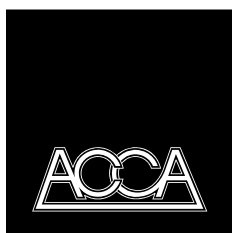




The cost benefit of electronic patient referrals in Denmark full report



The cost benefit of electronic patient referrals in Denmark

This report is published by ACCA and MedCom in collaboration with the European Commission Information Society Directorate – General.

Note: A summary of this report titled '*The cost benefit of electronic patient referrals in Denmark – summary report*' is available from www.accaglobal.com or www.medcom.dk

Authors

Ms Sharon Cannaby, ACCA

Mrs Christina E Wanscher, Danish Centre for Health Telematics

Mr Claus Duedal Pedersen, MedCom

Mr Henning Voss, MedCom

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Foreword

We are facing major challenges in the delivery of health services. We have an ageing population; we all expect to live longer and in better health; there are new medical techniques that improve the quality of life. Overall, health services are set to absorb an increasing part of our national and personal income. To meet these demands whilst containing costs we have to innovate in health service delivery.

As this report demonstrates, e-Health is one of the crucial contributors to these much needed efficiency gains. The case study of the Danish hospital referral system shows that the technology is mature and that it can deliver cost savings. According to the survey at current levels of use it saves 1 million € each year over paper based systems. If all referrals were sent electronically this could rise to 3.5 million € per year. In short, full electronic referral can cut costs by 25%.

This is just one case study and it needs to be checked against examples in other countries. But one can start to imagine the impact of e-Health when taken to European level and spread to other applications.

To me, this is what a European approach to e-Health should be about: spending euros on patients not paperwork!

e-Health is also one of fastest growing sectors of the health services industry. It is already the third largest, after pharmaceuticals and medical devices. And Europe is prominent in both the supply of high technology systems and in the application of e-Health. For example, Europe leads in the use of electronic health cards and records.

But the report also shows that e-Health faces many barriers to adoption, not least fear of technology and the difficulty we all face in changing our routines. This is why the Commission launched the 2004 Communication *'e-Health – making healthcare better for European citizens: An action plan for a European e-Health Area'*. This ambitious plan gives impetus to the Member States on how to implement proven e-Health solutions. But we need to work harder to help people see the benefits.

I therefore welcome this report and congratulate ACCA (the Association of Chartered Certified Accountants) and the Danish Centre for Health Telematics, who have produced it in association with my services.

The report helps gives hard evidence that e-Health delivers better services and more efficient services. Now let's build on this evidence to open the door to tomorrow!



Viviane Reding

Commissioner for Information Society and Media

With ever escalating health costs across the European Union (EU) as the population lives longer, patients' expectations regarding the capacity of and access to health services are understandably growing. Governments have embarked on a continuous search for new and better methods of delivering healthcare more efficiently and effectively.

One method to emerge with compelling prospects for enhancing the quality and effectiveness of patient care is e-Health.

I welcome the long-standing support by the European Commission to the development of e-Health initiatives, including the EC Communication on '*e-Health – making healthcare better for European citizens: An action plan for a European e-Health Area*' [COM (2004) 356 final]. This describes how e-Health, combined with organisational change and the development of new skills, can be used to 'deliver significant improvements in access to care, quality of care and the efficiency and productivity of the health sector'.

If governments are to be persuaded to invest in e-Health systems, however, proven qualitative benefits may not be enough; there must also be realisable quantitative benefits. Numerous studies have been undertaken that demonstrate the qualitative benefits that e-Health brings to patient care but little research has been undertaken into the quantitative benefits.

ACCA (the Association of Chartered Certified Accountants), in co-operation with the European Commission, conducted a study to help redress that balance. The study, which investigated the cost benefits that could be derived from the introduction of electronic patient referrals in the Danish Health Sector, is an important contribution to the base of evidence building up across the EU that there are indeed cost benefits to GPs and hospitals arising from the introduction of ITC (information technology communications) in healthcare.

ACCA is to be congratulated in undertaking this study which contributes to the EU's strategic goal of encouraging increased ITC investments in healthcare and presents a fresh approach to financial analysis in this area.

The challenge for the future remains one of sharing best practice across the EU healthcare sector, based on the empirical research such as the one in this joint ACCA/EC study.

John Bowis MEP

Co-ordinator of the EPP-ED Group on the European Parliament's Committee on the Environment, Public Health and Food Safety

Executive summary

There is little doubt that applying information and communication technology to healthcare (e-Health) delivers qualitative benefits to patient care, but do they bring any cost benefits? This is the question that the European Commission Information Society Directorate – General (DG INFSO) (now called the Information Society and Media Directorate-General) asked ACCA (the Association of Chartered Certified Accountants) and the Danish Centre for Health Telematics (MedCom) to investigate.

Denmark has been a prolific implementer of electronic communication in healthcare since the late 1980s; over 2.5¹ million electronic messages are now sent each month and the vast majority of hospitals, general practitioners (GPs), laboratories and pharmacists are able to correspond using electronic communication.

As there are so many different types of electronic message a full analysis of the cost benefits of all electronic communication across the Danish healthcare sector would have taken significant resources, both in time and money. It was therefore decided to restrict the study to just one message type: patient referrals to hospital. Nearly 60%² of patient referrals to hospital in Denmark are still paper-based, so the study looked at the difference in costs between electronically transmitted referrals and referrals sent by post or fax.

There were four main stages to the study:

- mapping the information flow between GP and hospital when a patient is referred to hospital
- undertaking a time and motion study for each of the different information flows
- calculating the cost of each information flow
- identifying the most cost effective method of transferring information.

Initial findings from the study suggest that the Danish health economy would save up to €3,512,146 or €0.65 per capita if all referrals were sent electronically.

Further research now needs to be undertaken to determine if this finding is replicated across all electronic communication in healthcare. In particular, studies need to be made of each of the different types of electronic communication systems currently used by healthcare professionals, including the electronic transfer of: prescriptions, laboratory requests and results, discharge letters and requests for reimbursement. This research will take time and significant resources but once complete will provide an answer to the question asked by DG INFSO: What are the quantifiable benefits of electronic communication in healthcare?

¹ www.medcom.dk

² www.medcom.dk

Introduction

Why do the study?

Numerous studies³ have been undertaken that consider whether applying information and communication technology to healthcare (e-Health) delivers qualitative benefits to patient care but very little research has been undertaken that looks at the quantitative benefits. This study, undertaken by ACCA (the Association of Chartered Certified Accountants) and the Danish Centre for Health Telematics (MedCom) at the request of the European Commission Information Society Directorate – General (DG INFSO) (now called the Information Society and Media Directorate-General), begins to redress that imbalance by identifying the quantifiable benefits that have been achieved by the Danish health economy from the introduction of one particular type of electronic message: patient referrals.

What does the study look at?

Although the Danish health economy currently transmits many of its health messages electronically it was decided to restrict the study to electronic patient referrals between general practitioners (GPs) and hospitals. This was because:

- it was agreed that this would give a reasonable indication of the overall quantitative benefits obtainable from e-health
- a full study that covered all electronic communication in the Danish healthcare sector would take significant resources in both time and money
- only 41% of patient referrals are sent electronically in Denmark which made it possible to obtain current data for the study from organisations using electronic systems and from organisations using paper based systems
- MedCom had already collected some data on electronic patient referrals which could be used to support this study⁴
- part of the data collection could be undertaken by the data consultants who regularly visit the GPs to provide them with support, advice and guidance on IT issues.

³ The Funen Healthcare Data Network – FynCom, T Joergensen and B Danneskjold-Samsoe (1996)

The CoCo Project Report, P W Moorman and K Bernstein (1999)

Expectations, Results, Outlook, FynCom 1991–1999, T Kaae (2000)

Communication between General Practitioners and Hospitals, S Morck Rubak and J Mainz (2000)

Referrals for Malignant Melanoma, M Hald et al (2004)

⁴ Expectations, Results, Outlook, FynCom 1991–1999, T Kaae (2000)

Examples of electronic communication in the Danish Healthcare Data Network

- Correspondence between health practitioners
- Discharge summaries
- Notification of electronic messages received
- Notification of discharge to municipalities
- Referral requests
- Municipality reports
- Laboratory requisitions
- Prescriptions
- Pathology requisitions
- Repeat prescriptions
- Pathology results
- Physiotherapy referrals
- Microbiology requisitions
- Foot therapy referrals
- Microbiology results
- Digital images
- Health insurance reimbursements
- Home care status

The stages of the study

The study had four main stages:

- mapping the information flows between GP and hospital when a patient is referred to hospital
- undertaking a time and motion study for each of the different information flows
- calculating the cost of each information flow
- identifying the most cost effective method of transferring information.

The results

Initial findings from this study suggest that widespread adoption of electronic patient referrals would be of significant cost benefit to the Danish health economy and would offer annual potential savings in direct costs of up to €1,900,000.

Future plans

This study is an important step towards finding an answer to the question: Are there any cost benefits to GPs or hospitals from the introduction of electronic communication in healthcare? Further and wider research, however, will need to be undertaken before the question can be answered with certainty and the results applied across other countries.

Background – the Danish healthcare system

The infrastructure of the Danish healthcare system is based around a primary and secondary care service model with GPs acting as gatekeepers to secondary care services. The system is funded mainly through taxation and it offers free access to most healthcare services for all, regardless of their economic situation.

Denmark has three political and administrative levels throughout its public services. Health follows this model with the following three levels:

- central government
- counties
- municipalities.

Central government

Central government's role is limited to advice and co-ordination, together with passing health-related legislation and major policy initiation. In 1989, central government established its own Ministry of Health with the remit to develop a national strategy for health and healthcare.

Counties

The running of hospitals is the responsibility of the 14 counties (the regional authorities) and, in Copenhagen, of the Copenhagen Hospital Corporation. These regions serve between 200,000 and 700,000 inhabitants and are responsible for general practitioners, dentists, physiotherapists and other specialist practitioners. Primary responsibility for Danish health service policy lies in this middle tier of government institutions. The regional authorities have wide-ranging powers to organise their health services according to their own wishes. Each region finances healthcare from a combination of its own local taxes and a relatively modest block grant from central government.

Municipalities

The primary responsibility for home nursing, public health and child health as well as social services rests with the lowest level of administration, the 273 municipalities. Municipalities serve an average of 19,000 people although there is a wide range in population between rural and urban areas with urban areas accounting for 85% of the Danish population. Health is only a small part of a municipality's responsibilities.

The Danish healthcare system in brief

- National Health Service covers all 5.3 million citizens
- 3,500 GPs have 90% of all patient contacts
- more than 90% of GPs use some kind of Electronic Health Record (EHR)
- GPs are largely publicly funded
- 63 hospitals are owned by 14 counties and the Copenhagen Hospital Corporation (no major private hospitals)
- 4.6 million outpatient visits per year
- 22,000 hospital beds
- 1.3 million annual discharges
- 13% of hospital beds are served by EHR.

Strategic political goals for 2003–2007

The key strategic political goals for the Danish health service for 2003 – 2007⁵ include:

- high professional quality of healthcare
- straight answers
- shorter waiting times
- a high level of user satisfaction
- better information about service quality
- efficient use of resources
- freedom of choice.

Electronic communication in the Danish health system

Denmark has been a prolific implementer of electronic communication in healthcare since the late 1980s and today ranks among the leading countries in electronic communication across the different parts of the healthcare service. Initially the move to electronic communication was led by a group of enthusiasts who began to transmit prescriptions electronically between GPs and pharmacists. This proved to be so successful that a number of other electronic communication projects were developed. Eventually, in 1994, a project organisation called MedCom, under the management of the Danish Centre for Health Telematics, was established to develop and implement the nationwide Danish Healthcare Data Network. (Appendix A)

Today over 2.5 million electronic messages are sent every month over the Danish Healthcare Data Network and the vast majority of hospitals, general practitioners (GPs), laboratories and pharmacists are connected and able to correspond using electronic communication. (Table 1)

TABLE 1

Access to Electronic Data Interchange (EDI) across the Danish healthcare sector (October 2004)⁶

| | Number with access to EDI | % with access to EDI |
|-------------------------|---------------------------|----------------------|
| GP practices | 2,024 | 93% |
| Specialists (full-time) | 508 | 65% |
| Pharmacies | 331 | 100% |
| Hospitals | 63 | 100% |

The degree of electronic communication, however, varies according to the message type. For example, although the majority of prescriptions, reimbursement requests, discharge letters and laboratory results are transmitted electronically, other messages, such as patient referrals to hospital, are still predominantly paper based and are transferred by fax or post from the GP to the hospital. (Table 2)

TABLE 2

Annual patient referrals to hospitals in Denmark (April 2004)

| | Number | % |
|----------------------|---------|------|
| Electronic referrals | 377,269 | 41% |
| Posted referrals | 217,160 | 24% |
| Faxed referrals | 325,739 | 35% |
| Total | 920,168 | 100% |

⁵ National IT strategy 2003–2007 for the Danish Health Care Service

⁶ www.medcom.dk (EDITOPPEN)

The study

The study had four main stages:

- mapping the information flow between GP and hospital when a patient is referred to hospital
- undertaking a time and motion study for each of the different information flows
- calculating the cost of each information flow
- identifying the most cost effective method of transferring information.

Stage 1 – Mapping the information flow between GP and hospital when a patient is referred to hospital

In Denmark all non-emergency patient referrals to secondary care are routed through a GP. Therefore the first stage of the study focused on the methodology used to pass patient referral information between the GP and hospital.

Over 90% of GPs and all hospitals are able to send and receive electronic referrals in Denmark; however, less than half the referrals are currently transmitted electronically. This is because:

- some referrals need to have copies of old paper based records attached eg lab results
- some GPs are not convinced that electronic messaging is faster or easier than fax.

“Electronic communication is not faster and I will not use it to send electronic referrals. However, the day the hospital shuts down the fax is the day I will start using electronic referrals”. Danish GP

“I have always used the fax. I know it is possible to use electronic communication, but for me, using a fax is easier and faster. I do not have to change my routine.” Danish GP

A telephone survey of GP practices and hospitals identified four possible communication flows between GPs and hospitals. In all cases the GP started the process by producing an electronic referral on the Electronic Patient Record system. The referral was then transmitted to the hospital:

- by post
- by fax
- by e-mail where the hospital printed the referral off and treated it as though it were received on paper
- by e-mail where the hospital processed the referral electronically.

Purpose of MedCom

The purpose of MedCom is to contribute to the development, testing, dissemination and quality assurance of electronic communication and information in the healthcare sector with a view to supporting coherent treatment, nursing and care. Defined in 1999, when the MedCom organisation became permanent

A nation-wide healthcare data network

The parties behind MedCom are: The Ministry of Health, The Ministry of Social Affairs, The Danish National Board of Health, The Association of County Councils, Copenhagen Hospital Corporation, Copenhagen and Frederiksberg Local Authorities, The Danish Pharmaceutical Association and Dan Net.

Stage 2 – Undertaking a time and motion study for each of the different information flows

Once the different types of information flow had been identified, they each had to be mapped out in detail. Two questionnaires were developed: one for use with GPs and one for use with the hospitals. (See Appendices B and C)

The GP questionnaire was designed to identify:

- the method the practice used to process referrals
- the time it takes practice staff to complete the referral
- the percentage of referrals that are returned to the practice due to incompleteness
- the procedure for processing incomplete referrals
- the reason for incompleteness
- any qualitative changes (positive or negative) that arise from electronic referrals.

The hospital questionnaire was designed to identify:

- how the hospital received referrals
- the method the hospital used to process referrals
- the time it takes hospital staff to process a referral
- the complexity of information on referral forms
- the percentage of referrals that are received with missing information
- the type of information missing from the referral form
- the process for obtaining the missing information
- any qualitative changes (positive or negative) that arise from electronic referrals.

Once the questionnaires were drawn up, MedCom, working closely with the data consultants, identified a representative group of GPs and hospitals and wrote to them inviting them to take part in the study.

(Appendix D) The sample included GPs from counties such as Funen and Viborg, where use of electronic referrals is widespread, and areas such as Copenhagen, where electronic transmission of referrals is much less common.

The GP practices chosen included:

- 4 practices that posted the referral forms to hospitals
- 4 practices that faxed the referral forms to hospitals
- 12 practices that transmitted the referral forms electronically to hospitals.

The hospitals chosen ranged from:

- one that received 99% of all referrals electronically, to
- one that received only 4% of referrals electronically with the remainder arriving by post or fax.

The sample chosen covered five hospital regions, 20 GP practices and 13 different hospital departments. These hospital departments receive 41,235⁷ referrals a year or 4.5% of all referrals in Denmark.

Telephone interviews or face to face visits were undertaken with each of the GP practices and hospitals that agreed to take part in the study. The detailed information gathered during these interviews was analysed and then used to produce a detailed time and motion study describing each step of the referral process including the time taken to process the initial referral, the staff involved, the percentage of referrals that were returned due to incompleteness or illegibility and the time taken to correct the returns.

⁷ At time of publication

Stage 3 – Calculating the cost of each information flow

The third stage of the study involved identifying the costs associated with each of the different referral patterns.

The survey identified three types of direct cost to GPs and hospitals: handling costs, operational costs and equipment costs. Where:

- handling costs were defined as the total cost of time taken by the GP, practice staff and hospital staff to process each referral
- operational costs were defined as the cost of physically transferring each referral from the GP to the hospital
- equipment costs were defined as the proportionate cost of hardware and software needed to produce, process and send (or receive) each electronic referral.

Handling costs

Handling costs were calculated using the detailed data collected from the time and motion study. The data was first analysed to give the average processing time of each of the referral patterns and then staff costs were attached to give the average handling cost for the three different information flows.

GP practice handling costs

Each GP and secretary who took part in the survey was asked to describe their method for processing patient referrals and to estimate the time it takes to handle simple, normal and complex referrals.

Where:

- 'simple' is a referral which contains standard information and the request for one examination
- 'normal' is a typical referral with some clinical information already present
- 'complex' is a referral where much more patient information is required.

The range of responses and the overall average processing time is shown in Table 3.

Method for processing a paper based referral at a GP practice

GP dictates referral information

GP gives tape to secretary

Secretary types up referral

Secretary returns referral to GP for signature

GP checks information and signs referral

Referral is returned to secretary

Secretary faxes or posts the referral to hospital

Method for processing an electronic referral at a GP practice

GP fills in information on screen

GP signs referral electronically and sends via Electronic Data Interchange (EDI) to hospital

TABLE 3
Time in minutes taken by practice staff to process a patient referral form

| | | Simple (25%) | | Normal (56%) | | Complex (19%) | | Weighted average | | Total |
|----------------------|---------|--------------|-------------|--------------|-------------|---------------|-------------|------------------|-------------|-------|
| | | GPs | Secretaries | GPs | Secretaries | GPs | Secretaries | GPs | Secretaries | |
| Paper referrals | Range | 0.5–2 | 1–3 | 2–6 | 3–7 | 5–10 | 6–10 | | | |
| | Average | 1.7 | 2.4 | 3.8 | 4.4 | 7.4 | 7.8 | 3.9 | 4.5 | 8.5 |
| Electronic referrals | Range | 0.5–4 | 0.5–4 | 1–8 | 1–6 | 2–18 | 0.5–15 | | | |
| | Average | 1.6 | 1.4 | 3.3 | 2.5 | 7.1 | 5.3 | 3.6 | 2.7 | 6.3 |

Table 3 shows that, on average, it takes practice staff a total of 8.5 minutes to process a paper referral and 6.3 minutes to process an electronic referral.

Once the average GP practice processing time had been identified the average processing cost was calculated. (Table 4)

TABLE 4
Average cost of processing a patient referral form by practice⁸ staff

| | | Weighted average | | Total cost |
|----------------------|------------------------------|------------------|-------------|------------|
| | | GPs | Secretaries | |
| Paper referrals | Average time in minutes | 3.9 | 4.5 | |
| | Cost per minute ⁹ | €1.51 | €0.35 | |
| | Average cost | €5.94 | €1.56 | €7.50 |
| Electronic referrals | Average time in minutes | 3.6 | 2.7 | |
| | Cost per minute | €1.51 | €0.35 | |
| | Average cost | €5.39 | €0.95 | €6.34 |

Table 4 shows that, on average, it costs practice staff a total of €7.50 to process a paper referral and €6.34 to process an electronic referral. This suggests that, on average, a paper referral costs a GP practice €1.16 more to process than an electronic referral.

⁸ 1 Euro = 7.4463 DKR (7 April 2004)

⁹ Based on average hourly rate of a GP of 682.91 Krone (€91.71) and average hourly rate of a secretary of 154.28 Krone (€20.72)

Hospital handling costs

Each hospital that took part in the survey was asked to describe their method for processing patient referrals and the time taken.

The overall average processing time was then calculated using this data and cost for each type of information flow. (See Table 5)

TABLE 5
Average time and cost of processing a patient referral in a hospital

| | Average time in minutes | € ¹⁰ |
|---|-------------------------|-----------------|
| Posted or faxed referral | 28 | 9.66 |
| Referral received electronically but processed as paper by the hospital | 23 | 7.94 |
| Referral received electronically and processed electronically by the hospital | 19 | 6.48 |

Table 5 shows that, on average, it costs hospital staff a total of €9.66 to process a paper referral and €6.48 to process an electronic referral. This suggests that, on average, paper referrals cost €3.18 more to process than electronic referrals.

¹⁰ Based on average hourly rate of a secretary of 154.28 Krone (€20.72)

Method for processing a correctly completed paper based referral at a hospital

Envelope opened

Date noted on the letter

Referral registered on hospital system

Temporary diagnosis code assigned to referral

Paper record created

Search undertaken for old information in archive

Referral passed to the medical officer

Referral read by doctor

Notes dictated by doctor

Referral and tape sent back to secretary

Information entered onto hospital system by secretary

Appointment letter sent to patient and copied to GP

Method for processing a correctly completed electronic referral at a hospital

Electronic mailbox opened and referrals distributed to departments

Referral read by doctor

System carries out electronic search for patient records

Patient record electronically updated by doctor

Letter to the patient and GP are automatically produced by system

Total GP and hospital handling costs

The total handling cost for each of the referral types is the sum of the GP practice costs and the hospital costs and this is shown in Table 6.

TABLE 6

Total handling cost of processing a patient referral

| | GP practice handling costs | Hospital handling costs | Total handling costs |
|--|---------------------------------------|------------------------------------|---------------------------------|
| | € | € | € |
| Referral produced electronically and sent by post or fax | 7.50 | 9.66 | 17.15 |
| Referral produced and sent electronically then treated as a paper copy by hospital | 6.34 | 7.94 | 14.28 |
| Referral produced and sent electronically and treated electronically by hospital | 6.34 | 6.48 | 12.82 |
| Total savings | | | 4.33 |

Table 6 shows that, on average, it costs health service staff €17.15 to process a paper referral and €12.82 to process an electronic referral. This suggests that, on average, paper referrals cost €4.33 more to process than electronic referrals.

The table also demonstrates that hospitals that currently receive referrals electronically but process them manually could achieve savings of €1.46 per referral if they switched from manual to electronic processing.

Returned referrals

Table 6 only looks at the handling cost of an initial referral form. However, many referral forms are submitted to the hospitals with missing data and so have to be returned to the GP practice for additional information.

An unpublished study undertaken by Dr P Grindsted and Dr P Grupe on referrals to the Department of Nuclear Medicine at Odense University Hospital found that about 2% of all electronic referrals and 36% of all paper referrals were submitted with incomplete data fields.

If these figures can be replicated across all types of referrals then handling costs are actually significantly higher than the figures suggested by this study.

Operational costs

Operational costs are defined as the cost of physically transferring the referral from the GP to the hospital. The time and motion study identified three ways that GPs send referral forms to hospital: by post, fax or electronically by e-mail.

If the GP practice sends the referral by post then the operational cost is the cost of postage, which works out on average to be €0.27¹¹

If the referral is sent electronically (41%) or by fax (35%) then the operational cost is approximately €0.16 per referral.

This suggests that operational costs are €0.11 more for posted referrals than faxed or electronically transmitted referrals.

Equipment costs

Identifying the cost of equipment was one of the more challenging aspects of this study as:

- there are a number of systems available, each with a different price tag
- the systems are multifunctional so it is difficult to isolate the cost for electronic referrals
- the prices of the systems are confidential.

After consulting the manufacturers it was agreed to use the proportionate average cost of equipment for this study and to assume that all equipment had a life of five years.

Equipment maintenance costs were excluded from the study.

GP software packages

Although there are only twelve EPR systems in Denmark, every sale is tailored to meet the individual requirements of a GP and each system carries out a multitude of integrated tasks so it is generally not possible to isolate the cost of just one area of functionality.

However, one manufacturer sells the communication module separately, at an estimated cost of €3,000. This module handles 15 different types of communication flow and so, based on the assumption that all 15 flows are utilised, the investment cost of sending referrals could be estimated as 1/15 of €3,000 or €200.

GP hardware and software packages

Manufacturers estimate that the cost of a completely new installation would, depending on the size of the GP practice, cost between €7,000 and €80,000. The majority of Danish GP practices are small with between three and five staff so the cost for an average system is estimated at about €24,000. Therefore, based on the assumption that each system handles 15 different message types and all are fully utilised, the cost of sending referrals could be estimated as 1/15 of €24,000 or €1,600.

¹¹ Average EDI cost per message in 2003 – 1.20kr (€0.16)

Fax costs, per minute are 0.5kr (€0.07), 0.25kr (€0.03) for the call fee and 0.25kr (€0.03) for each minute, plus handling time of 0.7kr (€0.09).

The cost of a stamp is €0.60 and calculations (the total number of postal referrals divided by 200 working days divided by number of clinics) show that each letter contains on average 2.2 referrals.

Overall investment costs

A GP must therefore invest between €200 and €1,600 to transfer referrals electronically to the hospitals, depending on the type of system purchased and on the number of workstations in the GP surgery. For the purposes of this study it was decided to use the average of these two figures, €900, and to assume that GPs invest in a new system once every five years.

Therefore, with 1,995 surgeries across Denmark the total GP investment in equipment every year is €359,100.

Hospital systems

Identifying the cost of the patient referral module on the hospital systems is no easier. The hospital communication systems were originally set up in the 1970s as part of the Patient Administrative Systems (PAS). Since then a range of functionalities has been added onto these systems so that they now handle a multitude of tasks.

There are six PAS systems but the cost of each of these is negotiated individually with each purchaser and is confidential. Even if the price were known, however, there would still be the challenge of isolating the cost of the referral module.

It was agreed therefore to take the average cost of hospital equipment that was identified in connection with a previous MedCom project concerning the specific communication of referrals and discharge letters between hospitals. This gave an estimated total hospital equipment cost across Denmark of €122,250 per year.

Stage 4 – Identifying the most cost effective method of transferring information

Initial findings from this study suggest that full adoption of electronic patient referrals would be of significant cost benefit to the Danish health economy.

These cost benefits would be delivered mainly through savings in staff time which, potentially, would enable staff to develop other areas of healthcare.

Handling costs

On average, it costs the Danish health service €4.33 more to process a posted or faxed referral than an electronic one. As 59% (or 542,899) of all referrals in Denmark are currently sent non-electronically, this suggests a potential saving of €2,350,753 per year if all paper referrals were to be processed electronically.

Operational costs

The cost of posting referrals is €0.11 more than sending them by fax or electronically. Therefore if all of the 217,160 referrals that are currently sent by post were sent electronically there would be a potential saving of €23,888 per year. As the Danish government has now said that all referrals must be transmitted electronically, this is a saving that should soon be realised.

Equipment costs

The potential savings in handling and operational costs must be offset against the costs of equipment. This is approximately €359,100 for GPs and €122,250 for hospitals or a total of €481,350 per annum.

Table 7 shows that the Danish health economy could potentially save up to €1,893,291 each year if all patient referrals were sent electronically.

Tables 8 and 9 describe how the potential savings grow as the number of referrals sent electronically increases. The total savings to date in direct costs, with 41% of referrals sent electronically, is estimated at €1,168,825 or €0.22 per capita¹².

In April 2004, 92% of Danish GPs had an electronic referral system; therefore, for referrals to be 100% electronic the remaining 8% of the GPs will have to buy equipment at an estimated cost of €31,320. If all referrals were then sent electronically the total saving would potentially increase to €3,512,146 or €0.65 per capita.

¹² Capita 5,397,640 (2004)

TABLE 7**Annual potential savings from direct costs from adopting a full electronic referral process in Denmark**

| | Number of referrals | Saving per referral | Total saving € |
|----------------------|---------------------|---------------------|----------------|
| Handling costs | 542,899 | 4.33 | 2,350,753 |
| Operational costs | 217,160 | 0.11 | 23,888 |
| Less equipment costs | | | -481,350 |
| Total saving | | | 1,893,291 |

TABLE 8**Total estimated savings to date from electronic transfer of patient referrals**

| | Number of referrals | Saving per referral € | Total saving € |
|----------------------|---------------------|-----------------------|----------------|
| Handling costs | 377,269 | 4.33 | 1,633,575 |
| Operational costs | 150,909 | 0.11 | 16,600 |
| Less equipment costs | | | -481,350 |
| Total saving | | | 1,168,825 |

TABLE 9**Growth in savings**

| Potential savings | % of electronic referrals | Savings from direct costs € | Less equipment costs ¹³ € | Savings from direct costs less equipment costs € | Saving per capita € |
|---|---------------------------|-----------------------------|--------------------------------------|--|---------------------|
| No referrals sent electronically | 0 | 0 | 0 | 0 | 0 |
| 41% of referrals sent electronically | 41 | 1,650,175 | -481,350 | 1,168,825 | 0.22 |
| Additional 59% of referrals sent electronically | 59 | 2,374,641 | -31,320 | 2,343,321 | 0.43 |
| All referrals sent electronically | 100 | 4,024,816 | -512,670 | 3,512,146 | 0.65 |

¹³ Equipment costs are a fixed cost as they are not dependent on the number of referrals

Other factors

As well as the costs analysed above and identified by GP practice and hospital staff there are also a number of 'hidden' costs. These include the cost of change management, which includes staff training, and the cost of lost production.

This section is included in the report as an acknowledgement that these costs exist even though neither cost has been factored into the study. Change management costs are excluded because it would be impossible to identify a realistic cost for such a small part of the Danish Healthcare Data Network as electronic referrals and the costs of lost production are excluded as no reliable data exists stating what these might be.

Change management

The three key features of the change management process used to move Danish GPs and hospitals towards electronic communication were:

- national co-ordination of the project
- active support and encouragement provided at county administration level
- acceptance by all that change takes time.

National co-ordination of the project

Nationwide roll-out of electronic communication requires national co-ordination for it to be a success. In Denmark, this critical role was given to MedCom¹⁴. It was MedCom's responsibility to pull together all the existing projects being undertaken in Denmark and to construct the new Danish Healthcare Data Network.

Today the network is well developed and handles over 2.5 million messages a month. Getting to this stage of development, however, took time and significant resources. The first three projects undertaken by MedCom between 1994 and 2001 cost €8.5 million and the latest project, the Internet-Based Healthcare Data Network, is likely to cost a further €240,000. (Appendix A) (This project is less costly than the earlier projects as it mainly involves linking up existing networks.)

MedCom also receives an annual budget of €1.8 million (2002 budget) which is used to run the Healthcare Data Network and to initiate new projects.

Active support and encouragement provided at county administration level

Active support and encouragement from the county administration level have proved key to successful implementation. The support network provided in the county of Funen, for example, has ensured that Funen has one of the highest take up rates of electronic communication in Denmark with nearly 90% of all communication between primary and secondary care now being handled electronically¹⁵.

Three main types of support have been provided for the roll-out of electronic communication: project coordinators, data consultants and practice consultants, although the level of support provided varies tremendously.

Project coordinators, who tend to be hospital based, are employed by the majority of counties to manage the implementation solutions issued by MedCom. For example, in the county of Funen, prior to the roll-out of electronic communication, project coordinators visited each individual hospital department to explain how the electronic communication process would work, to discuss the detail of the documents that would be sent electronically and to agree target dates for roll-out. They encouraged staff 'buy-in' by involving hospital staff (eg clinicians and nurses) in project groups tasked with describing the data to be communicated electronically and the functions to be made available on the new system.

¹⁴ Appendix A

¹⁵ June 2004

Project coordinators also ensure that all staff receive appropriate training.

The 'data consultant scheme' is also operated by most counties. This scheme, which has proved to be very successful, aims to provide support to GPs in the roll-out of electronic communication and to strengthen the use of computers for quality development and communication between primary and secondary care. Data consultants provide in-house training courses for GPs and their staff and they help build a strong working relationship between the GPs and hospital staff.

Finally, the counties provide support through the 'practice consultant scheme'. This scheme, first established in the county of Funen in 1991, has now been adopted throughout Denmark so that today all hospitals have one or more practice consultants. Practice consultants are GPs or specialists, who work a few hours a week to secure quality in communication flows between GPs and hospital departments in a given area. Their role is to remove any communication barriers between primary and secondary care and to support the sharing of knowledge across the two sectors¹⁶.

Acceptance by all that change takes time

The final aspect of the change management process was a general acknowledgement that change takes time.

Each organisation was initially given the freedom to choose when and how it introduced electronic communication. This freedom helped foster a high level of support from GPs and hospitals though it did have the slight disadvantage of allowing a few less enthusiastic counties to delay implementation.

Right from the start there was a general acceptance that the move from paper to electronic communication could not take place overnight. For example, it was not until January 2004, when 92% of GPs had electronic communication systems in place, that the

GP contract with the Public Health Insurance was changed to say that, wherever possible, all communication between GPs and hospitals must be electronic.

The introduction of electronic communication requires both organisational and cultural change but, in Denmark, it was the cultural change that was the most time-consuming and difficult to manage. For example, when the electronic referral project was set up in 1995, the lengthiest task was not putting the technology in place to transmit referrals electronically but the development of new procedures for hospitals and GPs to follow when handling the electronic messages. Although there are far fewer steps involved in processing a message sent electronically than one sent on paper¹⁷, it takes time to develop acceptable procedures for processing them.

Cost of lost production

There is one other cost that can be linked to posted rather than electronic referrals: the cost of delay in treatment for the patient. The study found that about 217,160 referrals are sent to the hospital by post and that these take an average of 1.33 days longer to reach the hospital than an electronic referral or fax. This extends the patient waiting time and, for patients unfit to work, creates a cost to society. GPs estimate that between 5% and 10% of patients referred to hospital are classed as unfit for work at an average cost to society of €93¹⁸ per day. This suggests that the increased patient waiting times caused by posting referrals could cost society as much as €1,343,026 per year.

This society cost is, of course, only an estimate and it may well be difficult to realise in practice.

¹⁶ "Evaluation of the practice consultants in Denmark", Ministry of Health, 2003

¹⁷ Expectations, Results, Outlook, FynCom, March 2001

¹⁸ Loss in production: GDP per capita (2002) €93

What do the GPs and hospitals say about electronic referrals?

Although the study found that some GPs were reluctant to make use of new technology, those GP practices and hospitals that have embraced electronic communication systems for sending patient referrals found that the advantages far outweighed the disadvantages.

The advantages included:

- faster referral process
- no risk of referral being lost in the post
- standard patient data already input
- referrals automatically delivered to the right department
- valid and complete (coherent) information
- removes the risk of hospital staff misinterpreting the GP's request due to illegibility of handwriting
- reduces the number of referrals returned to the GP
- once only data entry reduces the risk of errors.

The disadvantages included:

- system failure
- additional paperwork must be posted
- GP focus may be directed at the screen not the patient.

record for further information. It is also an advantage that the information is transferred automatically to the waiting list and that the referral information is immediately accessible from any computer in the hospital."

Marie Lykke Rasmussen, Executive Medical Secretary,
Odense University Hospital

"Using an electronic referral has many advantages. It is faster and I know it will reach the hospital in a safe and secure manner, which is also very important to the patient." Danish GP

"I love the fact that the patient can see me type in the referral and before the patient is out the door, the referral has reached the hospital. Besides this, there are hardly any returned referrals, since all the information is present and furthermore since my handwriting is terrible it is easier to read."

Danish GP

"Receiving an electronic referral is easier than receiving a paper referral. All the work is conducted by the computer – and no information is missing. If the referral is not filled in correctly, the general practitioner cannot send the referral. This means that we rarely have to spend time finding the patient

Could these savings be reproduced in other countries?

Every country is different so caution should be exercised before applying these results to another health system; however, Denmark is not unique; the savings achieved by the Danish health economy could be replicated in countries throughout the world subject to:

- political support
- support from all sectors of the health economy
- consensus on national standards
- support of the clinical associations
- financial support
- lead organisation to oversee the project.

Conclusion

This study suggests that significant cost savings are possible from the widespread adoption of electronic messaging in healthcare.

Further and wider research now needs to be undertaken to determine if this finding is replicated across all electronic communication in healthcare. In particular studies need to be made of each of the different types of electronic communication systems currently used by healthcare professionals including the electronic transfer of: prescriptions, laboratory requests and results, discharge letters and requests for reimbursement. This research will take time and significant resources but once complete will provide an answer to the question asked by DG INFOS: What are the quantifiable benefits of electronic communication in healthcare?

Appendix A

THE HISTORY OF MEDCOM¹⁹

MedCom I (1994–1996)

The purpose of the first MedCom project – MedCom 1 – was to develop nationwide EDI standards for the commonest forms of communication between GPs and pharmacies and hospitals: referrals, discharge letters, laboratory requests and results, X-ray letters, prescriptions and national health insurance billing (in total around 30 million messages a year). Quality improvement can be achieved using EDI as it enables automatic transfer of structured messages from one IT system to another, reusing all information in the receiving Electronic Medical Record system and improving security and costs in the process.

The development projects ran from 1994 to 1996 with 25 major pilot initiatives spread across the whole country, involving the majority of the IT system suppliers to hospitals and GP practices.

MedCom II (1997–1999)

The ‘MedCom I’ project had clearly shown benefits and in the ‘MedCom II’ project this scope was broadened from ‘pure EDI’ to ‘*Clinical work and electronic communication*’ in general. The Danish Society of General Practice supported the development and took an active part in the projects, especially those based on the use of clinical guidelines. Other projects were based on the use of telemedicine including tele-dermatology between GPs and specialists, web-based booking of patient appointments for GP consultations, the development of a web-based data warehouse for health insurance data and finally web-based recording systems providing data on hospital treatments, waiting times and so on.

The dissemination of these new developments was slow. A decision was therefore taken to carry out a major, nationwide project, with the primary aim of ensuring large-scale dissemination of the standards developed under the ‘MedCom I’ project. In addition, the local authority homecare area and dentistry were brought into the programme using the telemedicine approach.

Two hundred and twenty-three local projects were carried out in the ‘MedCom II’ period throughout Denmark and involved thousands of healthcare professionals. These included 193 EDI standard dissemination, 12 home-care, 8 dentistry and 10 telemedicine projects. Extensive use of electronic communication had been achieved in primary care by the end of 1999.

MedCom III (2000–2001)

The large-scale electronic project had demonstrated the potential for radical improvement in quality and conformity in medical communication. Therefore, the ‘MedCom III’ programme which ran from 2000 – 2001 had, as its goal, an in depth quality assurance assessment of all communication in primary care.

Large focus groups involving healthcare professionals, IT vendors and IT specialists were formed and agreed the so-called standardised ‘good EDI-letters’ – providing an exact description of the content information for the most frequent messages in Danish primary care.

Later on all counties and IT vendors joined this consensus process, and have implemented the same, nationwide healthcare guidelines, agreed by the professionals.

Measurement for improvement

From the beginning, methods of recording communication were established, counting the exact number of messages and number and types of participants.

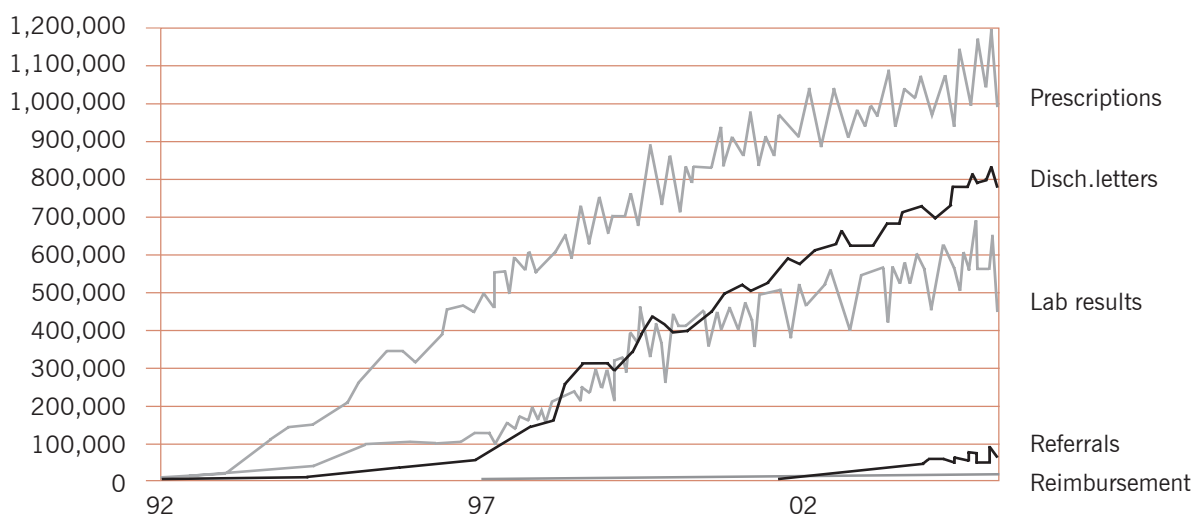
As can be seen from Figure 1, development has been rising rapidly during the whole period – now accounting for more than 2.6 million messages per month or about 83% of the total communication in primary care²⁰.

¹⁹ The Danish Health Care Data Network – MedCom, by Dr F Klamer and Mr H Bjerregaard Jensen

²⁰ www.medcom.dk (EDITOPPEN)

FIGURE 1

MedCom – The Danish Health Data Network
Messages/month



MedCom IV (2002 – 2005)

In the next MedCom programme – ‘MedCom IV’ which commenced in the year 2002 – it was decided to ‘recycle’ the established communication methods in the hospital setting – and to introduce internet based communication on a large scale in primary care, including web technology, telemedicine, booking and e-mail based home consultations. The so-called ‘SUP programme’ has also been established with the aim of facilitating access to hospital medical records by ‘data-pull’ (web based internet access).

Next steps and lessons learned

The current projects will gradually lead to internet based communication on a far larger scale and will also involve telemedicine in supporting the gatekeeper role, booking, e-mail consultation, prescribing, updating common registers and transferring healthcare data from partners’ record systems. In addition a constantly increasing part of practice is communicating with the ‘new, internet searching

patient’. Furthermore the potential for utilisation of new self-care based Health-IT projects are being centrally developed.

In the future there will be a constant focus on support of professional IT development in general practice with an emphasis on the fact that ethics are highly valued so that the central focus remains ultimately and appropriately on the patient.

Appendix B

GP PRACTICE QUESTIONNAIRE

1 Which county is the GP practice based in?

2 How many staff work in the practice?

| | |
|--|---|
| <input type="checkbox"/> <input type="checkbox"/> Doctor | <input type="checkbox"/> <input type="checkbox"/> Secretary |
| <input type="checkbox"/> <input type="checkbox"/> Nurse | <input type="checkbox"/> <input type="checkbox"/> Other |

3 How does the doctor produce a referral?

Hand written
 Electronically then printed off and sent by post
 Electronically then printed off and sent by fax
 Electronically then sent to the hospital electronically
 Other

4 For referrals completed by the GP

- what percentage of referrals are simple, normal and complex?
- on average, how long does it take the GP to fill in and send the referral?
Where:
- 'Simple' refers to a referral which contains standard information and the request for one examination
- 'Normal' refers to a typical referral with some clinical information already present
- 'Complex' refers to a referral where much more patient information is required.

Referrals to clinical departments

| | |
|---------|---------|
| Minutes | Percent |
|---------|---------|

| | | |
|----------------|-------|-------|
| Simple | _____ | _____ |
| Normal | _____ | _____ |
| Complex | _____ | _____ |

Comments _____

5 For referrals completed by the secretary

- what percentage of referrals are simple, normal and complex?
- on average, how long does it take the secretary to fill in and send the referral?

Referrals to clinical departments

| | |
|---------|---------|
| Minutes | Percent |
|---------|---------|

| | | |
|----------------|-------|-------|
| Simple | _____ | _____ |
| Normal | _____ | _____ |
| Complex | _____ | _____ |

Comments _____

6 Are the referrals sent daily?

Yes No

If no, how often are they sent?

7 Does the GP receive any phone calls regarding missing standard information on the referral?

If yes then:

a How many, on average, are updated by phone?

%

b Who provides the missing information?

GP Secretary Both

c How long does it typically take to provide this information?

minutes

8 How frequently is further clinical information requested after a patient referral?

%

a How is the information usually requested?

By telephone % Electronically %

By post % Other %

b What additional information is usually required?

c Who responds to the request for further clinical information?

GP % Secretary %

9 Has the GP ever had a referral returned?

No Yes. Please fill in the chart below.

Please state the reason why the referral was returned

How long did it take to reprocess the referral?

Who processed it?

10 If the GP practice has had referrals returned then, on average, what percentage of referrals are returned?

%

11 If the GP processes referrals electronically

a Are there any noticeable quality improvements?

b Are there any noticeable quality reductions?

Appendix C

HOSPITAL STAFF QUESTIONNAIRE

1 In which county is the hospital?

2 Hospital name

3 Hospital department

4 Describe the method used for processing a patient referral using Table 1

5 State how the hospital receives referrals

- | | | |
|--|-------|---|
| <input type="checkbox"/> Hand written | _____ | % |
| <input type="checkbox"/> Electronically produced but received by post or fax | _____ | % |
| <input type="checkbox"/> Electronically produced and received | _____ | % |
| <input type="checkbox"/> Other | _____ | % |

6 Describe the complexity of referrals received?

- | | | |
|--|-------|---|
| <input type="checkbox"/> Simple, where simple refers to a referral which contains standard information and the request for one examination | _____ | % |
| <input type="checkbox"/> Normal, where normal refers to a typical referral with some clinical information already present | _____ | % |
| <input type="checkbox"/> Complex, where complex refers to a referral where much more patient information is required | _____ | % |

Any other comments

7 How many minutes, on average, does it take to handle a referral?

| | Simple | Normal | Complex |
|-----------------|--------|--------|---------|
| Hand written | _____ | _____ | _____ |
| Machine written | _____ | _____ | _____ |
| Electronic | _____ | _____ | _____ |

8 How often is it necessary to return the referral to the GP for more information?

On average, what percentage of referrals are returned? _____ %

9 What are the most common reasons for returning a referral?

- a _____
- b _____
- c _____
- d _____
- e _____

10 Is it sometimes necessary for the hospital department to phone a GP practice to obtain missing information?

a On average how often does this happen? _____ %

b On average how long does it take to obtain the missing information? _____ minutes

11 How often are referrals received with missing information?

| | Type of referral | | |
|---|------------------|-----------------|------------|
| | Paper | Machine written | Electronic |
| What information was missing? | _____ | _____ | _____ |
| Percentage of referrals with missing information | _____ | _____ | _____ |
| How long does it take hospital staff to obtain the missing information? | _____ | _____ | _____ |
| Any other comments | _____ | | |
| | _____ | | |

Table 1 – Worked example

Elective transfer within a county

| Activity | Secretary | Doctor | Nurse | Time in minutes | Electronic Data Processing |
|---|-----------|--------|-------|-----------------|----------------------------|
| 1 Paper referral is received by letter. Letter is opened | X | | | 1 | |
| a If X-rays are missing from the referral the secretary must telephone the relevant dept to obtain them. This often requires several phone calls | X | | | 8 | |
| b If examination results or other information is missing then secretary requests it by fax or telephone | X | | | 7 | |
| 2 The referral is input to the PAS for going on the waiting list | X | | | 1 | X |
| 3 The referral is referred to triage to determine treatment needed and to assess urgency of appointment | X | | | 1 | |
| 4 Note regarding the triage decision is dictated | | X | | 15 | |
| 5 The referral is returned with the result of the triage | X | | | 1 | |
| 6 Registration of the diagnosis | X | | | 1 | X |
| 7 The note from the triage is written and printed | X | | | 15 | X |
| 8 The X-rays are sent to the radiology dept together with a note for hanging the pictures The process now transfers to the X-ray dept | X | | | 2 | |
| 9 X-rays are received from the clinical dept | X | | | 2 | |
| 10 Search in the archive for any earlier pictures | X | | | 2–10* | |
| 11 Pictures are placed on the wall in the conference room | X | | | 5 | |
| 12 Radiology conference with doctor in radiology and doctor from an oncological dept | | X | | 5 | |
| 13 Pictures are removed from the conference room | X | | | 3 | |
| 14 Conference noted in PAS | X | | | 3 | X |

Appendix C

| Activity | Secretary | Doctor | Nurse | Time in minutes | Electronic Data Processing |
|--|-----------|--------|-------|-----------------|----------------------------|
| 15 X-rays are returned to the clinical department The process ends in the X-ray department, and continues in the clinical department | X | | | 2 | |
| 16 Note written in patient record | X | | | 7 | |
| 17 The X-rays are returned to the referring dept | X | | | 5 | |
| a If new CT-scan (eg thorax), earlier pictures must be requested for comparison | X | | | 2 | |
| 18 Final triage | | X | | 3 | |
| 19 Booking of time for admission or outpatient treatment | X | | | 3 | X |
| a If appointment is over 14 days away doctor must be contacted for approval of date | X | X | | 15 | X |
| 20 Letter to the patient is printed (standard letter) | X | | | 1 | X |

Appendix D

LETTER TO GPs AND HOSPITALS

CFST

Rugårdsvej 15, 2. sal
DK-5000 Odense C

Phone 66 13 30 66

Direct 66 13 40 66

Lokalnr. 30

Telefax 66 13 50 66

Mobil 23 25 19 89

E-mail cew@health-telematics.dk

WWW.medcom.dk

J.nr. Cost-Benefit

Regarding: Participation in a study of patient referrals to hospitals.

The Danish Centre for Health Telematics (Medcom) is conducting a study of the advantages and/or disadvantages of using electronic communication in the healthcare sector. We would very much like your help – and it only takes 10 minutes.

In our study, we have chosen to focus on the GPs' use of referrals of patients for treatment at the local hospital. The study will show both the advantages and disadvantages of electronic communication both for the transmitter (the GP) and the receiver (the hospital). Therefore, we have to include GPs and hospitals whether they use electronic communication or not.

The study is anonymous, which means that it is not possible to see which doctor we are referring to in the final report. The report will be presented at a larger EU conference for the health ministers in Ireland in the beginning of May.

During this week (March 22 and 23) we will contact your secretary to ask if we can take about 10 minutes of your time. *Your secretary can then tell us when to call you or meet you for a personal interview so that we can fill in the attached questionnaire.*

We hope that you will be interested in participating and we will of course be available if you have any questions. Data consultant XX has provided us with your address.

Yours sincerely,

Christina E. Wanscher
Project assistant

Acknowledgements

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Dean Westcott FCCA, Director of Finance, Harlow PCT, England

Robert Baker, Head of Personal & Professional Development, Salomons, part of Canterbury Christ Church University College

Tove Kaae, Consultant, MedCom

Dr Per Grindsted & Dr Peter Grube, Department of Nuclear Medicine, Odense University Hospital

Henrik Bjerregaard Jensen, Manager, Danish Centre for Health Telematics

MD, GP, Finn Klamer, 7950 Erslev, Denmark.

The hospitals, general practitioners and data consultants from the participating hospital regions

ACCA (THE ASSOCIATION OF CHARTERED CERTIFIED ACCOUNTANTS)

ACCA is the largest and fastest-growing international accountancy body in the world, with 320,000 students and members in 160 countries. ACCA has an extensive network of over 70 staffed offices and other centres around the world.

Our portfolio of qualifications is designed for today's international business environment. ACCA qualified accountants are known for having integrity, professionalism and thoroughly relevant knowledge and skills.

Our unrivalled access to companies, governments, regulators and practitioners across the world gives us a unique perspective on the needs of modern accounting and financial management.

We create value for the profession and the business community through our innovative approach to developing new qualifications and services and to raising awareness of sustainable development and corporate governance.

www.accaglobal.com

MEDCOM

MedCom was founded in December 1994 to lead on the development of national EDI standards for the most frequently exchanged messages between the primary and secondary healthcare sector in Denmark. Since then our role has been significantly expanded and we now contribute to the development, testing, dissemination and quality assurance of all electronic communication across the Danish healthcare sector.

Our latest project aims to introduce internet technology to healthcare communication so that modern IP-based, but still secure electronic communication can take place between healthcare providers and their patients.

MedCom is now considered a European leader in the field of electronic healthcare communication and we were proud to receive an honourable mention at the e-Health 2003 Ministerial Conference and first prize at the e-Health 2004 Ministerial Conference.

MedCom is located within the Danish Centre for Health Telematics, a project organisation established by the County of Funen to give advice and support to health bodies on the use of health telematics. MedCom is funded by The Ministry of Health, The Ministry of Social Affairs, The Association of County Councils in Denmark, Copenhagen Hospital Corporation, Copenhagen and Frederiksberg Local Authorities, The National Board of Health, The Danish Pharmacy Association and DanNet.

www.medcom.dk

or

www.cfst.dk

