

## MedCom's 2nd pilot projects - how did it go?

MedCom's 2nd pilot projects started as planned on 1 January - despite the fact that the 1st pilot projects were not yet complete. This caused co-ordination problems, since it was not possible actually to accumulate experience which could be incorporated into "version 1.0" of the standard. This is why the 2nd pilot projects were launched in various versions. However, the 2nd pilot projects did succeed in meeting the deadline, which had been deferred by one month to 1 October. All the pilot projects except one were off the ground by this date - most of them just in time.



# Many small networks...

volving start-up of all the pilot projects by April - and succeeded!

All the pilot projects except one were off the ground by this date - albeit Funen, Copenhagen General Practitioners' Laboratory and Roskilde just a few days before the deadline. Only pilot project B9 - the pathology project in Århus - was then unable to start pilot operation, as a result of which MedCom's steering committee cancelled the co-operation agreement for the project.

As a minimum, a pilot project involves four parties: one hospital department/laboratory and its IT supplier and one GP and his IT supplier. However, most of the pilot projects involved both more recipients and more senders.

Local trials in various places in the early 1990s documented the great advantages which could be achieved through electronic communication. The budding of various projects involving electronic communication was a contributory factor to the fact that a large number of parties in the health care sector came together in the MedCom project.

The aims and results of the trials were in accordance with the overall health policy objectives of co-operation, service and quality within manageable economic frameworks. However, there was a need for co-ordination. The aim was to have one nationwide network. It would not have been appropriate for the regions of the country to form isolated islands in terms of communication for the sake of both the patients and the individual parties in the health care sector.

At the end of 1994 the project organisation MedCom was mandated to establish a nationwide health care data network based on the EDI (Electronic Document Interchange) concept. The project was to be completed within a period of two years.



## Need for coherence

"The Danish Ministry of Health was involved because we wanted to ensure coherence in the development of a nationwide health care data network. The need was there because of the many local initiatives. However, at the same time we also have a clear expectation that the data network will offensively be able to make a contribution to the

realisation of the overall health policy aims, i.e. co-operation, service and quality within manageable economic frameworks," concludes John E. Pedersen, office manager at the Danish Ministry of Health.

# EDI and the health care data network

MedCom - the Danish health care data network - is a "logical" data network, not a physical network. Not a single new telephone line was established in connection with its implementation. MedCom uses the lines which already exist: normal telephone lines, ISDN connections, etc. - depending on the technology which is most appropriate in the individual case.

## Electronic mailboxes

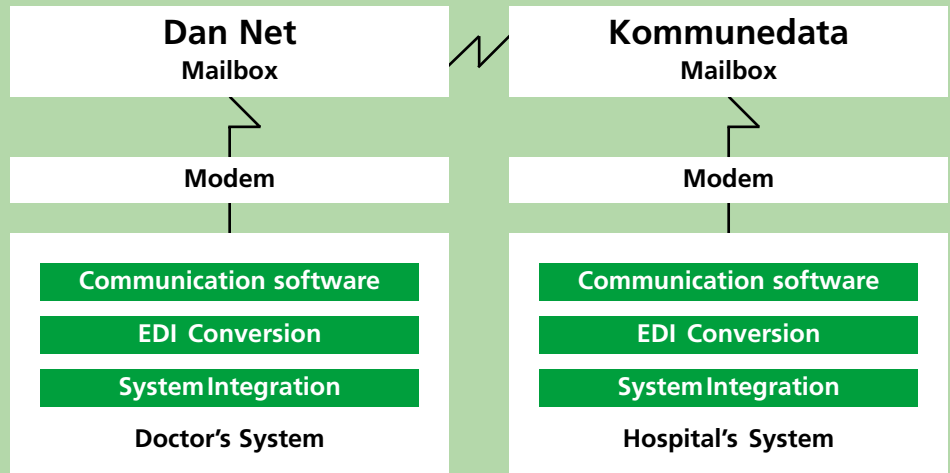
Electronic mail or "E-mail" is unformatted information which is sent from one person to another, or possibly to many others, via an IT network. **E-mail communication** takes place between people as opposed to **EDI, Electronic Document Interchange**, which is the transfer of standardised documents between two computer systems.

In the health care data network there are health care-specific EDI-FACT messages (a UN syntax for EDI) which are exchanged between the systems in the health care sector (pharmacies, general practitioners, laboratories, radiology departments, hospital departments).

In order to be able to ensure the smoothest possible method of transfer, it was decided to use electronic mailboxes. Both types of messages are based on the **Store and Forward** principle, in which the messages are stored along the way until they can be delivered to the next stage - and finally delivered to the recipient.

This method ensures:

- that the sender's system can deliver messages for forwarding without having to wait for the



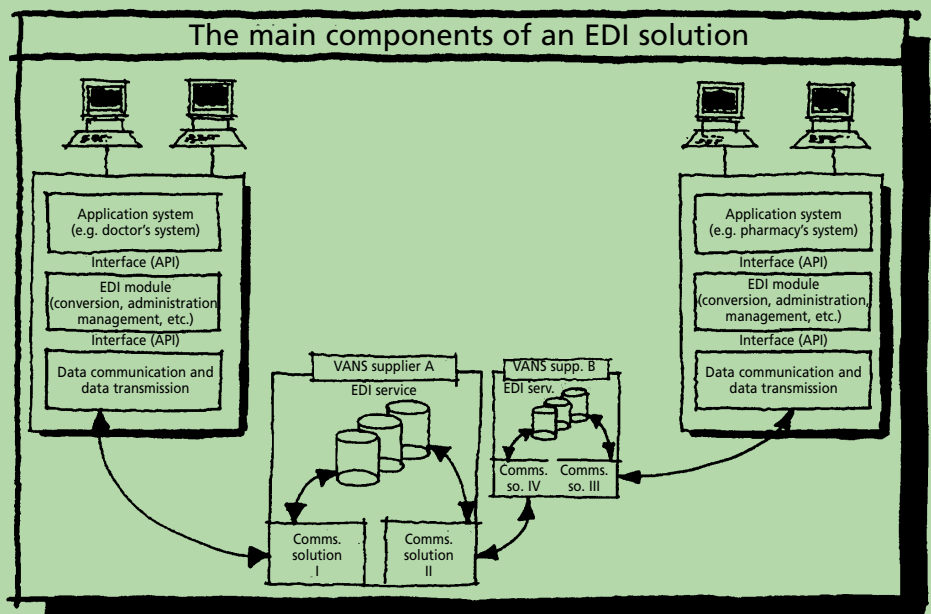
- recipient's system to be ready to receive messages
- that the recipient's system can "collect" its messages at any time
- that the sender's system can send a message to several recipients at once
- that the sender and recipient do not have to maintain fixed, defined communication channels between them.

In connection with the EDI messages this processing is carried out in

VANS (Value Added Network Services). Here in Denmark there are two such suppliers, Dan Net and Kommunedata.

Components of a "Store and forward" system for EDIFACT:

- An IT system - single user or multi-user
- A conversion system for constructing EDIFACTs and ensuring they are correct



# ...and one large one

- Communications software on this IT system
- An electronic link to a supplier of electronic mailboxes
- An electronic mail address/mailbox - which is obtained following agreement with the supplier.

The conversion system is used to place the message in an electronic envelope and to add an electronic address, after which the message is sent by the communication system to an electronic "post office" (VANS). This "post office" then ensures that the electronic item of mail is sent by the most appropriate route through the electronic network to the recipient's mailbox. The recipient can then collect the message as needed.

## System integration in the health care data network

In order to communicate with each other it is necessary for the individual IT suppliers to develop a standardised "interface" with other IT systems. The major work for the IT supplier lies in arranging such a system so that it can work functionally (screens, etc.) and then to develop "mapping" to the EDI converter. In this mapping the system house's in-house format is converted to the fixed EDIFACT format which is sent out to other users. Standard communications software and a standard modem are used to send it out. The rest of the system is built up around two "mailbox" systems belonging to the two VANS suppliers, Kommunedata and Dan Net - and, in principle, the system works in exactly the same way as when transferring e-mail.

The network is to communicate messages directly between different IT systems within the health care sector using existing technology. Communication is based on international CEN standards and covers the most frequently used messages in the health care sector:

**Referrals** from general practitioners to hospitals. **Discharge letters** from hospitals to general practitioners. **Laboratory requisitions** from general practitioners to clinical chemistry, pathology and microbiology laboratories. **Laboratory results** from clinical chemistry, pathology and microbiology laboratories to general practitioners. **X-ray requests** from general practitioners to radiology departments. **X-ray results** from radiology departments to general practitioners. **Reimbursement** from general practitioners and pharmacies to the national health insurance.



## Project success in Funen

The FynCom project established the Funen health care data network in 1993 and has been a great success from the start. In terms of the volume of communication, the Funen health care data network now makes up a very large part of the Danish health care data network. Project manager Tove Lehrmann of FynCom:

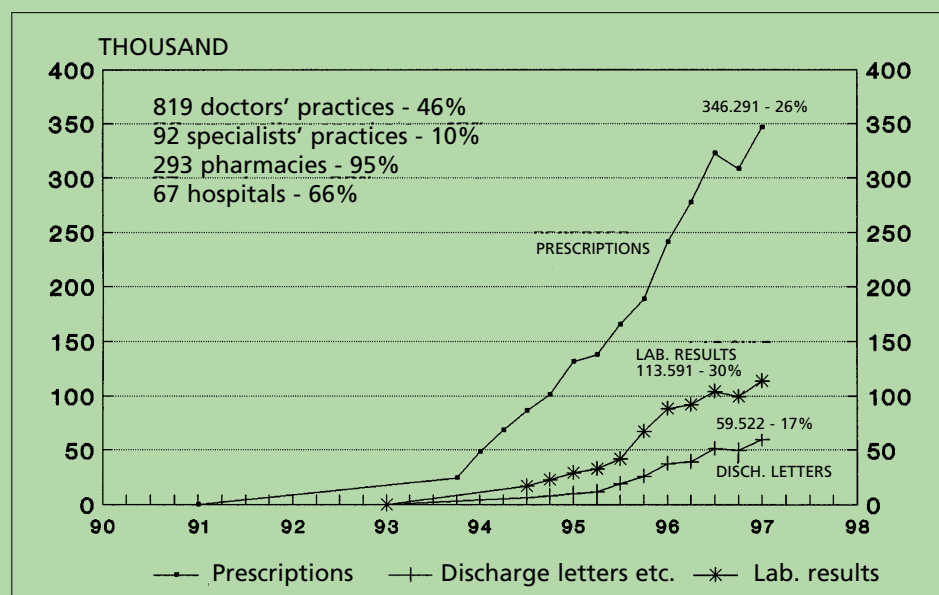
"It is essential to have a large organisation behind you - preferably an organisation which crosses the traditional boundaries within the health care sector in terms of both geography and specialist areas. At the same time, you need the fiery souls who, with their enthusiasm and pioneering spirit, make extraordinary efforts to get the project to succeed. These are not necessarily IT people," she stresses, "in fact, quite the reverse."

# EDI national statistics

In the period from 1988 to 1991 the "Amager project" was carried out in Copenhagen. In this project a standard was developed for communication of prescriptions - "RECEPT" ("PRESCRIPTION") - which has functioned since that time with just a single version update. Although it

took several years for prescription communication to become widespread, the Amager project formed a school for the subsequent projects and all EDI projects in Denmark since then have used the same "technology": EDIFACT syntax and "mailbox" technology.

In 1992 three major regional projects were carried out which developed and implemented two new standards in the health care sector: "EPIKRI" ("DISCHARGE LETTER") for discharge letters from hospitals to general practitioners, and "LABRES" for laboratory results from labora-



## Number of messages per month, October 1996

In October 1996 approximately half of the general practitioners (around 819 practices) had invested in EDI communication along with around 90 specialist practices. Almost all pharmacies and over half of the hospitals and laboratories also used "the Danish health care data network". Whilst a laboratory can normally send almost all its results electronically as soon as it is connected, this is often not the case with discharge letters. Thus there is normally a great difference between the degree to which the "discharge letters module" is used in the individual departments in the hospital,

and whether this module is also used for outpatient discharge letters etc. The "old" Danish standards are also used for X-ray results and, to a lesser extent, for communication internally in the hospital and between the general practitioner and the specialist. In October 1996 a total of 519,404 messages were sent, of which 346,291 were prescriptions, 113,591 laboratory results and 59,522 discharge letters. If we transfer the calculations from the FynCom evaluation to these figures, this is equivalent to the monthly release of resources in the health care sector in Denmark worth DKK 5.5m in total - merely for the month of October 1996.

## EDI communication in the pilot projects, September 1996

### Pilot project

- B1: Vejle County
- B2: Vejle County
- B4: Funen County
- B5: Roskilde County
- B5: Roskilde County
- B6: Copenhagen GPs' Lab. (KPLL)
- B7: South Jutland County
- B7: South Jutland County
- B10: Vejle County
- B10: Vejle County
- B11: Hvidovre
- B12: Copenhagen Dep. of Health
- B13: Århus County
- C1: North Jutland County
- C1: North Jutland County
- C2: Ribe County
- C2: Ribe County
- C3: Frederiksborg County
- C4: Storstrøm County
- C4: Storstrøm County
- C6: Copenhagen Hospital Corp.
- C7: Ribe County
- C8: Århus County
- C8: Århus County
- C9: North Jutland County
- C9: North Jutland County
- C10: Funen County
- C11: Copenhagen Hospital Corp.
- C13: Funen County
- C14: Ribe County
- C15: Århus County
- C15: Århus County

# Pilot projects prepare the ground

tories to general practitioners. The three major projects were "The Copenhagen General Practitioners' Laboratory Project" (the KPLL project) in the Copenhagen region, the "Odder Project" in Århus County and "FynCom" in Funen County.

The development of the health care data network is co-ordinated at national level through the MedCom project. However, local, independent project organisations remain the core of the work.

In 1995/96 11 pilot projects were carried out, each with the aim of testing out communication of one of

The level of communication in the pilot projects is still low at present, since most suppliers decided to wait

for the final standard to be implemented in February 1997 before connecting new users.

Message	Suppliers	MIG	Sent via Dan Net	Sent via Kommunedata
Referral	Kommunedata, Multimed, Æskulap	MEDREF	4	25
Discharge letter	Kommunedata, Multimed, Æskulap	MEDDIS	7	112
Referral	FynSys, Medex	MEDREF	6	
Lab. requisition	Labka, PC-Praksis, Midoc	MEDREQ	66	
Lab. results	Labka, PC-Praksis, Midoc	MEDRPT	135	
Lab. requisition	DECLAB, PC-Praksis, PLC, Midoc, Novax	MEDREQ	7	
X-ray request	Kommunedata, Æskulap	MEDREF	34	34
X-ray result	Kommunedata, Æskulap	MEDDIS	60	60
Pathology requisition	IBM, Multimed	MEDREQ	114	
Pathology results	IBM, Multimed	MEDRPT	87	
Microbiology result	ADBakt, EM-data, PC-Praksis, PLC, Midoc, Novax, Æskulap	MEDRPT	1190	
Nat. Health Serv. ins.	Kommunedata, EM-data, PC-Praksis, Midoc, S.Thygesen	MEDRUC	26	26
Nat. Health Serv. ins.	BEMA, Cito-Data, Midoc, Novax, Æskulap	MEDRUC	9	
Referral	B-DATA, I-Praksis, Medex, PLC, Æskulap	MEDREF	8	5
Discharge letter	B-DATA, Æskulap	MEDDIS	29	8
Referral	EDB-gruppen Herning, Æskulap	MEDREF	11	
Discharge letter	EDB-gruppen Herning, Æskulap	MEDDIS	6	
Discharge letter	SIS/SIBE, Æskulap	MEDDIS	16	10
Lab. requisition	B-Data, Novax	MEDREQ	90	
Lab. results	B-Data, I-Praksis, Midoc, Novax, PC-Praxis, PLC, Æskulap	MEDRPT	10	
Discharge letter	Grønt System, Novax, PC-Praxis, PLC, Æskulap	MEDDIS	25	28
Lab. results	EDB-gruppen Herning, Æskulap	MEDRPT	9	
X-ray referral	KODAK, Novax, PLC, Æskulap	MEDREF	8	1
X-ray result	KODAK, Novax, PLC, Æskulap	MEDDIS	1	1
X-ray referral	B-DATA, Æskulap	MEDREF	14	1
X-ray result	B-DATA, Æskulap	MEDDIS	46	9
Pathology requisition	FynSys, Medex	MEDREQ	1	
Microbiol. requisition	ADBakt, Novax, PC-praksis, PLC, Æskulap	MEDREQ	75	
Pathology results	FynSys, Medex	MEDRPT	12	
Nat. Health Serv. ins.	Cito-Data, RVFR-medicin, RVFR-sygesikring, Æskulap	MEDRUC	16	
Lab. requisition	Labka, Novax, Æskulap	MEDREQ	30	10
Lab. results	Labka, Novax, Æskulap	MEDRPT	507	335
MEDREQ		393		
MEDRPT		2285		
MEDREF		151		
MEDDIS		418		
MEDRUC		77		
<b>Total messages</b>		<b>3324</b>	<b>2659</b>	<b>665</b>

## EDI peak, August 1996

Assuming that the use of prescriptions, laboratory results and discharge letters is evenly distributed across the country (in accordance with the population in each county), we can estimate how great a proportion of these messages are actually sent using EDI in each county.

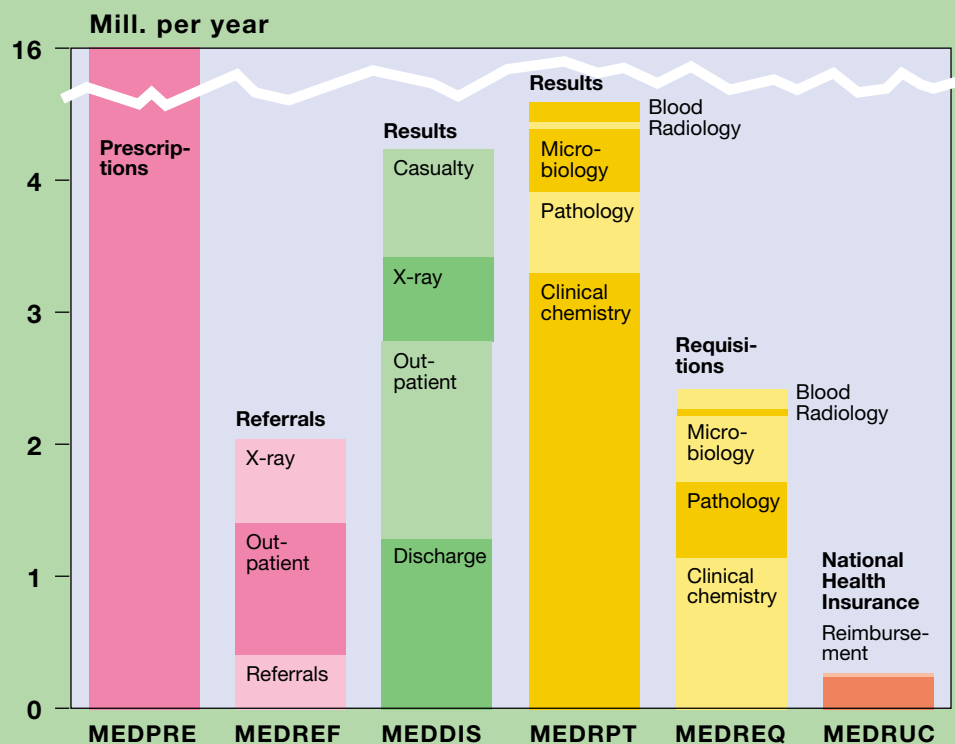
The figure shows, amongst other things:

- that 14% of all discharge letters, 26% of all laboratory results and 23% of all prescriptions are sent by EDI
- that in the counties in which most communication takes place, between a third and a half of all the messages in question are sent electronically
- that communication of more messages supports its spread. Two or three times as many prescriptions are communicated electronically in the counties which also send hospital results electronically
- that there are now only five counties which do not yet transfer hospital results electronically.

## The potential of MedCom's messages

MedCom's five EDIFACT standards are directly intended to replace the approx. 30 million messages sent between hospitals, pharmacies and general practitioners every year. The 30 million messages are divided into 16 million prescriptions (MEDPRE), 2 million referrals and X-ray requests (MEDREF), 4 million discharge letters and X-ray results (MEDDIS), 4.5 million laboratory results (MEDRPT) and 4 million requisitions (MEDREQ).

Counties	Number of messages and number of EDI-linked doctors' practices and pharmacies					
	Discharge letter	Lab. results	Prescriptions	Doctors	Pharmacies	Discharge letters
1 Funen	8420	26884	42990	137	29	27
2 Vejle	9561	12014	34173	68	20	42
3 North Jutland	7484	20870	55844	117	33	23
4 Århus	13325	13805	56570	136	32	33
5 Viborg	5252	3226	16070	60	13	33
6 Roskilde	472	4529	12525	29	7	3
7 Copenhagen Hospital Corp.	257	14430	16505	82	33	1
8 South Jutland	5011	0	10521	53	14	29
9 Ribe	108	240	12465	22	14	1
10 Ringkøbing	0	2769	6497	26	11	0
11 Storstrøm	12	779	11485	32	15	0
12 Bornholm	0	0	1955	4	2	0
13 Frederiksborg	0	0	9374	23	18	0
14 Copenhagen	5	0	16628	83	31	0
15 West Zealand	2	157	4125	13	13	0
<b>I alt</b>	<b>49909</b>	<b>99703</b>	<b>307727</b>	<b>885</b>	<b>285</b>	<b>14</b>



**As a percentage of all those possible**

Lab. results	Pre-scriptions	Doctors	Pharmacies
79	36	68	88
49	40	49	87
58	44	58	92
31	37	48	97
19	27	59	65
28	22	31	64
35	11	25	92
0	16	54	70
1	22	27	93
14	9	25	69
4	17	38	65
0	16	24	67
0	11	17	95
0	11	25	97
1	6	13	72
<b>26</b>	<b>23</b>	<b>38</b>	<b>84</b>

and 230,000 billing sheaves to the National Health Insurance (containing a total of 30 million bills) (MEDRUC). However, in addition, 1.3 million referrals are sent from general practitioners to specialists and around 3 million discharge letters the opposite way, approx. 10 million emergency service records and a large number of similar messages are sent to and from the local authority sector, physiotherapists, etc. The total communication which could take place using MedCom's standards is thus over 50 million messages per year.

the different types of messages for the first time. As a result, much valuable experience was gained of the use of international communications standards and of working methods and work organisation as a whole.

At the end of 1996 a further 15 pilot projects were carried out in which standards and working methods were finally tested. When these are complete it will be possible for all counties, doctors' practices, hospitals, laboratories and pharmacies to link up individually with the health care data network and to communicate freely with all the other parties connected. This is the case because the majority of the IT suppliers to the Danish health care sector have created a range of software solutions for use on the data network in connection with the MedCom projects. The software suppliers quite simply participated in the pilot projects and in this context carried out the necessary product development. New users are therefore able to choose between different system solutions which immediately enable them to communicate via the health care data network.



**Co-operation**

"Users and suppliers have together developed a concept, a system and a product range, which enable all interested doctors' practices and hospitals to link up with the health care data network so as to benefit from EDI," says Henrik Bjerregaard Jensen, MedCom's project manager.

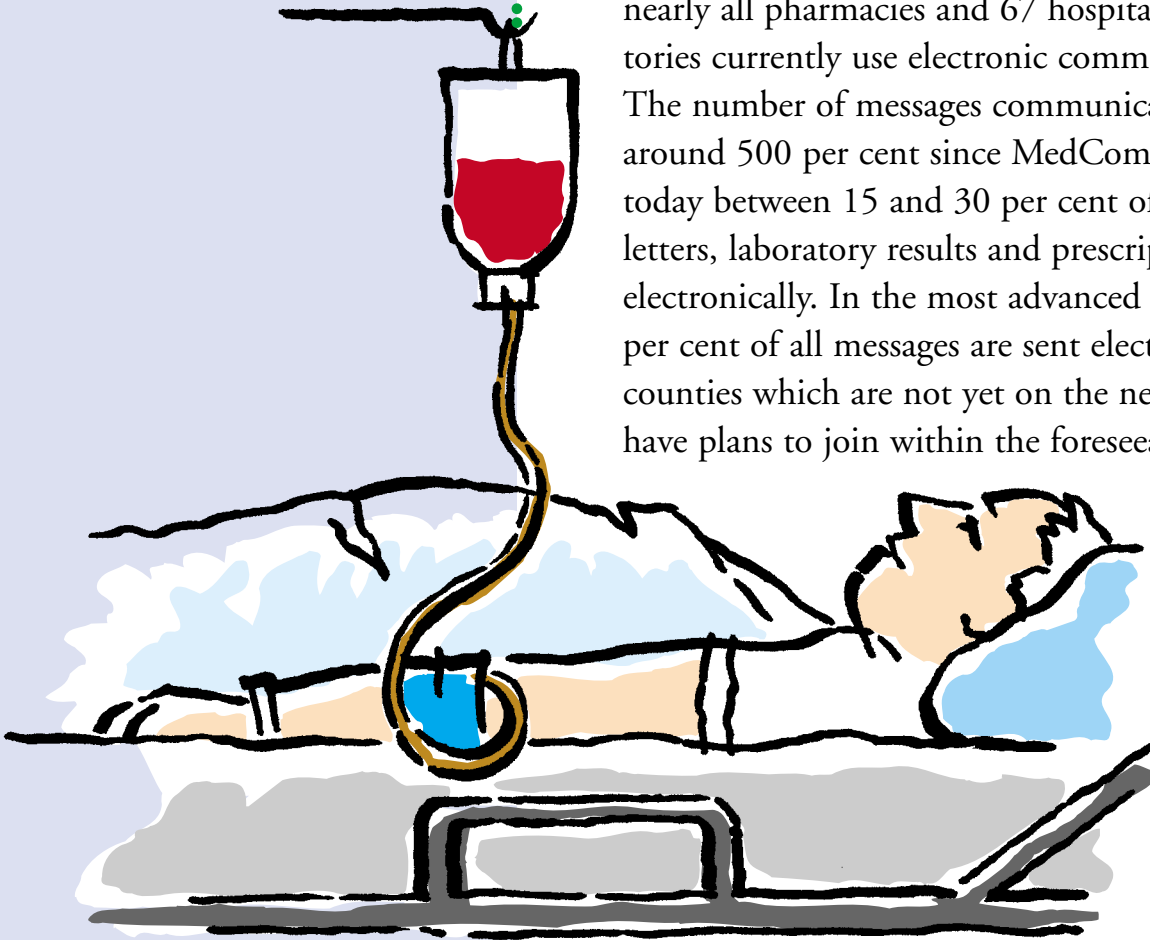
# Who can do what on 1 October 1996?

## System houses which participated in MedCom's pilot projects

Pilot project	As at 1 October 1996
Referrals from GPs to hospitals	I-Praksis, Medex, PLC, Æskulap, B-Data, EDB-gruppen Herning, Kommunedata, FynSys, Multimed
Discharge letters from hospitals to GPs (discharge letters)	B-Data, Æskulap, EDB-gruppen Herning, SIS/SIBE, Grønne System, Novax, PC-praksis, PLC, Multimed, Kommunedata,
Laboratory requisitions to clinical chemistry laboratories	Novax, B-Data, Æskulap, Labka, DEClab, PLC, PC-praksis, Midoc
Laboratory results from clinical chemistry laboratories	B-Data, I-praksis, Midoc, Novax, PC-Praksis, PLC, Æskulap, EDB-Gruppen Herning, Labka
X-ray requests to radiology departments	Novax, PLC, Æskulap, Kodak, B-Data, Kommunedata
X-ray results from radiology departments	Kodak, Novax, PLC, Æskulap, B-Data, Kommunedata
Laboratory requisitions to pathology laboratories	Medex, FynSys, Multimed, IBM
Laboratory results from pathology laboratories	FynSys, Medex, Multimed, IBM
Laboratory requisitions to microbiology laboratories	Novax, PC-Praksis, PLC, Æskulap, ADBakt
Laboratory results from microbiology laboratories	ADBakt, PLC, Æskulap, Midoc, EMAR, Novax
National health insurance reimbursement from pharmacies	Cito-Data, RVFR-medicin, Kommunedata, S.T.Data, BEMA
National health insurance reimbursement from GPs	Æskulap, RVFR-sygesikring, Kommunedata, EMAR, Midoc, Novax, PC-Praksis

# Many people involved

Many people have already been connected to the health care data network. Over 900 doctors' practices, nearly all pharmacies and 67 hospitals and laboratories currently use electronic communication. The number of messages communicated has risen by around 500 per cent since MedCom started, and today between 15 and 30 per cent of all discharge letters, laboratory results and prescriptions are sent electronically. In the most advanced counties 30-40 per cent of all messages are sent electronically. Of the counties which are not yet on the network, many have plans to join within the foreseeable future.



## Considerable improvements

"Used correctly, the new technology provides opportunities for considerable improvements," says John Ravndam, financial manager of the Copenhagen General Practitioners' Laboratory (KPLL). The laboratory carries out 3.5 million analyses for 340,000 patients every year.

"In the final event it always comes down to ensuring that the GP has access to the right information as quickly and easily as at all possible. The health care data network is a very important tool in this context."

# Who can do what?

## MedCom messages and IT systems

Pilot operation completed as at 1 October 1996

175 communications interfaces in total - 3/4 of which are in the GPs' system	Referral	Discharge letter	Laboratory		Microbiology		Patho
	MED REF	MED DIS	MEDREQ/ MEDRPT		MEDREQ/ MEDRPT		MED MED
	Req.	Resp.	Req.	Resp.	Req.	Resp.	Req.
<b>Hospital systems</b>							
Kommunedata	Dark Green	Dark Green					
B-Data	Dark Green	Dark Green					
EDB-Gruppen	Dark Green	Dark Green					
Fyn-Sys	Dark Green	Light Green					
Frb-Sys (SIS/SIBE)	Light Green	Dark Green					
<b>Laboratory systems</b>							
Labka			Dark Green	Dark Green			
DeClab			Dark Green	Light Green			
B-Data			Dark Green	Dark Green			
VGLIMS			Light Green	Light Green	Light Green	Light Green	
EDB-Gruppen			Light Green	Dark Green			
<b>X-ray systems</b>							
Kommunedata							
B-Data							
Kodak							
<b>Pathology systems</b>							
Kommunedata							Light Green
IBM							Dark Green
Fyn-Sys							Dark Green
<b>Microbiology systems</b>							
AdBakt					Dark Green	Dark Green	
FynSys					Light Green	Light Green	
<b>National Health Insurance</b>							
Kommunedata							
Bema							
Kommunedata - local / EDB-Gruppen							
<b>Pharmacy systems</b>							
Datapharm							
CiTo-Data							
S.T. Data							
Apoteksdata							
<b>Doctors' systems</b>							
Æskulap	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Light Green
Novax	Light Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Light Green
PC-Praksis	Light Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Light Green
PLC	Dark Green	Light Green	Dark Green	Dark Green	Dark Green	Dark Green	Light Green
Midoc	Light Green	Light Green	Dark Green	Dark Green	Light Green	Dark Green	Light Green
Multimed	Dark Green	Dark Green	Light Green	Light Green	Light Green	Light Green	Dark Green
Medex	Dark Green	Light Green	Light Green	Light Green	Light Green	Light Green	Dark Green
EMAR	Light Green	Light Green	Light Green	Light Green	Light Green	Dark Green	Light Green
I-praksis	Dark Green	Light Green	Light Green	Dark Green	Light Green	Light Green	Light Green
Apex	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
Docbase	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
Ganglion	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green



# Standardisation in MedCom

The standardisation in MedCom is based on the "simultaneous" development of communications standards for the health care sector "on paper" and "in practice" in the same organisation and in the same process. This is not normally the case in standardisation work, which is often first developed "on paper" by an organisation, after which others must examine "in practice" whether the standards can be used. However, experience from the four large regional EDI projects in Denmark had shown that it was not possible to develop functioning EDIFACT communication standards for the health care sector "solely on paper". The subsequent implementation necessitated further specification and

amendments during the actual implementation process - since "local agreements" directly between the suppliers should not be necessary.

Neither was MedCom any exception. Here, too, it proved necessary to have a number of emergency standardisation and co-ordination measures in order to ensure that the communication could be implemented "in practice" and the standards specified accordingly. This process was planned to the extent that a process of development involving three subsequent versions of the standards and two subsequent groups of pilot projects was planned.

However, the development of the standards was more resource-intensive than expected and necessitated more activities than anyone had foreseen.

Amongst other things, in the course of 1995 and 1996:

- permanent co-ordination groups were appointed for the laboratory and referral/discharge letters area
- MMM correction letters for the MIGs were elaborated
- a consensus data list for the use of the standards was drawn up
- specifications of requirements were harmonised in the 2nd pilot projects ("do likewise")

## MedCom's standards, version 2.0

MedCom's standards are made up of two parts:

A: A Message Implementation Guide (MIG) for each message

B: A consensus data list for each message.

Future version revisions will cover both documents. The MIG specifies the structure and describes the subset of the CEN standard applied in Denmark. The consensus data list clearly states which part of this subset is used in Denmark, including what all sending systems must send each time, what the sending systems may choose to send - and thus together what all receiving systems must be able to receive. No information other than that shown in the

consensus data lists may be sent since it cannot be expected that the receiving systems will be able to process this information in a relevant way.

In addition, a set of "validating test messages version 2.0" has been drawn up, which meets the requirements of the two documents mentioned and which can therefore be used for the suppliers' testing during the development of the communications interfaces.

MEDRPT for laboratory results from clinical chemistry, pathology and microbiology laboratories to general practitioners.

MEDREQ for laboratory requisitions from general practitioners to clinical chemistry, pathology and microbiology laboratories.

A joint guide for both MEDRPT and MEDREQ.

MEDDIS for discharge letters from hospitals to general practitioners and X-ray results from radiology departments to general practitioners.

MEDREF for referrals from general practitioners to hospitals and X-ray requests from general practitioners to radiology departments.

A joint guide for both MEDDIS and MEDREF.

MEDRUC for national health insurance reimbursement by general practitioners and pharmacies to the national health insurance.

CONTRL for acknowledgement message for messages received.

# International standards - EDIFACTs

- a "tutor secretariat" was established for quality assurance of test messages
- operational EDIFACT messages were compiled from the 1st pilot projects
- "loose ends" rounds were held for the project participants
- consensus data lists were "elevated" to form part of the official standard.

However, the process succeeded in the end: "version 2.0" was assessed by all to be precise enough to function as an "everyone to everyone" communication standard in the health care sector.

The messages mentioned are expected to be able to be used unchanged for similar messages in a great number of cases, e.g. communication between hospitals, internally within hospitals, between general practitioners and specialists, to and from local authority, home nurses, etc.

To avoid a large number of closed systems for EDI communication being established, standards - which are recommended for electronic communication - have been laid down under the auspices of the UN. The name for these standards is "EDIFACT" and it is possible to draw up EDIFACTs for all types of EDI communication based on the guidelines (syntax ISO 9735) adopted.

These are drawn up gradually as the need arises. EDIFACTs adopted are international and the use of the standards opens up EDI communication in a given area for everyone communicating in accordance with these standards without prior negotiations and agreements.

The pilot projects in MedCom use five EDIFACTs. These EDIFACTs have been adapted to Danish circumstances by MedCom's EDI group, which translated and processed the international standards. In the MedCom project the major standardisation work was carried out by the EDI group, the members of which were responsible for modification of the EU or UN standards to Danish circumstances within their field.

## MedCom's standardisation authors:

- MEDRPT and MEDREQ were drawn up by Niels Jørgen Christensen of Århus County Hospital. NJC is also chairman of the EDI group.
- MEDREF and MEDDIS were drawn up by Jesper Theilgaard, a general practitioner.
- MEDRUC was drawn up by Jan

Mark of Kommunedata.

- CONTRL was drawn up by Anders K. Jørgensen of Dan Net.
- CODES maintained and distributed by Stig Korsgaard of the National Board of Health.
- The consensus data list was drawn up by Mogens Schlamovitz of MOS Informatik.
- Electronic test messages are maintained and distributed by Thomas Hensing of Dan Net.

MIG standard "version 0.0" was released in spring 1995 and was for use in the 1st pilot projects. MIG standard "version 1.0" was released in spring 1996 and was for use in the 2nd pilot projects. MIG standard "version 2.0" was released on 10 December 1996 and is for permanent use after the MedCom period.

## Two methods of standardisation

In the development of the “old” Danish communication standard “EPIKRI” a traditional “bottom-up” process was used. The existing forms for discharge letters were taken as the starting point and were described as an EDI document stating the data content, formats, field lengths, etc. The standard was made generally applicable by taking account of the circumstances in various hospitals.

The European CEN standards are developed the opposite way using a “top down” approach. First a general definition apparatus and data model are created at European level, in which both the terminology and the structure are wide enough

to cover the circumstances in a number of countries with comprehensive functionality. On the basis of this broad model a national MIG (Message Implementation Guide) is created which defines the parts which are relevant in the country in question.

However, since both the definitions and the data model are very general, the CEN standards have the nature of a “framework” or “maximum” standards which provide many options for their concrete implementation. It is estimated that only 10% of the Danish MIGs are used in actual communication. This results in a risk of “local variants”. MedCom’s standardisation practice therefore included ongoing specification and clarification of the standard - as it became clear that it

**Normal Edifact: Bottom up**  
Common concrete Edifact standard is created based on actual forms

↓  
**Result:**

Becomes common EU standard

**EU process: Top down**  
A broad “framework” standard is created based on general definition framework

↓  
**Result:**

Becomes the de facto standard

was not possible for the suppliers to implement the full MIG, i.e. the full “sub-set” of the standard which had been chosen for use in Denmark.

The need for further specification

## Transition to version 2.0

In MedCom’s pilot projects temporary standards (“version 0.0”, “version 1.0” and variants) were tried out, and these are still in operation in the pilot projects. Since it is a precondition for the rapid spread of MedCom’s standards that all suppliers use exactly the same standard, the suppliers who took part in the “loose ends” round in

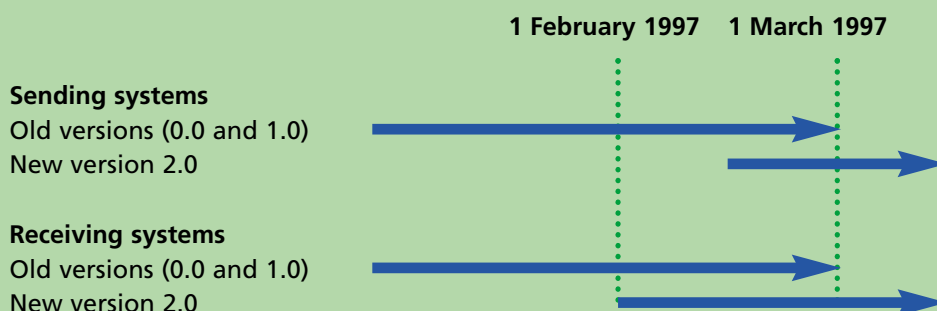
Randers October 1996 decided to convert to the final “version 2.0” by February 1997. This means that all receiving systems will be able to receive the new standard from 1 February, and that all sending systems must use only the final standard after 1 March 1997. After MedCom the intention is for future version updates to be carried out according to the same principle - i.e. based on dates laid down centrally

between which the receiving systems must be able to accept both “old” and “new” standards.

### Internationalisation

#### Principle of version revision

- All receiving systems must be able to receive both old and new versions in the transitional period.
- All recipients shall support version 2.0 from 1 February 1997.
- All senders shall make the transition to version 2.0 after 1 February 1997 and before 1 March 1997.
- All recipients shall be entitled not to receive the older version after 1 March 1997.
- All senders must stop using the older version after 1 March 1997.



was therefore satisfied by “elevating” the Danish consensus data lists to form an actual part of the standard, which therefore consists of two parts: a MIG and an associated consensus data list. There has been similar experience in Norway and Britain, which countries have also been working on the European standardisation process for several years. The idea of the European CoCo project is therefore also to implement a “bottom up” process by taking as a starting point the national consensus data lists and “adding” each time the circumstances in another country require further functionality. If this process succeeds, CoCo’s standards will be able to be used as an actual European communication standard which is capable of functioning “from North Cape to Gibraltar”.

Several members of the group are also members of the international standardisation bodies and have thus been involved in the elaboration of the standards in this capacity.

In connection with the implementation of MedCom’s pilot projects, the EDI group had the task of coordinating the work involved in a final adjustment of the various standards from a version 0.0 (draft) via version 1.0 (provisional) to version 2.0 (permanent standard).

## How do the suppliers produce one version which is able to be used throughout the country?

### 1. Sending systems

- It must be possible for all mandatory information in the consensus data list (M, R and D) to be keyed in (if relevant), as some may be formed automatically. Mandatory information must be present in every message.
- All non-mandatory information in the consensus data list (A and O) must be able to be keyed in (if relevant) and must be able to be sent.

- Further information which is not shown in the consensus data list must not be sent, since it cannot be expected that the receiving systems will be able to process it in the relevant way.
- Users must accept screen information which is used in only a few places in Denmark, e.g. same day surgery.

### 2. Receiving systems

- It must be possible for all mandatory and non-mandatory information in the consensus data list to be received and displayed (if relevant) as the display of some information may not be relevant to certain systems.

- It can be expected that no other information will be sent than that shown in the consensus data list.
- However, other MIG information must preferably be able to be handled - possibly in an error list.

# CoCo - a MedCom in Europe?

Experience from the Danish (co-) operation within standardised electronic communication in the primary health care sector has been so positive that for a long time it has seemed natural to establish contacts with similar activities in Europe, including Norway, the Netherlands and Britain. Since summer 1992 Funen County Council has therefore been working on a number of European links within the field with the aim of achieving wider participation in a larger European project in the area. In spring 1994 Funen County Council designated DKK 1.5 million for this work, and on the formation of MedCom in the summer of the same year MedCom's steering committee decided to contribute half this investment (DKK 775,000) in order to be able to participate in the EU's

fourth framework programme for medical informatics which is to be carried out in the three-year period from 1996 to 1999.

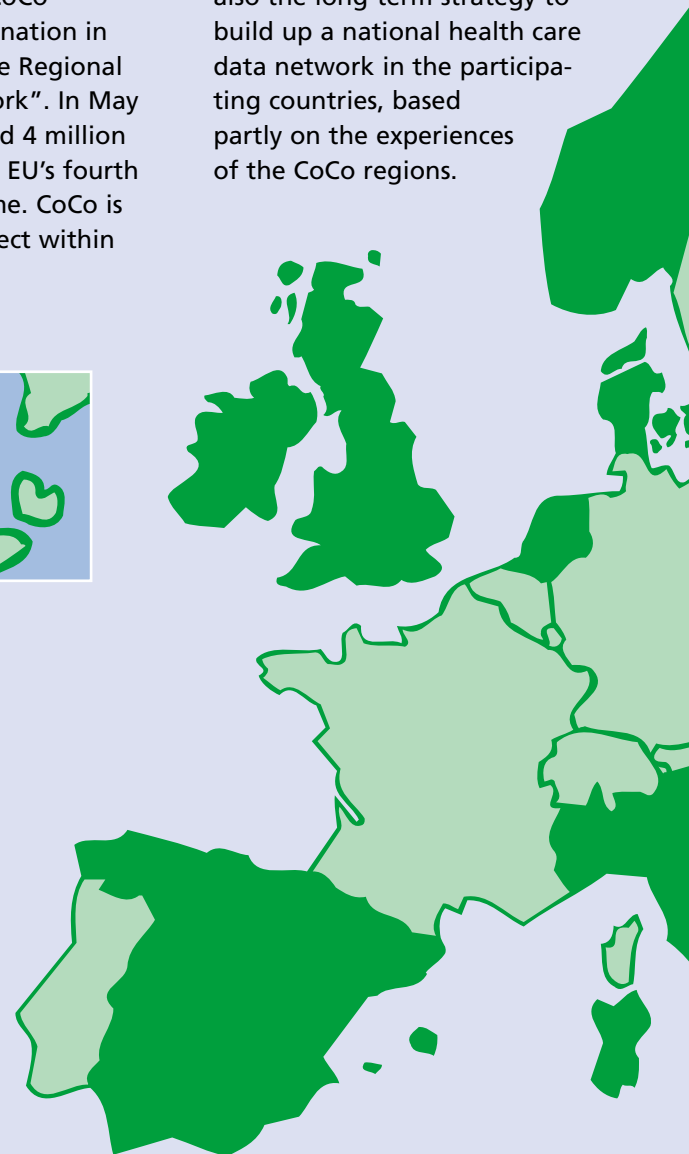
Thus, in co-operation with Funen County Council, MedCom took the initiative to establish an EU project based on building up regional health care data networks in 10 regions in Europe using the same technical and organisational principles as were used in Denmark.

The project was called CoCo - "Continuity and Co-ordination in Primary Health Care. The Regional Health Care Data Network". In May 1995 the project received 4 million ECU in a grant from the EU's fourth IT framework programme. CoCo is thus the largest EU project within

the area of information technology in the health care sector.

## Who?

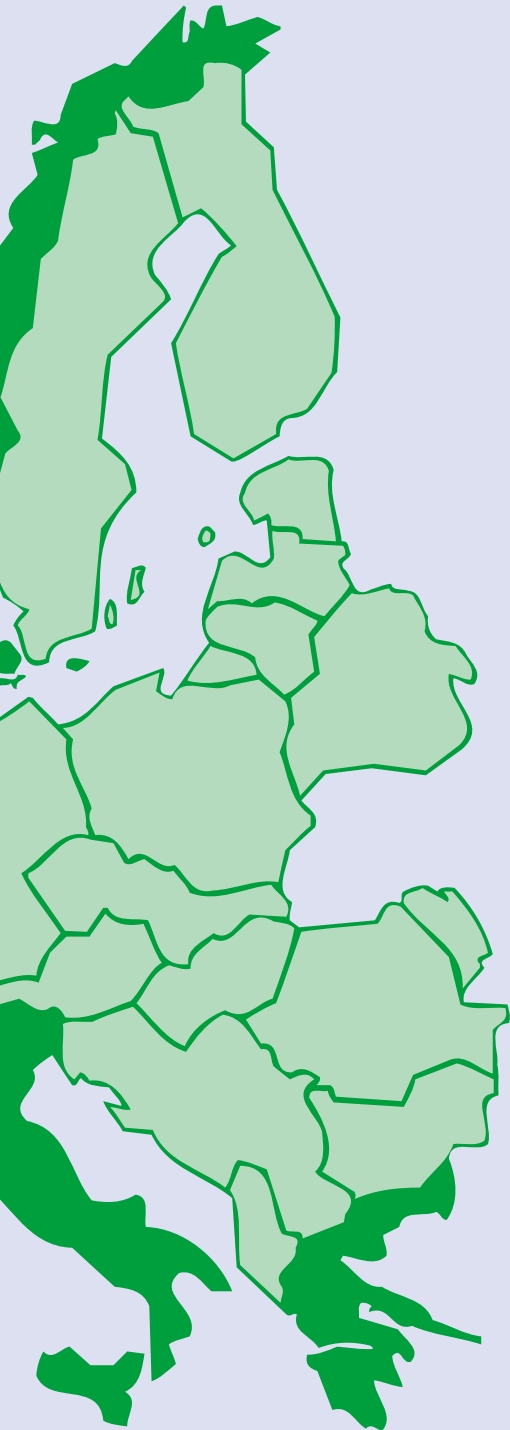
During the establishment of the CoCo consortium the intention was to make contact with those regions in Europe which had most experience within EDI in the primary health care sector in each country. All the participating CoCo regions are therefore either officially appointed national test areas, or leading projects in the area. And it is therefore also the long-term strategy to build up a national health care data network in the participating countries, based partly on the experiences of the CoCo regions.



# MedCom's EDIFACTs

In total over 100 GPs, over 30 hospitals, 20 health centres, 12 universities, 7 national telecommunications companies and 50 IT system houses are taking part in CoCo.

*continued on page 28*



The five EDIFACTs used in the Danish health care data network are:

MEDREQ for requisitions and MEDRPT for the results of bio-chemical laboratory investigations, further microbiological investigations, and some histo-pathological and nuclear medical investigations. MEDREF for referrals and MEDDIS for discharge letters. This also applies to referrals for, and the results of, X-ray investigations, ultrasound diagnostics, nuclear medical investigations and clinical physiological investigations and the areas of casualty and obstetrics.

MEDRUC for the submission of reimbursement messages, including reimbursement between GP's and the national health insurance, between pharmacies and the national health insurance, reimbursement between the municipality of Copenhagen and the local pharmacies, notification of information to the National Board of Health's drug statistics, and the drug statistics database between the National Board of Health and the Danish Pharmaceutical Association. MedCom also uses an acknowledgement message, CONTRL, which was not specifically designed for messages in the health care sector. The acknowledgement message can be used to approve or reject a message or part of such and to acknowledge receipt of the message following a syntax check.

## What?

In exactly the same way as occurred in the big regional Danish EDI projects and in MedCom, the intention is to build up regional health care data networks in the individual regions in Europe. And just as happened in MedCom, a number of central CoCo LINK activities have been established accordingly to provide the regions with standards, standardisation tools, etc. In the light of the standardisation experience from MedCom (and similar experience in Norway and Britain), the standards will be based on a CEN sub-sub-set from the start. These standards are as pragmatic, narrow, concrete and simple as possible, based on the national MIGs and data lists which have already been tested in some of the participating countries. The aim is to "expand" these national standards so that, in the course of the process, a single European CoCo standard is developed which is capable of functioning in all regions. Pilot projects will be established in Denmark to test out whether these standards can func-

tion here - but, since the starting point is largely the Danish MedCom standards, the European CoCo standards are not expected to be vastly different.

CoCo also includes a three-stage strategy for the long-term development of a regional health care data network. In the strategy the "heaviest" existing information flows in the health care sector (prescriptions, laboratory results, etc.) will be used to provide a market lift for a gradual introduction of new and more advanced communication flows:

- First, standards will be developed and implemented for the most frequently used messages in the health care sector: prescriptions, laboratory results, discharge letters, etc.
- The next standards will be developed which cover previously unmet communication needs in the health care sector: communication with the home nurses, communication of excerpts from records in connection with joint

treatment of certain patient groups between a GP and hospital laboratories, etc.

- Finally, communication standards will be developed for image and multimedia communication.

## Why?

The majority of communication in the health care sector is regional and only a negligible part takes place across national borders. So why take part in building up a European health care data network? And why develop common European standards for this communication? Why devote Danish resources to this task? Although the CoCo project has received EU support, the economic benefits for Denmark are small.

On the minus side, it has been necessary to invest considerable resources in order to take part.

On the plus side, the EU has granted DKK 5.7 million in total to the Danish partners and thus Denmark will receive financing for some of the activities it had already planned.

This means that the EU is financing:

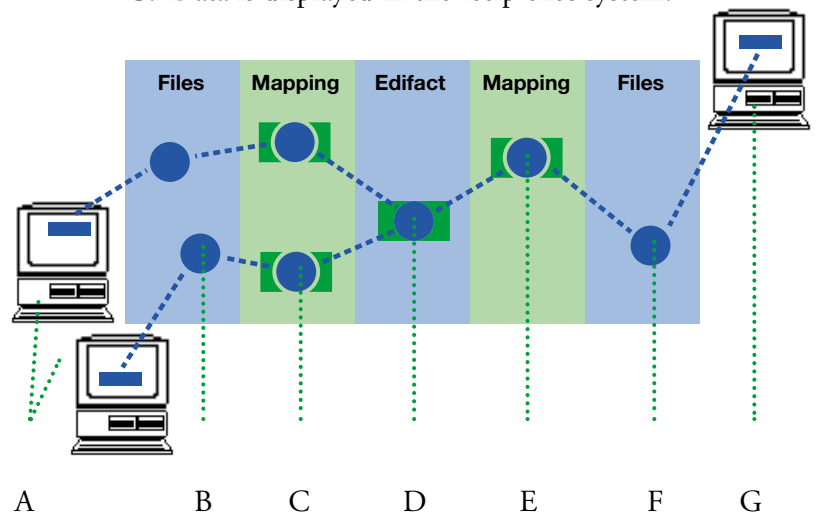
- Denmark becoming visible in a high-tech field and being able to influence the European standardisation process.
- Denmark making European contacts and gaining experience within research and development in an important area for future expansion (telematics and telecommunication).

### CoCo regions:

<b>Denmark:</b>	Some of MedCom's pilot projects, Funen County and the municipality of Odense
<b>Northern Ireland:</b>	S&E Belfast Health Trust
<b>Eire:</b>	NW & NE Health Board
<b>Greece:</b>	Rhodes
<b>Holland:</b>	Zwolle
<b>Italy:</b>	Lombardy
<b>England:</b>	Oxford, Suffolk and Ipswich
<b>Canada:</b>	Prince Edward Island
<b>Norway:</b>	Western Health Region
<b>Spain:</b>	Catalonia and the Balearic Islands

- Danish trade and industry being able to utilise its head-start to establish exports of services to regional health care data networks, the European market being worth something in the order of 1-2 billion ECU. The company RAMBOLL has established exports to Ireland on the basis of this.
- the development of a European market for health telematics, which would mean electronic communication in the health care sector becoming radically cheaper.
- we, as professionals in the Danish health care sector, can learn a lot from the contact with colleagues in the other European countries.
- the fact that European contacts can assist in obtaining further funds from the EU, e.g. Funen county has received DKK 1m in connection with the Prestige project and DKK 0.7m for the Primacom project, and MedCom DKK 0.8m for the WISE project; moreover, CoCo will have great opportunities to obtain extra grants in connection with the planned top-up grants from the EU in May 1999.

- The same data may be shown differently in different systems.
- Data, e.g. the name of the patient in a GPs' system file.
- Information on the type, size and position in the EDIFACT is added.
- Placed in a predetermined position in the EDIFACT.
- Type and size are read off. Extra information is removed.
- Data is placed in the receiving file.
- Data is displayed in the recipient's system.



## Automatic communication

Data in the IT systems connected to the data network is automatically reformatted to the EDIFACT format. The reformatting is carried out using mapping tables which vary from one IT system to another, explains Steen Mariboe, MedCom's project co-ordinator.

"Protocol conversion is necessary in order for communication to be possible between different types of IT systems. This part of the communication is carried out by a network supplier - a VANS supplier - who is thus the link between the parties on the network."

# MedCom II

MedCom's steering committee has decided to propose to the granting organisations that a three-year continuation of the MedCom project be established, known as MedCom II, with a total budget of DKK 25m. MedCom II would have the following main tasks:

1. To encourage the rapid spread in the Danish health care sector of the communication standards developed in the period 1995-96.
2. To develop further communication standards and test these in pilot projects as an extension of the first MedCom project, including standards for use in connection with the introduction of electronic health care records, hospital waiting times and electronic scheduling (booking).

## Spread

MedCom II is to encourage the spread of electronic communication in the health care sector by providing information material concerning the possibilities and advantages of EDI communication. In addition, the

organisation should have the task of providing advice in connection with concrete projects within the sector in which EDI communication is introduced.

MedCom II's first priority in the initial years is thus to secure the rapid spread of the communication standards developed in 1995-96, with a view to achieving usage of 75% - equivalent to over 23 million messages per year - by the year 2000.

In concrete terms, this means:

- A. Implementation of a project for transition to the new standards in spring '97.
- B. Implementation of a number of dissemination projects in co-operation with interested counties, etc. The task will be to implement electronic communication between the parties in the health care sector using MedCom's standards.
- C. Ongoing quality assurance and co-ordination.

## New standards

As an extension of the MedCom project carried out to date, continuous consideration should be given to developing and testing new communication standards. Amongst the types of messages/areas of communication which may be relevant are:

- sending information on waiting times at hospitals to general practitioners
- communication standards in relation to electronic patient records
- booking
- gathering of data for clinical databases
- statistical reports
- administrative information between the IT systems of health specialists, including patient ID
- internal information between IT systems in the hospital which were supplied by different suppliers
- death certificates
- image and multimedia communication.

## It is important

- that the MedCom standards are supported by the health authorities
- that a nationwide transition to the new MedCom standards is completed in 1997
- that the MedCom standards developed remain unchanged until substantial use of these has been achieved
- that MedCom's standards are attempted to be used unchanged in connection with other similar communication needs in the health care sector, e.g. for equivalent communication between hospitals, between specialists and general practitioners, between laboratories, hospitals and so on.

# “The Mailbox” - a node

## The National Board of Health to act as the authority

The development and project orientation tasks connected with the establishment and development of a Danish health care data network will be carried out by MedCom II, whilst the tasks which fall to the authorities and maintenance tasks, including “adoption” in connection with EDI communication and the message standards applied, will be carried out by the EDI Secretariat placed in the National Board of Health.

The tasks of the authority include:

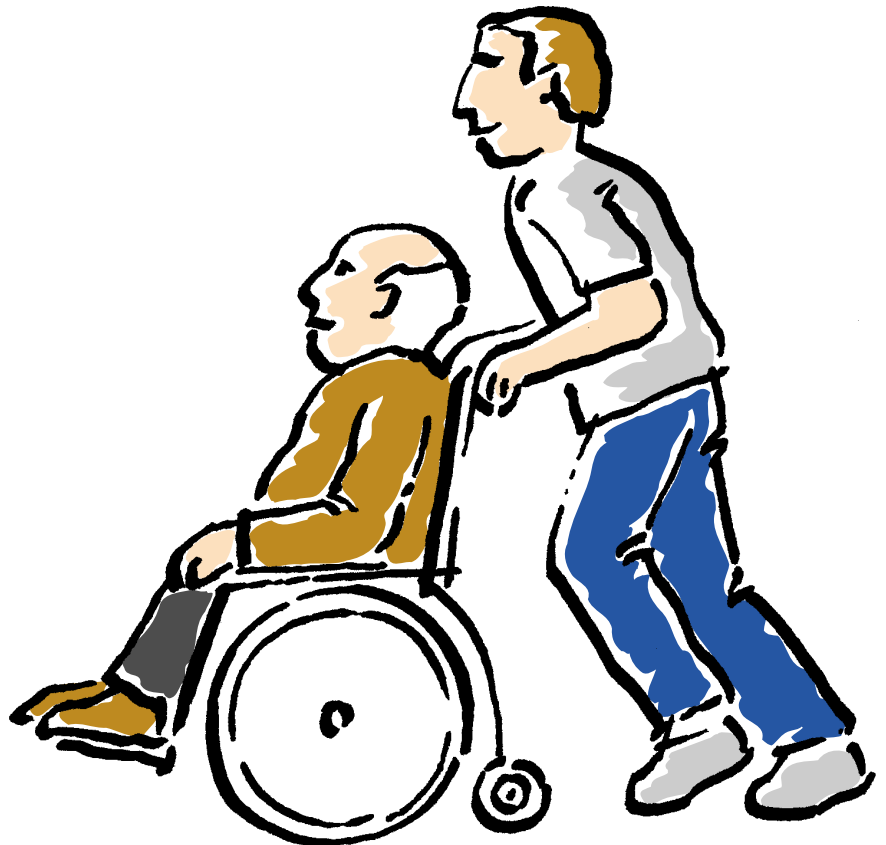
- Participation in EDI standardisation work at national and international level
- Development and distribution of codes and classifications
- Safety aspects
- Development and implementation of test and certification procedures
- Expert maintenance, updating, user profiles and version management of MedCom’s EDI standards
- Assignment and administration of location numbers
- General overall co-ordination and information regarding the tasks of authorities

The electronic mailbox provided by the network supplier acts as a node in the health care data network, where the messages can be delivered and collected when the sender and recipient wish.

The use of the mailbox means that users of the data network are not restricted to sending or receiving if or when the other party is ready or has the computer turned on.

Another advantage of building up the health care data network around a common node is that independent links do not have to be established between a great number of parties who communicate with some or all of the others.

Each party establishes one connection to the common platform, the health care data network’s mailbox, and through this is linked to all users of the agreed EDIFACTs.



# Organisation and participants

## The Steering Committee

MedCom's steering committee is made up of the financing parties. The committee has had overall responsibility for the execution of the project. The Danish Ministry of Health has acted as secretariat and chair of the steering committee.

### Members:

Nielsen, Vagn, head of department,  
Ministry of Health (Chairman)  
Vestergård, Leif, head of administration,  
Vejle County Council (deputy chairman)  
Gylling, Svend, consultant, Copenhagen  
Hospital Corporation  
Jensen, Henrik Bjerregaard, project manager,  
MedCom  
Jensen, Ida Sofie, head of department,  
the Association of County Councils in Denmark  
Jensen, Keld Gert, development manager,  
Tele Danmark  
Korsgaard, Stig, cand.polyt.,  
National Board of Health  
Lund, Palle, director, Funen County Council  
Mark, Agner, director, Dan Net A/S  
Mikkelsen, Ole, director, Kommunedata I/S  
Munk, Karsten, special consultant,  
Ministry of Health  
Nielsen, Kresten, GP, the Medical Association  
Olesen, Lene Hübertz, pharmacist,  
the Danish Pharmaceutical Association  
Pedersen, John Erik, office manager,  
Ministry of Health

## Project management and project staff

Everyday management was carried out by a project manager who had responsibility for the implementation of the project and for planning and prioritisation of the tasks, including internal organisation, accounts and maintenance of the budget.

### Staff:

Jensen, Henrik Bjerregaard, project manager  
Henriksen, Gitte, secretary  
Johansen, Ib, consultant  
Bernstein, Knut, consultant, physician  
Mariboe, Steen, project co-ordinator  
Hansen, Maj-Britt Meyer, secretary

## Working parties and co-ordination groups

Three advisory groups were set up in connection with the implementation of the project, along with an "EDI group" and a "code group", which carried out standardisation tasks for MedCom.

### The advisory group

had the aim of advising the project in the start-up phase with a view to the elaboration of a project description and project handbook. The advisory group consists of specialists within the

fields of EDI, standardisation, technology and the medical areas involved. The advisory group consists of experts and users of various subject areas, e.g. standardisation, technology, medical specialities, etc.; in addition, all the key people from the previous Danish regional projects were also members.

### Members:

Jensen, Henrik Bjerregaard,  
project manager, Danish Centre for Health  
Telematics (Chairman)  
Bernstein, Knut, project leader,  
Danish Centre for Health Telematics  
Christensen, Niels Jørgen, cand.scient.,  
Århus County Hospital  
Erbs, Kjeld, head of section, Århus County Council  
Grinsted, Per, GP-coordinator,  
Odense University Hospital  
Jensen, Frank I., head of department,  
Vejle County Council  
Jensen, Michael Voel, IT manager,  
the Danish Pharmaceutical Association  
Johansen, Ib, consultant,  
Danish Centre for Health Telematics  
Jørgensen, Anders Kristian, departmental  
manager, Dan Net A/S  
Klamer, Finn, GP, Øster Jølby  
Korsgaard, Stig, cand.polyt.,  
National Board of Health  
Korsholm, Niels, director, Fischer & Lorenz A/S  
Lehrmann, Tove, project leader,  
Danish Centre for Health Telematics  
Mariboe, Steen, project co-ordinator,  
Danish Centre for Health Telematics  
Mark, Jan, consultant, Kommunedata I/S  
Munk, Karsten, special consultant,  
Ministry of Health  
Parker, Jens, GP, The Health Centre, Copenhagen  
Ring, Peder, consultant, the Association of  
County Councils in Denmark  
Theilgaard, Jesper, GP, The Health Centre,  
Bramdrupdam

### The project management group

was MedCom's basic co-ordination group during the execution of the project. The project management group was made up of the project managers from each of the participating regions in MedCom. The project managers were locally responsible for the implementation of the regional projects - and the pilot projects' contact with MedCom. The project managers were typically IT managers from the participating county councils and laboratories.

### Members:

Christensen, Bente, IT co-ordinator,  
Kolding Hospital  
Erbs, Kjeld, head of section, Århus County Council  
Gylling, Svend, consultant, Copenhagen  
Hospital Corporation  
Henriksen, Tom Onsberg, IT consultant,  
Ribe County Council

Hjerresen, Kristian,

South Jutland County Council  
Hvolris, Henrik, IT-coordinator, Hvidovre Hospital  
Jensen, Frank I., head of department,  
Vejle County Council  
Jørgensen, Henrik Munk, IT co-ordinator,  
Køge Hospital  
Larsen, Ib Alfred, IT Manager, Hillerød Hospital  
Lehrmann, Tove, project leader,  
Danish Centre for Health Telematics  
Madsen, Peer Sloth, IT co-ordinator, specialist,  
Hillerød Hospital  
Nielsen, Birgit, Storstrøm County Council  
Nielsen, Grethe, systems planner,  
North Jutland County Council  
Nielsen, Lis Lund, IT assistant, Horsens Hospital  
Parker, Jens, GP, The Health Centre, Copenhagen  
Pedersen, Peter, consultant, Bispebjerg Hospital  
Porsborg-Smith, Jeffrey, departmental manager,  
North Jutland County Council  
Poulsen, Frank V., deputy head of section,  
the Department of Health  
Ravndam, John, financial manager, Copenhagen  
General Practitioners' Laboratory  
Sprøgel, Ole, National Serum Institute  
Svanholm, Åge, Storstrøm County Council  
Svendens, Bente R., Vejle County Council  
Øtoft, Ely, senior clerk, Ribe County Council

### The EDI group

carried out all the standardisation work in MedCom, including the elaboration of the EDIFACT STANDARDS used and associated implementation guidelines (MIGs - Message Implementation Guides). In addition, a code group was appointed with the purpose of facilitating the use of codes and classifications in MedCom and supporting the Board of Health's work on getting uniform, nationwide codes and classifications established in the Danish health care sector. The EDI group was made up of all the Danish members of the international standardisation bodies CENT251-WG3 and EPOS-MD9.

### Members:

Christensen, Niels Jørgen, cand.scient.,  
Århus County Hospital (chairman)  
Eriksen, Poul Willy, consultant, Novax  
Hensing, Thomas, consultant, Dan Net A/S  
Jensen, Henrik Bjerregaard, project manager,  
Danish Centre for Health Telematics  
Korsgaard, Stig, cand.polyt.,  
National Board of Health  
Mariboe, Steen, project co-ordinator,  
Danish Centre for Health Telematics  
Mark, Jan, consultant, Kommunedata I/S  
Schlamovitz, Mogens, consultant, MOS Informatik  
Theilgaard, Jesper, GP, The Health Centre,  
Bramdrupdam

## Suppliers

A total of 24 IT suppliers representing 29 different IT systems took part in MedCom - accounting for 80% of all IT systems relevant to communica-

# The development continues

tion in the Danish health care sector. The IT suppliers were involved in the individual pilot projects and were active in the standardisation work, attending supplier meetings, courses and "loose ends" rounds in MedCom. In addition, the VANS firms Dan Net and Kommunedata were suppliers of EDI-MANAGER and EDI-TUTOR products as well as VANS services, and both were particularly active in the standardisation.

## Suppliers

ADBakt, the County Hospital in Herlev,  
Peter Steenberg  
Apex, Datasupport A/S, Henrik Thuren Jensen  
B-Data A/S, Ivan Christensen  
BEMA, Jesper Egebak Jensen  
Cito Data A/S, Bo Nielsen  
Dan Net A/S, Anders Kristian Jørgensen  
Dansk Datalab ApS, Henrik Ishøj  
Datapharm A/S, Allan Giese  
DEClab/CRI, Mogens Schlamovitz  
Docbase A/S, John Aggerholm  
EMAR, EM-data A/S, Jens Traberg  
EDB-gruppen Systems, Knud Erik Hovgaard  
Frb-Sys, Hillerød Hospital, Ib Alfred Larsen  
Fyn-Sys, Funen County Council, Ole Søndergaard  
Ganglion, Aver & Lauritzen ApS,  
Jens Christian Lauritzen  
I-praksis, RAMBOLL, Morten Bruun-Rasmussen  
IBM DANMARK A/S, Stig Pedersen  
Kodak, Per Iversen  
Kommunedata I/S, Jan Mark  
Kommunedata I/S, Mogens Koefoed  
Kommunedata I/S, Per Frey  
LABKA, Dansk Datalab ApS, Uffe Christiansen  
Medex, RAMBOLL, Morten Bruun-Rasmussen  
MIDOC, Michael Johansen, EG Data Inform  
Multimed, Datagruppen Vejle A/S, Erik Jacobsen  
NOVAX, Nordteamgruppen A/S, Erling Abildgaard  
PC-Idé/PC Praxis, Jørgen Block-Petersen  
PLC, A-Data ApS, Jørgen Granborg  
S.T. Data, Søren Thygesen Data, Søren Thygesen  
VGLIMS, Datacentralen A/S  
Æskulap, Ascott Software A/S, Ivan Andersen

## Key people in the pilot projects

Around 200 key people took part in MedCom's pilot projects from nine counties, the National Serum Institute, Copenhagen General Practitioners' Laboratory, 12 hospitals, 80 doctors' practices and 10 pharmacies.

Bispensgade Practice, Aalborg  
Torvestræde 8 Practice, Næstved  
Østerbrogade 33 Practice, Nykøbing F  
Spentrup Practice, Spentrup  
Dommervænget Health Centre, Roskilde  
Adeler, Haagen, GP, Århus C  
Andersen, Henning Ejbye, GP, Frederikshavn  
Andersson, Britt Sylvester, secretary,  
Horsens Hospital, Horsens  
Andreassen, Erling, senior physician,  
Kolding Hospital, Kolding

*continued on page 34*

It is realistic to believe that the remaining parties in the Danish health care sector will connect to the health care data network in the coming years and that a substantial part of the communication in the primary health care sector will take place electronically before the year 2000. Denmark is thus the first country in Europe to establish a functioning, nationwide health care data network.

After 1996 communication will also be expanded to include new forms. EDIFACT trials have already been started for communication between local authorities and hospitals, GPs and pharmacies. In addition, there is great interest in "interactive EDI" in the form of the booking of treatment and investigations at hospitals directly from the GPs. And finally, image and multimedia communication will also be highly important in the health sector in the future. An existing health care data network will probably mean that this development takes place considerably faster than in other countries.



## Odense has started

"The idea of involving the local authorities as an active part of the health care data network led to Funen County Council contacting Odense Local Authority and the Association of Local Authorities in Denmark," relates Anne-Mette Oudrup, project manager of FynCom Municipality.

"Both parties were positive.

Where Odense Local Authority has become involved in the development of the actual data network solution, the National Association of Local Authorities is involved in the project first and foremost in order to ensure that the solution can be extended to other local authorities, both large and small."

# Organisation and participants

continued from page 33

Ankjær, Annelise, IT consultant, Hillerød Hospital, Hillerød  
Arends, Peter, pharmacist, Bagsværd Pharmacy, Bagsværd  
Arendtsen, Lise, senior laboratory technician, Hvidovre Hospital, Hvidovre  
Arvelind, Finn, GP, Copenhagen K  
Baandrup, Ulrik, senior physician, Århus Municipal Hospital, Århus C  
Bak, Ole, GP, Rødning  
Banke, John, GP, Vejle  
Bencke, Susanne, Randers Central Hospital, Randers  
Bisjær, Niels, senior physician, Randers Central Hospital, Randers  
Bjørnshave, Thomas, The Health Centre, Års Borgen, Gitte, Næstved Central Hospital, Næstved  
Borum, Torben, Århus County Council, Højberg  
Bundgård, Minna, secretary, Farsø Hospital, Farsø  
Campell, Kirsten Skov, systems planner, IT department, Esbjerg  
Christensen, Anni, IT technician, Esbjerg Central Hospital, Esbjerg  
Christensen, Ole, Esbjerg Krone Pharmacy, Esbjerg  
Christensen, Ole Holst, GP, Vordingborg  
Christensen, Peter, Skødstrup Medical Practice, Skødstrup  
Christoffersen, Claus, gynaecologist, Brønshøj  
Damsgaard, Kristine, senior secretary, Odense University Hospital, Odense C  
Dernecke, Rungø & Nilsson, The Health Centre, Svendborg  
Dissing, Helle, secretary, Hvidovre Hospital, Hvidovre  
Dybdahl, Knud, GP, Esbjerg  
Edelmann, Ulrik, GP, Randers  
Eg, Bodil & Jørgen Winther, Medical Practice, Randers  
Engelholm, Anni, GP, Brønshøj  
Engsig-Karup, Mogens, Århus County Council, Højberg  
Erin-Madsen, Jes, senior physician, Horsens Hospital, Horsens  
Fjeldgård, Bruno, programmer, North Jutland County Council, Aalborg East  
Frederiksen, Lars, Nygårdsvej Practice, Esbjerg  
Frimodt-Møller, Hans & Hans-Christian Møller, Medical Practice, Copenhagen K  
Frydenlund, Elise, senior secretary, Odense University Hospital, Odense C  
Fryd & Gunnersen, Medical Practice, Copenhagen N  
Gade, Janni, Aalborg Hospital, Aalborg  
Grøn, Anna, secretary, Hjørring Hospital, Hjørring  
Gudixsen, Ann Lilholt, IT assistant, Farsø Hospital, Farsø  
Götzsche, Henrik, The Health Centre, Brædstrup  
Hansen, Anette Gadegaard, GP, Copenhagen Ø  
Hansen, Anni, Copenhagen General Practitioners' Laboratory, Copenhagen K  
Hansen, Ernst, GP, Haderslev  
Hansen, Ingelise, pharmaceutical assistant, the Danish Pharmaceutical Association, Copenhagen K

Hansen, Janne Voss, senior secretary, Aalborg Hospital South, Aalborg  
Hansen, Margaretha H, IT Centre, Esbjerg  
Hansen, Per Blicher, The Health Centre, Vejby  
Hansen, Peter Würigler, GP, Odder  
Haugbølle, Nils, GP, Copenhagen K  
Hauge & Grove, The Health Centre, Farsø  
Hedemand, Niels, senior physician, Haderslev Hospital, Haderslev  
Hem, Johannes, GP, Odense SV  
Henningesen, Poul, RAMBOLL, Odense NV  
Henriksen, Hans Erik, IBM, Kolding  
Henriksen, Karen, senior secretary, Århus Municipal Hospital, Århus  
Henriksen, Marianne, The Central Hospital, Nykøbing-Falster  
Henriksen, Rita, IT user consultant, the IT Centre, Esbjerg  
Hjortkjær, H., J. Kongstad, Medical Practice, Copenhagen N  
Hvid-Hansen, Ole, The Health Centre, Tommerup  
Høst, Arne, managing senior physician, Odense University Hospital, Odense C  
Ibsen, Vera, Vejle County Council, Vejle  
Jacobsen, Klaus Berggren, GP, Copenhagen S  
Jakobsen, Jakob R., Vejle County Council, Vejle  
Jensen, Anette Palm, National Serum Institute, Copenhagen S  
Jensen, Flemming, GP, Greve  
Jensen, Hans Jacob, GP, The Health Centre, Odense C  
Jessing, Lone, secretary, Kolding Hospital, Kolding  
Johnsen, Bodil, GP, Copenhagen V  
Jøhnk, Hanne, GP, Copenhagen N  
Jørgensen, Hilburg, Smutten Health Centre, Hjørring  
Jørgensen, H. Ask & F.E. Kaup, the Health Centre, Næstved  
Kaae, Tove, head consultant, Odense University Hospital, Odense C  
Kastfeldt, Stine, IT assistant, National Serum Institute, Copenhagen S  
Kirkegaard, Jens, GP, Nykøbing Falster  
Kjær, Ole W., GP, Vejle  
Klestrup, Lene, consultant, Kommunedata I/S  
Kundsén, Ulf, head of section, Randers Central Hospital, Randers  
Knudsen, Hans-Jørgen Vendelbo, GP, Copenhagen Ø  
Kolby, Peter, GP, Næstved  
Kold, Niels, radiographer, Aalborg Hospital North, Aalborg  
Korsgaard, Ove, Esbjerg Central Hospital, Esbjerg  
Kowacs, Ferenc, GP, Copenhagen Ø  
Krarup, Ole, GP, Nakskov  
Kristiansen, Jane, assistant, North Jutland County Council, Aalborg East  
Kristiansen, Kirsten, the IT Centre, Esbjerg  
Kruise, Verner, senior physician, Aalborg Hospital North, Aalborg  
Landt, Bodil, laboratory technician, Hvidovre Hospital, Hvidovre  
Larsen, Jane, secretary, Give Hospital, Give  
Larsen, Preben, GP, Køge  
Lassen, Torben, GP, Vanløse

Leth, Inge, The IT Centre, Esbjerg  
Lindskov, Jørgen, managing senior physician, Farsø Hospital, Farsø  
Lindskov, Rune, Gerda Frenzt, Willy Wolf Avrach, Mads Nielsen, The Skin Clinic, Copenhagen V  
Lund, F.N., Swane & K. Billekop, The Health Centre, Nykøbing F  
Madsen, Anders Gram, IT consultant, Hillerød Hospital, Hillerød  
Madsen, Finn, the Danish Pharmaceutical Association, Copenhagen K  
Madsen, John, BEMA, Hjørring  
Madsen, Søren, GP, Oksbøl  
Mathiassen, Elkær, director, EM-data A/S, Vejle Ø  
Mayntzhusen, Pia, senior laboratory technician, Århus Municipal Hospital, Århus C  
McNair, Peter, senior physician, dr.med., Hvidovre Hospital, Hvidovre  
Messerschmidt, Birger, National Serum Institute, Copenhagen S  
Michaelsen, Peter, Hvidovre Hospital, Hvidovre  
Mikkelsen, Else, National Serum Institute, Copenhagen S  
Møller, Karin & Torben, The Health Centre, Copenhagen K  
Nielsen, Bente, GP, Copenhagen V  
Nielsen, Birthe, the IT Centre, Esbjerg  
Nielsen, Jan Bruhn, Kaas Health Centre, Pandrup  
Nielsen, Jan Erik, GP, Copenhagen V  
Nielsen, Jørgen, Vamdrup Health Centre, Vamdrup  
Nielsen, Kresten, GP, Mallings  
Nygård, Anne, secretary, Aalborg Hospital North, Aalborg Hospital  
Nyland, Nick, GP, Esbjerg V  
Nørregaard, Flemming, GP, Copenhagen N  
Olsen, Dorte, Odder Central Hospital, Odder  
Olsen, Paul P., GP, Esbjerg  
Oxholm, Anne Mette, GP, Frederiksberg C  
Pedersen, Berrit, senior secretary, Hjørring Hospital, Hjørring  
Pedersen, Frank, IT manager, Århus Municipal Hospital, Århus  
Pedersen, Poul, pharmacist, Svane Pharmacy, Århus C  
Pedersen, Susanne, laboratory technician tutor, Hvidovre Hospital, Hvidovre  
Petersen, Marianne, laboratory technician, Hvidovre Hospital, Hvidovre  
Petersen, Poul Henrik, consultant, Kommunedata I/S, Århus N  
Pilgaard, Dorte, Ribe County Council IT Centre, Esbjerg  
Poulsen, Ole Eckhardt, GP, Jyllinge  
Poulsen, Stig Hempel, GP, Copenhagen NV  
Poulsen, Ulla, pharmacist, Vejen Pharmacy, Vejen  
Rasmussen, Jan, senior physician, Vejle Hospital, Vejle  
Rost, Dan, GP, Christiansfeld  
Ruhwald, Jørgen, GP, Copenhagen V  
Rønhof, Kim, GP, Svendborg  
Samsig, Paul D., A-DATA ApS, PLC, Frederiksberg  
Schlarbusch, Christian, senior physician, Give Hospital, Give  
Schroll, Henrik, GP, Odense M

# MedCom II in Odense

On conclusion of the first MedCom project at the end of 1996 it was decided that, in purely physical terms, MedCom II should be located at MedCom's previous address at the Danish Centre for Health Telematics in Odense, where MedCom II will share premises with the FynCom county and local authority projects.

At the same time it was decided that MedCom II should be manned by a project manager, three consultants and two administrative assistants. The project manager is expected to be appointed early in 1997.

Schulsinger, Charlotte, GP, Copenhagen K  
Siboni, Knud, senior physician, professor, dr.med.,  
Odense University Hospital, Odense C  
Sigh, Poul, GP, Viuf  
Silbye, Hanne & Peter, The Health Centre, Køge  
Sinding, Ruth, ontologist, Copenhagen K  
Skjold, Per, GP, Copenhagen S  
Skov, Bjarke, GP, Skanderborg  
Sparre, Jørn, GP, Copenhagen S  
Stabel, Niels J., GP, Give  
Stenvald, Henrik, GP, Horsens  
Svensson, Niels, GP, Maribo  
Sølvkjær, Martin, doctor, Højbjerg  
Søndergaard, Ole G., development manager,  
the IT office, Odense University Hospital,  
Odense C  
Søndergaard, Ole, GP, Frederikshavn  
Sørensen, Bodil, secretary,  
Esbjerg Central Hospital, Esbjerg  
Theilgaard, Jesper, GP, Kolding  
Thomassen, Helle, Randers Central Hospital,  
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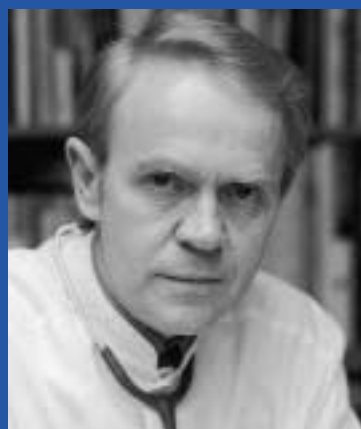
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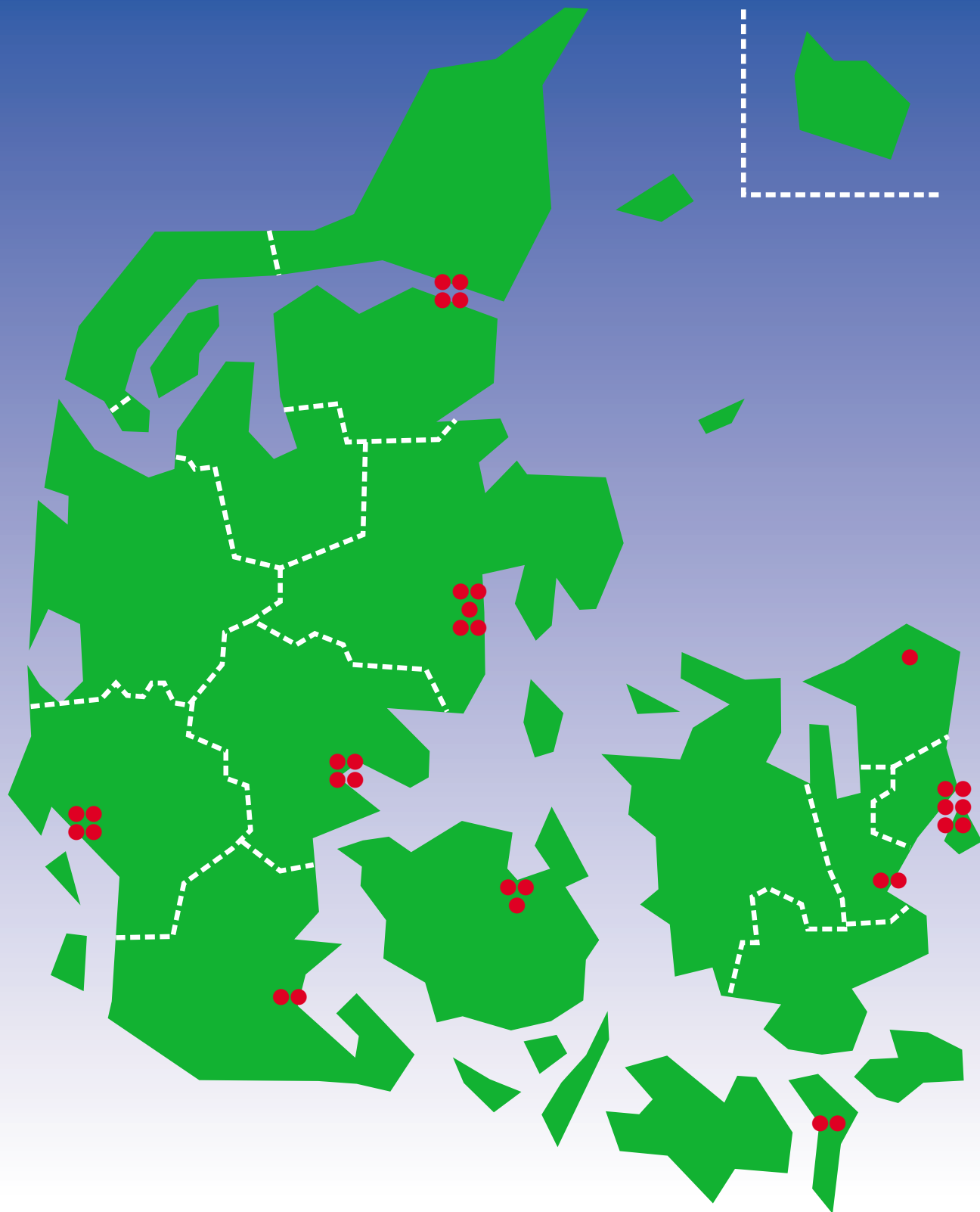
## The future is here

GP Finn Klamer has taken the first of many steps towards the practice of the future. For example, he has facilities for receiving digital images which are loaded directly into electronic patient records. With extended data communication he will quickly be able to send the same pictures to a specialist to get an opinion and advice on

the further treatment of the patient.

Finn Klamer is also able to transmit the readings for a patient with heart problems directly from their home to the patient's records in the clinic, via a portable computer.

"Naturally, the same readings should be able to be transferred through the health care data network to specialists who can advise on treatment," says Finn Klamer.



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