Status report, MedCom 5

On the threshold of a healthcare IT system for a new era
MedCom – a brief overview

MedCom is a national project organisation which is involved in developing, testing, distributing and quality-checking electronic communication and information in the healthcare sector.

MedCom is supported by the Ministry of Health and Prevention, the National Board of Health, Danish Regions, Local Government Denmark, the Ministry of Social Welfare and the Danish Pharmaceutical Association.

It operates in the following main areas:

- **Communication standards**
  This includes EDI, XML and web-based services, which are used by all IT providers to the Danish healthcare sector.
  Uniform implementation of the standards is guaranteed through the provision of documentation, provider testing and certification, as well as through holding courses.

- **Health Data Network (SDN)**
  This is a secure national infrastructure which can be used by all public and private organisations in the healthcare sector for exchanging data, transmitting images, videoconferencing and consulting external IT systems, including via the common public healthcare portal sundhed.dk.

  For further information, visit www.medcom.dk

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**MedCom receives Digitaliseringsprisen 2007**

The task of establishing the healthcare IT system of the future is a key aspect of the entire digitisation process in the public sector. At a ceremony on 20 November, MedCom received the Digitaliseringsprisen 2007 (Danish Government Digitisation prize) in recognition of its contribution in this area. This prize has been set up to highlight IT projects and visions which create value for both individual citizens and society as a whole.

The initiative for setting up this prize came from the Ministry of Science, Technology and Innovation, the Ministry of Finance, Danish Regions, Local Government Denmark, KMD, Rambøll Management and HP.
MedCom in a period of transition

Electronic healthcare communication has been evolving over a number of years in a manner which has brought about extensive changes to numerous procedures throughout the entire healthcare sector. Cooperation between general practice, hospitals, pharmacies, laboratories, local authorities etc. has become much smoother and more effective, while the risk of mistakes has been reduced considerably.

MedCom has played a crucial role in this development process. This explains why MedCom has recently received the Digitaliseringsprisen 2007 in the Cooperation category as a token of Denmark’s official recognition of this contribution.

However, receiving this prize does not mean that MedCom can look forward to a relaxing time, resting on its laurels! The profile of the healthcare communication system of the future, which is based on Service-Oriented Architecture (SOA), is emerging ever more clearly. It will be founded on a wide selection of web-based services, involving every party associated with the provision of healthcare, including ordinary citizens. The key element is to focus on making relevant data available online and in a form which the agencies involved in the healthcare system can use to improve the quality, level of service and effectiveness of every single course of treatment.

An example of one of the new web-based services of the future will be the common medication card, carrying information about the medication each citizen takes. Completely up-to-date information will be available directly 24/7. This might sound a simple task, but in actual fact, it requires a particularly complex development project, which will involve many of the agencies in the healthcare sector.

Its specialist expertise and extensive experience make MedCom an obvious participant when it comes to making the new digital opportunities a reality. This organisation has accumulated valuable knowledge and experience through its development activities over the last 15 years. This will also benefit the digitisation of the Danish healthcare sector in the future.

In this status report, MedCom looks at the past and present as well as the future, in terms of what has been achieved, where we are right now and what direction we are heading in. The first part of this report contains nine articles dealing with healthcare IT, the national IT strategy, the common medication card, international cooperation and about healthcare IT as it is used in practice in different areas of the healthcare sector.

However, the main content is devoted to describing a large number of projects, which give some indication of the status of MedCom’s current activities.

The overriding message of the report is that MedCom is still going in the right direction, which is as it should be in a dynamic organisation that is contributing to the development of one of society’s most important sectors with the highest possible level of communication exchange.

Vagn Nielsen,
Head of Department
Ministry of Health and Prevention and Chairman of the MedCom Steering Group
The national IT strategy for the healthcare sector is nearly finalised. This means that a new platform is going to be developed for the healthcare IT system and MedCom will be assigned key tasks as part of this.

“Denmark is streets ahead in terms of the use of electronic communication in the healthcare sector. This is not always the impression given by the media, but it is actually true,” confirms Ivan Lund Pedersen, project manager at SDSD (Coherent Digital Health in Denmark).

“This means that there are a large number of agencies, including MedCom, which have acquired very valuable experience and skills. We therefore need to know as far as we can how to utilise this as we now embark on developing the next generation of digital healthcare communication systems. Not that we’re standing still and doing what we’ve always done. We need to learn to master every kind of innovation, but we obviously have a good starting point here, allowing us to build further upon the last 15 years of development.”

Coherent architecture

SDSD has the overall task of creating a coherent IT architecture offering facilities and features that can boost quality, efficiency and service for all the stakeholders in the healthcare sector, including individual citizens. As has already been mentioned, the strategy is close to being ready. It sets out the framework and outlines the directions for development which need to be focused on. The next step will be to draw up the first action plans. These are expected to be ready before the end of the year.

“The objective is to implement a service-oriented architecture for the entire sector which we can call a healthcare IT system,” explains Ivan Lund Pedersen.

“We will define the architecture and create a platform according to how we want to distribute data and which functions we want to make available. MedCom’s role will be primarily to act as a sort of administrator for this platform. MedCom will be responsible for the platform’s expansion and for ensuring that it meets all the relevant quality and security requirements.”

New services

“You could say that this role is a direct extension of the tasks which MedCom has carried out so far in connection with the electronic exchange of messages between the agencies in the healthcare system.”

Ivan Lund Pedersen, project manager for SDSD, Coherent Digital Health in Denmark.
the data they need online. In other words, we are developing a communication system which is going from primarily sending information in the form of messages from a sender to a recipient to a system where data is made available, thereby allowing the actual recipients to access the data they need."

"A very specific example of this is the common medication card, which will be a web-based service that hospitals, local authorities, individual doctors and even ordinary citizens will be able to use. In this instance, they will be able to find out details online from their own record system about every patient’s medication. It is, of course, a service which will be made available to patients via sundhed.dk."

"This is a major project involving a huge number of procedures and users. The main benefit will be that we can prevent errors when providing medication. It will also make cooperation far smoother between hospitals, home care services and GPs."

"This project, which is called FAME, is also an example of the kind of role that MedCom will play in the future as the contractor involved in ensuring that the services offered on the platform are disseminated."

Real needs

"Another important principle for digital solutions in the future is that we'll develop solutions that meet a real need. In other words, we won't develop something new just because we can. At the same time, we'll be very much prepared to take small steps and produce results that can be used for something, and only when this coincides with the strategy. In keeping with this attitude, we are not concerned either about inventing everything from scratch. Over a number of years there have been so many good experiences with electronic communication, communication standards and many other aspects. We will, of course, reuse these results as much as we can."

"Another absolutely crucial factor is that we have an open system where citizens are very actively involved and have some influence over their own situation. For instance, they will be able, in the future, to change an appointment and get involved directly in other ways. This means that citizens are not only people we transfer information about, but also people we communicate with and who have some influence."

The vision of the healthcare IT system of the future is both radical and promising, but the implementation of the initial components is just around the corner.

"I think that we’ll see the initial results from the common medication card within a year, but it will take several years to achieve full dissemination," reckons Ivan Lund Pedersen.

"We are also currently working on a patient index, which is a list of data about individual citizens, which citizens themselves and healthcare professionals will obviously have access to. I also expect to see results from this fairly quickly. But it will take a long time before the vision of an extensive range of web-based services presented using a coherent digital architecture is fully realised."
Prescribing the right medication every time

Within the foreseeable future all healthcare professionals will have online access to up-to-date information about every person’s medication. This will eliminate a major source of errors and prevent time being wasted.

“I find it so frustrating every single day that those of us in the health service cannot share knowledge about what medication our patients are taking,” says GP Jens Parker.

“For instance, we may be dealing with requests from the district nurse to prescribe medication for a patient whom I’ve been treating and who perhaps has also been admitted to hospital. It can take a number of different phone calls before I have an overview of the patient’s medication. Mistakes can occur if I don’t get hold of the right information. There is also a risk of giving the wrong medication in the time that goes by while I’m gathering information.”

Jens Parker’s vision is for him to be able one day to access up-to-date information about his patients’ medication directly from their medication card on his own IT system. This will mean that he can always have real-time information about patients’ medication provided by himself, as well as other specialists and hospital doctors. The “common medication card” is the name for this solution. Patients will obviously be able to see their medication card, and not just health professionals. This will be possible via the healthcare portal sundhed.dk

Enthusiasm

“The concept is so obvious,” states Jens Parker. “And although I’ve worked with many types of healthcare IT systems down the years, it is significant that this concept has actually been greeted with enthusiasm by everyone without exception.”

When the idea was first conceived, there was no problem either in terms of reaching agreement on that it should and would be implemented.

To start with, the various agencies in the sector – GPs, the home care service, hospitals and pharmacies – each have their own medication records. From a purely technical perspective, the task involves creating an IT infrastructure where different systems communicate with each other. Each system, whether at the GP’s surgery, in the hospital or at the home care base, must provide direct access to up-to-date, shared data about patients’ medication, which must be presented in a user-friendly format in the user’s own IT program. These tasks are being carried out as part of the FAME project which MedCom is the main contractor for. The FAME project also involves extending the solution to every user in the healthcare system.

“This presents a major technical challenge. It means both expanding the IT infrastructure and implementing a common security solution. Both aspects will need to be included when establishing a common healthcare IT system with many other facilities,” explains Jens Parker.

Key facts

The FAME project’s overall vision is to ensure that patients receive the correct and therefore safe treatment with medication in the Danish healthcare system. This applies to medication prescribed for treatment in hospitals, by patients’ own doctors, by the home care services, in care homes etc.
“We are ready to run pilot projects in 2008, which will include systems used in GP surgeries, certain hospital systems and the electronic care record system used by the home care service. I believe that GPs and the home care service will be able to use the common medication card from early 2009. It will probably take at least a few years until all the hospitals have implemented the solution fully.”

**Major benefits**

“It is absolutely crucial that rapid, user-friendly access is provided to the common medication card. The speed of access will ultimately succeed or fail according to the capacity of the individual doctor’s Internet connection. Another issue is that all the agencies involved will need to change their procedures. For instance, if I change one of my patients’ medication, this will no longer just be a matter between my patient and me. If I make changes I’ll have to update the medication card to reflect this. Similarly, the other agencies will have to make sure that colleagues in the other sectors can depend on the information which we input individually.”

“On the other hand, the benefits are obvious. It will help us save time and avoid mistakes, whether we are in general practice, the home care sector or the hospitals. Just think about, for instance, the hospital doctor who receives a patient as an emergency admission. In the best case scenario, the patient will perhaps have a plastic bag containing their medication, but this won’t necessarily make it easy to form an overall picture. In other cases, the patient cannot provide any information at all. In this instance, the hospital doctor needs to act without knowing whether the patient is currently receiving medical treatment or is, for example, hypersensitive to certain types of medication etc.”

“First and foremost, it is obviously beneficial for the patient to receive the treatment he or she needs without any delays or mistakes. But by introducing the common medication card, the entire healthcare sector will be able to improve the quality in terms of prescribing medication, while also saving resources.”

**Key facts**

Introducing shared data about medication is a wide-ranging project which will more or less involve the entire healthcare sector, with more than 4,000 healthcare institutions and over 30 different IT providers.
The Region of Southern Denmark is continuing to run international healthcare IT system projects where the counties have left off. An absolute requirement for every project is that it must be targeted at some of the specific challenges which the region is facing.

The Region of Southern Denmark is involved in a fairly large number of international projects revolving around electronic healthcare communication. Jane Kraglund, director for healthcare, is more than happy with this, even though these are not actually projects which the region itself initiated.

“We’ve inherited them from the former counties, particularly from Funen County,” she explains.

“But as you well know, you don’t always want to get rid of everything you inherit. From the region’s perspective, the only vital prerequisite for projects of this type is that they need to meet a real requirement. Put quite simply, you need to be able to use them for something. This is the case with these projects, which is why we’re more than willing to pick up from where the counties left off.”

Dealing with challenges

Obvious examples of international projects which can deal with some of the challenges the regions are facing include Baltic eHealth and R-Bay, where hospitals are countering the shortage of radiologists by obtaining radiological assistance remotely. Telecardiology and teleradiology projects, in which hospitals treat patients in remote areas, for instance, on an island, also provide a solution model for a very specific challenge facing the regions. Another example is the Better Breathing project, which is improving COPD patients’ quality of life by giving them the opportunity to have a consultation, monitoring etc. in their own home.

“The region has only been running for a year,” says Jane Kraglund. “But we have taken on the international projects and we have chosen to focus on them being implemented throughout the whole region. For example, we can see numerous opportunities in telemedicine, but overall we want to strengthen electronic communication between hospitals, between local authorities and hospitals, as well as between patients and hospitals. One very relevant example of this is the measure for sending rehabilitation plans from hospitals to local authorities. This will obviously be done electronically.”

Spreading the impact through the region

“In order to spread the impact of these international projects, we recently let MedCom present the projects to hospital managers. At the same time, we paved the way for MedCom to initiate dialogue with individual hospital managers about specific projects. They can be controlled both internationally and centrally within the region too. For example, we intend to consolidate cooperation between the region’s hospitals using telemedicine. One example of our efforts in this area is a thrombolysis project where Esbjerg Central Hospital and Odense University Hospital communicate online.
about the emergency treatment of blood clots.”

“We are also completely aware of the fact it is worth channelling resources into the international aspect. We do this, even though it requires, of course, something extra when the development work includes many parties spread across different countries. These are usually the projects with a very long-term outlook as well. What this offers us primarily is valuable inspiration and a useful exchange of experience. In some cases, specific technical solutions are also offered by cooperation partners, which can be implemented at our site more or less directly by us.”

Good cooperation

“It is, of course, important to The Region of Southern Denmark’s international commitments that MedCom was actively involved in cooperating with several of our hospitals, even before the region was created,” maintains Jane Kraglund.

“Many personal contacts have been established which facilitate cooperation on a day-to-day basis. It helps make it easy for us to decide to make international project work a high priority.”
From two sheets of paper to one file

GPs began using IT before all the other parts of the healthcare sector. This was perhaps an acknowledgement of the fact that pharmacists, laboratory technicians and other doctors find GPs’ handwriting difficult to read.

“In the past, an average patient record would fill two A4 sheets,” says GP Jesper Andersen.

“This meant that only summarised information was available, not to mention that it could be difficult for doctors to make out their own and other doctors’ scribbles.”

Jesper Andersen himself has never written his records up on paper because when he started working as a GP in 2000, the MedWin system had long since been introduced at the GP surgery in Kolding.

“But we still have the old records stored in filing cabinets up to 10 years after the last note was written. It’s actually rare for me to need to go back to past records and try to decipher information from my predecessors’ scribbles.”

Nete Christensen remembers clearly what it was like before IT came on the scene.

“I’ve been working here for 24 years and I must admit that I’m no genius when it comes to using IT. But it has certainly made many things easier. For instance, I used to spend most of my time transcribing the doctors’ dictated notes into the various records, first of all by hand and later on using a typewriter. There also used to be a lot of toing and froing with paper records in the course of a day, which meant countless trips between my desk and the filing cabinets.”

The doctor’s desk with and without IT

On the other hand, medical secretaries do not wear out their shoes as quickly and gives them the time to carry out a number of clinical tasks.

<table>
<thead>
<tr>
<th>Nationally, GPs sent the following number of electronic messages in September 2007:</th>
</tr>
</thead>
<tbody>
<tr>
<td>18,162 doctor’s letters</td>
</tr>
<tr>
<td>14,947 items of correspondence</td>
</tr>
<tr>
<td>181,272 laboratory test requests</td>
</tr>
<tr>
<td>31,295 microbiology requests</td>
</tr>
<tr>
<td>28,362 pathology requests</td>
</tr>
<tr>
<td>52,270 hospital referrals</td>
</tr>
<tr>
<td>16,613 X-ray referrals</td>
</tr>
<tr>
<td>7,806 bills</td>
</tr>
<tr>
<td>453 BIN documents</td>
</tr>
<tr>
<td>1,092,328 prescriptions</td>
</tr>
</tbody>
</table>

After switching to electronic patient records, filing cabinets no longer play an important role in the everyday work at a GP’s surgery. It means the medical secretaries do not wear out their shoes as quickly and gives them the time to carry out a number of clinical tasks.

Effective, open communication

Apart from sending prescriptions and referrals via the GP system, the practice also regularly acces ses sundhed.dk, for instance, in order to obtain lab results from other doctors.

Jesper Andersen is in no doubt at all that electronic communication has made cooperation with the other agencies in the healthcare system and with local authorities faster, more secure and more effective. Not to mention the benefit to patients too.

“My screen is positioned so that patients can see what’s on it. And I often type in prescriptions, referrals or record notes during the consultation while the patient is still there. This allows you to be open about what you’re entering.”

Disruption on the line

However, life is not all rosy with IT communication. Now and then things do not work at all the way they should.

“But, in actual fact, we really notice the benefits when communication links are disrupted and we need, say, to call a laboratory to get some results,” explains Jesper Andersen.

“This is a hassle both for us and the laboratory technician who is having their work interrupted. This then reminds us about how easy it all is when things are working properly.”
The Private Hospital Mølholm uses electronic communication to a large extent, even though the agreement between the private hospitals and Danish Regions only covers electronic referrals and invoicing at the moment.

“All our patient records have been stored electronically since the hospital was opened in 1992. Only patients are given a paper copy,” explains Marianne Regan, Head of Secretariat at The Private Hospital Mølholm in Vejle.

In summer 2007 the hospital implemented a new EPR system which has been developed by a Swedish IT company.

“This has been carried out in compliance with MedCom’s standards, which we apply under the agreement with Danish Regions. We just need to test the final components and integrate the procedures into our everyday operation.”

When MedCom has approved the system in its final form, The Private Hospital Mølholm will be able to receive and send lab results, referrals, discharge letters and pathology results.

Electronic format as part of the agreement

“The agreement between the regions and private hospitals stipulates that electronic format must be used for making referrals and invoicing,” explains Lisbeth Elmstrøm, a consultant at Danish Regions.

“This is how it has been since 1 January 2006. The agreement only applies to the section of the hospitals’ patient base where the patients have exercised the option to select a hospital of their own choice.”

The bill is settled directly between the private hospital and the region where the patient lives. Under the agreement an invoice is sent electronically.

Danish Regions is setting up the framework, which means it is up to the agencies involved to deal with the practical aspects. The extent to which electronic communication is used depends, according to Lisbeth Elmstrøm, on how long electronic communication has been established in the relevant region.

“However, the agreement is clear on this. All private hospitals and clinics which have an agreement with Danish Regions must be able to receive electronic referrals based on MedCom’s referral standard REF01.”

“As regards discharge letters, the situation is that the private hospital can send these electronically if the referral hospital agrees to this. However, there is no requirement in the agreement for discharge letters to be sent electronically.”

Nationally, the following number of electronic messages were sent in October 2007:

From private hospitals:
- 3,652 discharge letters
- 429 items of correspondence

From private laboratories and X-ray departments:
- 1,244 cervix cytology results
- 3,254 histology results
- 13,030 X-ray results

Looking ahead to a totally electronic future

The Private Hospital Mølholm communicates electronically with the outside world. The system has been developed by a Swedish IT provider and approved by MedCom.
Thumbs up from Hillerød Municipality!

Hillerød Municipality has tested MedCom’s electronic rehabilitation plans. They have been given a big thumbs up, even though the IT systems belonging to the local authority and the hospitals were reluctant to communicate of their own accord.

“We have two hospitals where we are testing the use of the electronic rehabilitation plan,” explains Gitte Femerling, IT coordinator for VITAE Systems in Hillerød Municipality’s Social and Health Department.

“And it’s going really well. Once the patient has been discharged and the rehabilitation plan has been filled in, you just press a button. It then takes just a few minutes at the most for the plan to reach the local authority’s offices, with a copy to the patient’s doctor. The information is also available in the patient’s record to anyone who needs to use it.”

“So it’s a thumbs up from us,” says Gitte Femerling. “In fact, a huge amount of effort has gone into this, with a very large number of people involved and not least to control! It has also been a little bit like needing to lay the track while the train was running,” she adds. “But it has also been very exciting to be involved in this!”

Details and language

“We were organised into a large working group, representing many specialist groups, which would deal with both the content and technical side of things. We first had to find out which sections were actually needed in an electronic rehabilitation plan. We also needed to take into consideration the layout for the headings so that there couldn’t be any misunderstanding. We then had to take into account the number of words that would need to be used under each section etc. There are an awful lot of details to think about!”

“Then there was the technical side of things. This area suddenly presented new challenges en route,” explains Gitte Femerling. “We were very well aware of the fact that the local authorities use systems of one particular type, while the hospitals use another type. This meant that the rehabilitation plan would have to be converted en route from the hospital to the local authority office. This presented challenges when it turned out that the hospitals have different providers in this area. In the long term, the local authorities will be able to receive the rehabilitation plan in the same format which the hospitals use to create it.”

The test group included, apart from Gitte Femerling, Grethe Annie Jensen from the regional IT department, Tove Emanuel from Gentofte Hospital and CSC, which is the provider of Hillerød Municipality’s healthcare IT system.

First steps

“The only slight negative with the test version is that the space is limited in the individual sections, simply because the local authorities receive it in a different format to the one the hospitals use,” says Gitte Femerling. “But this will be sorted in the next version.”

“From now on then, there will be no more time wasted sending letters, faxes or similar items. Hillerød has some healthcare agreements which stipulate that patients must be contacted within five working days. And we’re definitely able to keep to this. Unfortunately, it doesn’t mean that we can offer them a rehabilitation place within five working days. And we’re definitely able to keep to this. Unfortunately, it doesn’t mean that we can offer them a rehabilitation place within five working days. But the first step is to establish good communication. The therapists are also happy to receive information electronically. The challenge then is to get the rehabilitation plans up and running well in the future.”
Creating a single complete system out of many

This is an area of activity on which system consultant Rene R. Jensen has focused his attention more than any other over the last few years. It is about getting electronic communication solutions to interact much better across the former counties and new regions.

Rene R. Jensen works at The Regional Hospital of Viborg, Skive, Kjellerup where he has been involved for a number of years in the development of electronic communication in the X-ray service.

“We’ve achieved a great deal in terms of both exchanging electronic messages and transmitting images,” he explains. “A system for communicating X-ray referrals and results was introduced many years ago and it has been a big help in facilitating cooperation between hospitals and GP surgeries. We have also been working a great deal in Viborg on integrating requests, results and images directly into EPRs. In 1993 we established the first image connection with Aalborg, which allowed us to obtain assessments via the telephone from radiology specialists. We do this, for instance, if someone is admitted as an emergency after an accident. The radiologists in Aalborg can help us in this instance to assess the situation and make a decision about the next course of action, for example, whether we need to transfer the patient to Aalborg.”

“In 1998 Viborg County implemented its RIS/PACS system, which provided access to a common image and RIS database from the county’s hospitals. More or less at the same time, we also received an extended image connection to the Neurological Department at the then Aarhus Municipal Hospital. Since then, we have established an image connection between hospitals in Herning and Viborg, as well as the old Aarhus County’s PACS system.”

“Another focus area is image connections between hospitals and specialists. It is blatantly obvious that this is a form of cooperation that can and needs to be strengthened,” emphasises Rene R. Jensen.

“On the whole, communication needs to be developed to the point where it can contribute in a sensible, relevant manner to bringing the organisations involved in the healthcare system closer together.”

Working together

“Overall, it’s going really well, but the major challenge is about getting the whole thing to work together. On this subject, the main feature of the solutions used is still that they have been created from the bottom up, in the individual hospitals and counties, in other words, not at regional or national level. Some of the old counties more or less had their own RIS/PACS system. Of course, communication needs to operate seamlessly in the new region and at a national level. We need to have a set-up where, regardless of whether a patient from, say, Viborg or Herning is admitted as an emergency to a hospital in Odense or Slagelse, the doctors can have online access to image data for this patient. In other words, we’re shifting from electronic communication that involved exchanging messages between a sender and recipient towards a web-based service where anyone needing particular information, such as image data, can access it themselves. In fact, the biggest challenge is not transferring images, but rather exchanging request and results data across RIS systems and integrating it with EPRs.”

“Another focus area is image connections between hospitals and specialists. It is blatantly obvious that this is a form of cooperation that can and needs to be strengthened,” emphasises Rene R. Jensen.

“On the whole, communication needs to be developed to the point where it can contribute in a sensible, relevant manner to bringing the organisations involved in the healthcare system closer together.”

Here the radiologist is using the integrated RIS and PACS system to make a diagnosis based on X-ray images displayed on high-resolution screens.
Creating a happy working environment at pharmacies

There is no longer the sound of phones ringing all the time at the Løveapotek pharmacy in Svendborg. The pharmacy’s staff have been using electronic correspondence messages since May, which has saved a lot of energy.

Pharmacies were streets ahead for many years when it came to electronic communication. Sending prescriptions electronically from doctors to pharmacies made their job easier, both in terms of the actual means of transmission and of being able to read what they said. But the Løveapotek pharmacy in Svendborg is not just stopping there. It has been one of the first pharmacies, along with the Sct. Nicolai Apotek pharmacy, also in Svendborg, to opt for the correspondence messages used for exchanging information between pharmacies and local authorities. And this has produced positive results.

“It has made our day-to-day work easier,” explains pharmacist Hans Ulrik Schaffalitzky de Muckadell. “In the past, we would be interrupted in our work when we got a call from the home care service, for instance. And we used to get lots of calls every day! Now we just have messages popping up on screen without being disturbed. We can then gather them up and deal with them afterwards.”

“The correspondence message is a form of e-mail,” he explains. “It is encrypted for protection, which means that the system is protected against anyone intruding and reading the information. The message is also input in free text format, making it easy to use.”

Product orders from the home care service

“The typical correspondence message contains product orders from the home care service for over-the-counter items, for instance, but it may also say that an elderly person, who receives pre-dosed medication, has been admitted to hospital. In this case, we need to stop making up the medication pack,” explains Hans Ulrik Schaffalitzky de Muckadell.

“Other times the local authority gets in touch if medication and prescriptions do not turn up for a patient for one reason or another.”

“We could see a clear benefit from introducing the correspondence module. If anything, it would quieten things down for us during the working day. That’s why we requested that the local authorities use the system, as a result of which electronic correspondence messages accounted for at least 50% of the enquiries. We went live in May 2007, and after a few months the figure was over 75%. This is the level we’re currently at, so you can call this a success.”

“This obviously requires a certain readjustment as it involves new procedures for both the home care service and us, but we are pleased,” concludes Hans Ulrik Schaffalitzky de Muckadell, hurrying back to the growing queue of customers.
The use of electronic communication in connection with taking samples and providing test results makes life easier for bioanalysts in their day-to-day job. Not to mention for doctors, patients...

"Using IT is hardly anything new to us. All our analysis results have, for a long time now, been transmitted directly from our instruments to a database," explains bioanalyst Gitte Borgen, from the Clinical Biochemistry Department at Storstrømmens Hospital in Næstved.

"It has enabled us to increase production and reduce the number of errors. What's new is the different forms of electronic communication, both internally and with GPs and other laboratories. This also offers benefits in terms of efficiency and keeping errors to a minimum."

"We have a database that is shared by Næstved, Nykøbing, Fakse, Nakskov and Oringe hospitals. This makes all the test results available to everyone. In other words, doctors at the five hospitals can print a complete list of all the test results for each single patient. GPs receive results via EDI from each laboratory. Doctors outside the old Storstrøms County can view the results via the healthcare portal sundhed.dk."

More time in the working day

The facility for receiving requests from GPs in particular has created more time during the working day at the laboratory.

"We don’t need to log into the system and request tests as the doctor does it directly. It’s also a great help that we don’t need to type the whole request in, which means we also avoid making mistakes because the handwriting is difficult to read. For the time being though, we’ll continue to receive the request on paper as well so that we can check for any corrections or additions that the doctor has made."

But in the meantime, Gitte Borgen and her colleagues feel that electronic communication is slower than human communication.

"Sometimes we’re ready with the patient or the tests but the electronic request hasn’t yet reached the laboratory. We then need to wait or, if necessary, input the information manually so that we can get going with the analyses, before we can activate the request."

Reliant upon IT communication

In spite of the slight delays, Gitte Borgen is still quick to say that they are reliant upon the new communication channels.

"It does make things much easier and ensures greater consistency with the end product. Patients also receive their results more quickly than before when we used to send requests and results by post. We dispatch from the laboratory completed results every five minutes and uncompleted results once a day. This means that doctors receive the test results as soon as their analysis has been completed. They also receive a list every day of the tests that they still need results for."

Easy to update

Another crucial benefit of the shared electronic request system is that the laboratories can easily ensure that the doctor’s repertoire of analyses is up to date. In this way, GPs will know at any time, for instance, which analyses they must carry out themselves and how many test tubes they need to use when taking blood samples for the relevant analyses in the laboratory.

"The number of test tubes must match up with the equipment we’re using for the analyses. When we get a new piece of equipment, one thing this can mean is that we’ll need to use either more or fewer test tubes than before. It is crucial for the analyses that the doctor delivers both the right type of test tubes and the correct number."

The laboratories can also use the same system to monitor directly news on general practice matters.

"So, gradually, the extent to which we are communicating on paper is becoming really limited," concludes Gitte Borgen.

When patients come to the laboratory to have a blood sample taken, they must have their health insurance card with them. The request is ready in the laboratory system, providing that the patient does not appear two minutes after the patient has sent the request. Even electronic communication takes time!
MedCom standard for the Good Rehabilitation Plan (DGOP)

As part of the local authority reforms implemented on 1 January 2007, the local authorities took over jurisdiction for rehabilitation, apart from specialised rehabilitation. At the same time, local authorities and regions have been signing healthcare agreements relating to six mandatory focus areas, including rehabilitation.

These measures are helping to improve cooperation on rehabilitation procedures and to create a greater need for communication between clinicians across the various sectors. Communication can be supported electronically using a communication standard for rehabilitation plans.

MedCom’s rehabilitation plan standard (DGOP) has the following objectives:

- it can be used to exchange a rehabilitation plan when a patient is discharged from hospital to the local authority or from a hospital/hospital ward to another hospital/hospital ward
- it can be sent to patients’ own GPs for information
- it must contain the data that the healthcare professionals need to use
- it can replace the exchange of rehabilitation plans by post or fax.

**Results**

MedCom’s rehabilitation plan standard has been pilot-tested since July 2007. An initial pilot implementation is being launched from November 2007. Four regions and 13 local authorities are taking part in the pilot test and implementation, with different message types being used in the project.

Most hospitals send their information in DGOP format, while the local authorities and GPs receive the information in correspondence format. This gives VANS providers a key role in carrying out conversions between the various message types, as well as to EDIFACT and XML format respectively, see figure below.

**Next step: DGOP version 1.0**

User feedback from the pilot project has resulted in requests for changes to the DGOP standard, as well as for the desire to have hospitals, local authorities and GPs both sending and receiving rehabilitation plans in DGOP format rather than correspondence format.

As a result, MedCom is planning version 1.0 of DGOP, which will be available from 1 January 2008. After this, the participating hospital providers (PAS) and local authority providers (ECR (electronic care record) and rehabilitation systems) will implement DGOP 1.0 in early or mid-2008.

The GP systems are operating in several projects with the technology used in DGOP format. This means that it will also be possible in the long term for GPs to receive the DGOP format.

**Pilot trial of rehabilitation plan (DGOP)**

- Capital Region of Denmark in cooperation with Hillerød, Gentofte, Ruder- dal, Lyngby-Taarbæk, Copenhagen and Frederiksborg municipalities.
- Region of Southern Denmark in cooperation with Svendborg and Odense municipalities, as well as an agreement with all the local authorities in the region. On Funen more than 1,000 rehabilitation plans have been sent at the moment via correspondence format.
- Mid Jutland Region in cooperation with Viborg, Aarhus and Favrskov municipalities.
- North Jutland Region in cooperation with Aalborg and Brønderslev municipalities.
Local authorities and regions have entered into healthcare agreements intended to continue and step up their cooperation on the admission, rehabilitation and discharge of patients. MedCom offers a number of communication standards to support communication between the home care sector, hospitals, GPs and pharmacies. Communication takes place between these agencies nationwide at very different levels. In some areas, communication takes the form of simply sending a notification, whereas leading local authorities, hospitals, GPs and pharmacies are exchanging data electronically about medication, care, rehabilitation, examinations and examination results. These agencies often use correspondence messages, which are clinical e-mails for healthcare data.

IT working groups between the region and local authorities have been established in all five regions. The groups must analyse how local authorities and hospitals can support their communication process using MedCom’s standards. GPs are also involved in this in several areas of the country.

Results

23 new local authorities are using the correspondence system between the home care service and GPs, with 12 of these authorities involved in numerous exchanges every day. GPs send messages to the home care service about patients’ medication, examination results and requests for examinations. The home care service benefits greatly from sending prescription renewals directly from the care system to the GP system electronically rather than by telephone, when reordering medication.

Communication facilities between care staff in hospitals and the home care service are currently being developed in several places beyond just the basic notification. Several local authorities are exchanging care reports with regional hospitals. Information is exchanged either via MedCom’s admission report/discharge report standard or via a care report sent in correspondence format. A few local authorities are also sending discharge warnings electronically. Numerous local authorities are in the process of implementing the correspondence message system.

Two local authorities and the local pharmacies are using the correspondence format to send information about OTC medicines and exchange information about dose dispensing.

The home care service in 65 local authorities is exchanging basic admission and discharge notification information, as well as admission replies with almost every hospital in the five regions. MedCom’s local authority statistics can be viewed at www.medcom.dk/wm110427 or requested by sending an e-mail to medcom@medcom.dk

Next step

The home care service, GPs and several hospitals are taking the initiative of using the existing facilities within the hospital-local authority-GP-pharmacy communication system. A heading is being used in the correspondence message with the intention of increasing the benefit produced.

MedCom will develop, in the course of 2008, an XML version of the existing care report standards, while also looking into whether extension projects should be set up for the care report and birth notice standards.

The standard for prescription renewals/reordering medication is currently available and used in an ECR system. All GP systems can receive prescription renewals. The other ECR systems will also be able to use the prescription renewal facility when the Danish Medicines Agency has completed its project for setting up a prescription server and providing the home care service with access to Medicinprofilen, the electronic medication profile system, see www.medicinprofilen.dk

The map of Denmark shows that in October 2007 there were 65 local authorities already using electronic communication:

- North Jutland Region: 7 local authorities
- Mid Jutland Region: 7 local authorities
- Region Sealand: 9 local authorities
- South Denmark Region: 18 local authorities
- Capital Region of Denmark: 24 local authorities

Message types used within the local authority sector

<table>
<thead>
<tr>
<th>Message type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission notification</td>
<td>Send information about patient admission</td>
</tr>
<tr>
<td>Admission reply</td>
<td>Send information about patient admission reply</td>
</tr>
<tr>
<td>Discharge notification</td>
<td>Send information about patient discharge</td>
</tr>
<tr>
<td>Correspondence</td>
<td>Exchange data electronically about medication, care, rehabilitation, examinations and examination results.</td>
</tr>
<tr>
<td>Care reports in</td>
<td>Exchange information about OTC medicines and exchange information about dose dispensing.</td>
</tr>
<tr>
<td>correspondence format</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation plan</td>
<td></td>
</tr>
<tr>
<td>Discharge warning</td>
<td></td>
</tr>
<tr>
<td>Prescription renewal</td>
<td></td>
</tr>
<tr>
<td>Home care status</td>
<td></td>
</tr>
<tr>
<td>Admission report</td>
<td></td>
</tr>
<tr>
<td>Discharge report</td>
<td></td>
</tr>
<tr>
<td>Birth notice</td>
<td></td>
</tr>
<tr>
<td>Negative/positive</td>
<td></td>
</tr>
<tr>
<td>acknowledgement</td>
<td></td>
</tr>
</tbody>
</table>

The standards are available in EDIFACT format at www.medcom.dk/wm110099

Message types used within the local authority sector
In many areas of local authority administration, such as early retirement pensions and sickness benefits, various forms are used for written communication. These are known as ‘LÆ forms’.

The task of standardising LÆ forms is carried out by the certification committee of the Danish Medical Association, which consists of representatives of general practitioners and Local Government Denmark (LGDK). Electronic versions of these forms are an integral component of the GP systems, but they are still not sent electronically.

In view of this, MedCom has launched, in collaboration with LGDK, a pilot project involving the electronic exchange of selected forms between local authorities and GPs.

The pilot project offers local authority administrators the chance to send the forms electronically using the web-based access to NetAdministration Health, which is Kommuneinformation’s (local authority information service) solution for managing forms electronically within the health-care sector.

Results

MedCom has cooperated with a number of GP system providers and Kommuneinformation to draft a proposal for the Dynamic Form (DDB) and the Good Web Service (DGWS) standards. The GP system providers have established direct access from the GP system to the form server, which means that requests from local authority administrators and the completed certificates which are subsequently sent are handled seamlessly in the doctor’s EPR in the same way as with the other forms of electronic communication.

The GP system providers Æskulap and MedWin carried out a simple technical test in June and September in cooperation with Aalborg and Odense municipalities respectively. Both these local authorities have reported the need for more than the forms originally planned to be available during the pilot phase. The number of forms has therefore been increased to now include the following:

- LÆ 121 and 125 Status certificate and request for one
- LÆ 141 and 145 General health certificate and request for one
- LÆ 251 and 255 Certificate confirming ability to take on work and request for one
- LÆ 131 and 135 Specific health certificate and request for one
- LÆ 132 and 142 Attendance certificates

Based on the feedback from the simple technical tests, changes have also been made to the NetAdministration Health solution’s user interface and functionality.

Next step

A limited pilot operation is being carried out in Odense Municipality from November 2007 in collaboration with Æskulap and MedWin. The pilot trial is expected to be completed by the end of the year. Following this, plans for extending the electronic exchange of LÆ forms will be drawn up based on an evaluation of the project.

Several other GP system providers are in the process of implementing the technologies used – DDB and DGWS. Several local authorities and GPs have shown a great deal of interest in the project. It has also been considered appropriate to disseminate the electronic exchange of LÆ forms to also include cooperation between local authorities and specialists in hospitals and private practice.

Key figures

It is estimated that more than 200 official forms are completed by each GP every year. The local authority LÆ forms and “Other agreed forms” account for the biggest proportion by far of these forms. Nationally, more than 100,000 status certificates (LÆ 125) are completed every year.
Increasing access for consulting laboratory data via sundhed.dk and the Health Data Network (SDN)

The purpose of this project is to provide doctors and healthcare staff with access to test results from laboratories in the specialties of clinical biochemistry, clinical microbiology and pathology, using a digital signature via sundhed.dk.

sundhed.dk retrieves the analysis results from the county laboratory systems by making a web service call via the Health Data Network. At present, a facility is available for viewing clinical biochemistry results in this way in most of the counties.

This specifically involves searching for the patient’s civil registry (CPR) number in all the connected laboratories. The laboratories respond by sending a list of the available analysis results. You then choose the specific analysis results you want to have presented.

The following targets have been set:

- **Biochemistry**: 100% of the country’s laboratories connected by the end of 2007.
- **Microbiology**: 50% of the country’s laboratories connected by the end of 2007.
- **Pathology**: 100% of laboratories connected by the end of 2007 via access to the Patobank pathology database.

**Work is currently in progress on the following:**

- all regions being connected with access for consulting clinical biochemistry laboratory results via sundhed.dk by the end of 2007 at the latest.
- developing an operational solution for the Patobank database so that data can be accessed via sundhed.dk.
- developing a technical solution for transferring data from microbiology systems to a central database, including establishing a connection via the Health Data Network (SDN).

**Technology used**

- Web service using the XRPT01 and XRPT05 standards, as well as MedCom’s WS standard.
- Pathology laboratories are using secure session transfer. Clinical biochemistry laboratories are using advanced framing.
- The web service for the microbiology database is using advanced framing.

- establishing framing for microbiology results via sundhed.dk.

MedCom is also signing cooperation agreements with individual regions on the use of the Patobank database and on supplying data to a common microbiology server, including agreements on payment for connecting and operating this server.

In order to support better presentation of clinical biochemistry results via sundhed.dk, MedCom’s healthcare laboratory group is working on the following in cooperation with the National Board of Health:

- **National classification of short names**
- **Enhancing the presentation** so that it complies with MedCom’s professional healthcare recommendations. Recommendations for the presentation layout and format are being drawn up by the group and submitted to the relevant clinical organisations, the National Board of Health and Danish Regions.

**Results**

- **Clinical biochemistry**: All biochemistry laboratories are included. However, Funen will only be included from the end of 2008, while North Jutland and Ringkøbing will be included from early 2008.
- **Clinical pathology**: All included by 1 April 2007.
- **Microbiology database**: No final decision has been made about purchasing this. The solution has been developed, including a new MedCom XRPT05 standard.
- **Short names – national**: Development work is under way. 3,500 analyses have been classified and named. It has been agreed that MedCom will take control of the next stage in the process to get the names ready.
- **Better presentation**: Recommendations have been drawn up. The solution description will be ready in December 2007.

**Next step**

The decision to establish a consultation facility for the microbiology database will hopefully be made by the end of 2007. This facility can be set up during the first half of 2008 and consultation can start around 1 July 2008.

The short name and improved presentation projects are expected to be completed by 1 April 2008. They will then be submitted to SDS (Coherent Digital Health in Denmark), the National Board of Health and the relevant clinical organisations for a final decision. The solution being proposed for sundhed.dk is being devised and integrated into the SDS strategy for individual projects. The proposals will be implemented on sundhed.dk in 2008.

**Who’s involved**

**Biochemistry**: North Jutland County (2008), Aarhus County, Viborg County, Ringkøbing County (2008), Vejle County, Ribe County, South Jutland County, Funen County (2009), West Sealand County, Storstrøms County, Roskilde County, Frederiksborg County, KPLL (Copenhagen’s General Practitioners’ Laboratory), Bornholm.

**Pathology**: All counties/regions.

**Number of consultations in October 2007**

<table>
<thead>
<tr>
<th>Biochemistry</th>
<th>Microbiology</th>
<th>Pathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,546 visitors with a total of 17,897 pages viewed.</td>
<td>1,546 visitors with a total of 17,897 pages viewed.</td>
<td>244 visitors with 928 pages viewed.</td>
</tr>
</tbody>
</table>
Three-in-one: Integrated communication with citizens

One of the purposes of the common public healthcare portal sundhed.dk is to provide patients and citizens with a gateway to obtain information from and communicate with the healthcare system. As a result, sundhed.dk already offers at the moment some of the following facilities:

- Personal appointment book, a diary for patients which can contain the patient's appointments with any part of the healthcare system, with an option for notifying the patient about any pending appointment.

- Secure e-mail function, which can be used as an e-mail consultation facility where queries are sent from the patient to the healthcare system or personal information is supplied to the patient from the healthcare system, such as clear test results or appointment letters.

However, these functions have not been used widely so far as they have not been integrated into the IT systems that are the tools used by healthcare staff and GPs in their everyday work, nor into electronic communication and calendar management systems. sundhed.dk and MedCom have therefore launched a pilot project intended to test integration between the appointment book on sundhed.dk and local calendar systems, as well as the secure e-mail function on sundhed.dk and local communication modules.

Results

The GP system provider A-data, appointment system provider Cap Gemini and sundhed.dk’s provider Acure have implemented MedCom standards for the following:

- Online updating of the patient’s appointment book on sundhed.dk with appointments from the local appointment system.

- Online updating of sundhed.dk’s notification mechanism with the patient’s mobile phone and e-mail address details.

The integrated appointment book with the notification facility has been tested and scheduled for release on sundhed.dk by the end of November 2007. A pilot trial will then be launched in hospitals in Mid Jutland Region and on site at selected users of A-data, including GP surgeries, dental surgeries and hospital outpatients departments.

A MedCom standard is also being developed during the project for supporting integration between sundhed.dk’s secure e-mail function and local communication modules.

Technology used

The Good Web Service (DGWS). Reuse of the good XML booking confirmation in DGWS. Reuse of the good XML correspondence letters in DGWS. The Health Data Network (SDN).

Next step

The solution will be assessed, based on the feedback from the pilot trial involving the integrated appointment book in Mid Jutland Region and from A-data’s users and focusing on the following points:

- Technical feedback, including the load on the portal servers and the need for a closer link between the appointment book and the use of the secure e-mail function for appointment letters.

- Feedback on the content, including the need to expand and/or enhance the communication standards used.

- Feedback on legal aspects, including the practicalities of dealing with patient consent.

The feedback and solutions from the three-in-one project are expected to be useful with regard to the regions’ involvement in the common public NemSMS project, launched by the Digital Taskforce under the Ministry of Finance.

Key figures

Over 200,000 scheduled operations in the public hospital sector every year.

Over 5 million scheduled outpatient visits in the public hospital sector every year.

On average, 4% of patients fail to turn up for appointments in the public hospital sector.

Source: Potentialevurdering af NemSMS (Assessment of the potential of NemSMS), Digital Taskforce, March 2007
The purpose of this project is to:

- Establish an automatic link from record systems, consultation facility solutions and request systems, e.g. WebReq, to the laboratory guides available on sundhed.dk. The link is based on the analysis code and IUPAC code of the individual analysis, as well as the code for the laboratory carrying out the analysis. sundhed.dk hosts these guides which can be accessed via general links.

- Agree on and develop a template for producing laboratory guidelines on sundhed.dk. This part of the project supports a common structure, layout and content for laboratory guides.

- Produce a guide for creating county/regional news pages targeted at WebReq.

Results

The development of a link module for laboratory guides, allowing them to be accessed via an analysis code or laboratory code, is now complete and it is available on sundhed.dk. The description has been written and is ready for testing.

Region Sealand is planning to incorporate the link into its guides. No other laboratories have implemented this function yet.

Next step

With support from MedCom, sundhed.dk is running a course at the start of 2008 on how to use the laboratory links. Over the following years the laboratories can adapt their guides so that they can be accessed via analysis codes or a lab ID.

Example of a laboratory guide from sundhed.dk

The analysis guide template has been produced and is ready for use.

The guide for the news pages is ready.

All the laboratories were informed about the solution at a joint meeting held on 6 December 2007.

Short names

MedCom’s short names are available at www.medcom.dk/wm110282. 3,500 national short names have been devised, which will be available on the National Board of Health’s website from April 2008.

The main challenge is that most regions are using their own CMS systems, which are different to the one used by sundhed.dk. A description of a solution for this is expected to be produced in 2008–2009.
MedCom expects to implement the FAME project (Common Medication Data) during 2008–2009. The purpose of the project is to enable doctors and nurses in hospitals and at GP surgeries, as well as other healthcare professionals in the care sector and at pharmacies to use the same common, up-to-date medication data from the Danish Medicines Agency’s Medicinprofil (electronic medication profile system). The project will also launch the nationwide introduction of an SOA-based IT infrastructure as part of the future IT strategy for the healthcare sector.

Information about medication is used widely every day in the home care service, hospitals, GP surgeries, pharmacies and in many other types of institutions in the healthcare sector. Each of these institutions’ IT systems contains therefore a medication card, which is a list of medication, with each patient’s medication information being continually updated.

Introducing “common medication data” will mean that these local medication cards are updated with the latest medication information from a medication card installed on a central server. It will also mean that data from the local medication cards will be transferred to the central solution.

A far-reaching project

The task of introducing common medication data is a far-reaching project which will involve more or less the entire healthcare sector, i.e. over 4,000 healthcare institutions and more than 30 different IT providers.

The dissemination project includes three pilot projects which are being implemented by the Danish Medicines Agency, followed by three rollout projects being implemented by MedCom.

The purpose of the Danish Medicines Agency’s three pilot projects is to test a web service interface which will enable the healthcare sector’s medication systems to be integrated with the prescription server.

Timetable

The project for disseminating nationwide online communication of medication information includes the following:

- two “spearhead” rollout phases in MedCom 6 in 2008–09, which are expected to involve a total of 10–15 hospitals and local authorities, as well as more or less all the IT providers in the area.
- a major nationwide rollout project will follow on in MedCom 7 in 2010, with the aim of introducing online communication of medication information in the remaining 30 or so hospitals and 85 local authorities.

Key figures

The introduction of the common medication data system in the healthcare sector will involve:

- 642 departments in 60 hospitals, which use 11 different EPR systems.
- 3,000 GP surgeries and specialist practices with a total of around 15 different systems.
- 700 care homes and care centres, along with home care services in 98 local authorities, which use 4 different ECR systems.
Further development of the prescription renewal standard from care systems and GP systems

As part of the “Lighthouse project” in North Jutland, a standard was developed for exchanging data between the local authority’s ECR system and four selected GP systems. This standard made it possible to submit a request for a prescription renewal directly from the patient’s medication card in the ECR system. This request is transferred directly to the medication card the doctor has for the patient. The GP can then select the required medication in his medication module and generate an electronic prescription for the relevant pharmacy.

Thanks to the introduction of the common prescription server, it will be possible – gradually as the home care service gains access to the electronic medication profile – to implement web services with data from the medication profile. It will also be possible, in this case, to generate a request for a prescription renewal.

As part of this, it was necessary to have both an EDIFACT and XML version of the prescription renewal standard. At the same time, a change was made to the EDIFACT version so that it is now based on the current prescription standard, which offers the opportunity to indicate whether the prescribed medication needs to be dose dispensed.

The purpose of the prescription renewal standard is to allow community healthcare staff to order prescription medicines from GPs or specialists on the patients’ behalf. In those cases where patients on fixed prescribed medication are involved, these reorder requests can be transferred from system to system. This means that care staff can order the prescription at any convenient time during the day.

Results

Implementing acceptance of the new prescription renewal standard in the GP systems was part of the cooperation agreement between MedCom and the GP system providers. According to the agreement, all medical systems were to be able to receive the new version by 1 October 2007. The standard was presented at a course for providers in May 2007 where several providers developed their own solution.

Most GP systems have now been tested for acceptance. The development of the ECR systems’ integration with the electronic medication profile has taken a long time. This is due to the need for a change in the law on storing data in a separate system. The ECR system which can handle the task directly from its own system has been updated so that the standard can be sent in the new version. This means that the communication already taking place does not need to be stopped, while all the doctors in the relevant local authorities can continue to receive requests for prescription renewals.

Next step

The ECR system providers are developing web services for the electronic medication profile. One system is ready for pilot operation in spring 2008, with the remaining systems to follow. There is no definitive timetable for the other systems.

| North Jutland Region | 1,705 |
| Mid Jutland Region    | 1    |
| Region of Southern Denmark | 2,147 |
| Region Sealand        | 5    |
| Capital Region of Denmark | 83  |
| **Total**             | 3,941 |
Other medication-related projects

Information activities related to the use of the Danish Medicines Agency’s interaction database and Standard development in connection with transferring information on medicines, including information on discontinuation, between the medication database and GP systems

MedCom’s steering group decided to follow up the recommendations from the one-day seminar devoted to medication in November 2006 with a draft plan for the medication sector. The draft plan is described in the FAME project where the Danish Medicines Agency is carrying out in 2007–2008, in cooperation with three regions and three GP system providers, a pilot project aimed at developing and testing a procedure for updating medication information on the central medication server.

MedCom is responsible for the implementation of the GP system pilot project.

During the project the GP system providers must develop and test a solution for updating and reporting medication information from each doctor to the electronic medication profile system. The solution requires a significant change to GP systems, which is why an agreement has been signed with three key GP system providers concerning the development and testing of the solution.

**Results**

The GP system providers, a doctor from each of the participating systems and MedCom have held meetings to look at the professional healthcare requirements to be implemented in the GP systems.

**Next step**

The three GP system providers, Æskulap, PLC A-data and MedWin, expect to carry out a pilot to test the integration of the Danish Medicines Agency’s system with the medication card system in spring 2008.

Transferring medication information between the hospitals’ medication systems, GP systems and PEM (personal medication profiles).

As part of these implementation projects, testing has been carried out during the MedCom 5 period on prescriptions which go from the prescription server directly to the pharmacies. There have been problems during this period in that not all the information sent by the doctor in the prescription was displayed in the pharmacy system. This problem has now been resolved.

The implementation projects have focused on information briefings with providers, the Danish Medicines Agency and hospital representatives. The hospital systems’ prescription dispatch facility was also tested as part of this.

**Results**

A number of medication systems in hospitals still need to have their prescription dispatch facility tested and approved. The challenge for the hospital systems is the difference between the dosage they have displayed, which reflects administration times in each department and the prescription, which contains coded dosages according to the basic data from the Danish Medicines Agency.

**Next step**

MedCom is trying to have all the hospital systems approved for electronic prescription dispatch by the end of 2007.

Connecting the Danish Medicines Agency’s prescription server to the Health Data Network VPN

The prescription server has been connected to the Health Data Network.

<table>
<thead>
<tr>
<th>Hospital medication modules (Sender)</th>
<th>Prescription standard (PRE01, LMS016)</th>
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</thead>
<tbody>
<tr>
<td>WM-Data, Viborg</td>
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</tr>
<tr>
<td>MediCare, Funen Hospital</td>
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</tr>
<tr>
<td>IBM (IPJ), Kolding</td>
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</tr>
<tr>
<td>CSC Opus Medicin, Roskilde, Storstrom, West Sealand</td>
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</tr>
<tr>
<td>Systematic, Aarhus (AAA-EPJ)</td>
<td>Approved</td>
</tr>
<tr>
<td>Systematic, South Jutland</td>
<td>Approved</td>
</tr>
<tr>
<td>FICS Danmark A/S (FICSSAG), Slagelse</td>
<td>Approved</td>
</tr>
<tr>
<td>ACURE - EPM, H-S</td>
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</tr>
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<td>ACURE - EPM, Copenhagen County</td>
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<td>Cosmic (WM), OUH</td>
<td>Approved</td>
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<tr>
<td>MyClinic</td>
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<tr>
<td>ACURE - EPM, Bornholm</td>
<td>Approved</td>
</tr>
<tr>
<td>TM-Theriak, North Jutland</td>
<td>Approved</td>
</tr>
</tbody>
</table>
SUP/e-record

The SUP/e-record project is a continuation of the SUP (Standardised extract of patient data) project. The purpose of the project is to support good patient progress by offering a facility for consulting via the Internet the hospital systems’ existing clinical information from electronic patient records (EPR) and patient administrative systems (PAS) respectively, across regions and hospitals.

The project focuses on offering access to five user groups:

- Hospital staff who are looking for clinical information (including cave) about patients admitted from other hospitals.
- GPs who are looking for more detailed information about hospital treatment than is contained in a discharge letter.
- Specialists who are looking for earlier information about a patient’s case history.
- On-call doctors who need an overview of any case history a patient has before making a visit.
- Ordinary citizens who want to know more about the treatments they have received in hospital.

The SUP/e-record project has not been involved with creating wider access to patient records from GPs or specialists.

E-records are created in a central database which constantly receives information from EPR and PAS systems. The information is then made available via a web browser. All communication on the Health Data Network is encrypted.

Results

Access to e-records has been established for hospitals since 2004, for GPs since January 2007 and for the citizens of former Viborg County since January 2007.

By the end of 2007, 3.6 million patient records will have been delivered to the e-record database for 2.6 million patients, corresponding to 50% of the Danish population. This data comes from North Jutland Region, Mid Jutland Region minus the former Ringkøbing County and Region of Southern Denmark minus the former Ribe County.

There are 3,000 visits to consult records from hospitals every month. During the first nine months of 2007, around 400 GPs consulted records for around 1,400 patients. During the same period, 2,000 citizens from the former Viborg County viewed their own records on sundhed.dk.

A consolidated operating environment is being commissioned at the end of November, which can handle, in terms of capacity, access for consulting all the data from every region.

Next step

The e-record's data and user structure are based on the former counties. Some restructuring is therefore expected in relation to the regions. A number of improvements are planned with regard to viewing e-records via the Internet, aimed at improving the search facilities and the clinical data's layout.

The Danish Data Protection Agency has just approved a more secure and suitable access facility for e-records in hospitals. It comprises a button solution so that as a clinical user in a PAS system (or EPR system) you can have the patient/treatment provider role clarified and then obtain additional information about a given patient from an e-record using a deep link (and signing with a server certificate). This scenario is currently being analysed with regard to the decision process, development and implementation of regional solutions.

Key facts

Region Sealand and Capital Region of Denmark are establishing the delivery of data to e-records during the first quarter of 2008. The former Ribe and Ringkøbing counties are doing the same.

In hospitals access to e-records is being established via the Health Data Network (SDN). Access to e-records is being established for GPs and ordinary citizens via sundhed.dk, with the use of employer and citizen signatures respectively.

Key facts

North Jutland Region supplies all data.

Mid Jutland Region, minus Ringkøbing, supplies all data.

Region of Southern Denmark, minus Ribe, supplies all data.

Region Sealand will supply data in spring 2008.

Capital Region of Denmark will supply data in spring 2008.
Expanding the use of WebReq – electronic laboratory requests

Electronic requests have been sent to pathology and microbiology laboratories in only a few counties for a number of years. The development of the WebReq modules now offers the opportunity for requests to be sent electronically to clinical biochemistry and clinical immunology laboratories as well.

According to the new agreement signed with GPs on 1 April 2006, all laboratory requests were to be sent electronically using MedCom’s MEDREQ standards by 1 August 2007 at the latest. The WebReq solution is being used to do this.

With the aim of achieving complete expansion of WebReq’s use through a huge, rapid campaign, a project has been launched aimed at expanding and establishing WebReq in the following areas:

- Clinical biochemistry
- Clinical microbiology
- Clinical pathology
- Clinical immunology

The target was for 80% of all laboratory requests to be sent electronically by the end of 2007.

Results

WebReq is currently being used in all five regions. Four of the regions have set up expansion teams and their laboratories all have WebReq contacts. A WebReq user group has been set up, which meets twice a year and sets the priorities for the system’s further development. A WebReq feedback group has also been set up and meets once or twice a year to exchange tips and ideas.

MedCom has taken on a coordinator to support the initial effort and provide guidance in connection with launching WebReq in the individual laboratories.

The connection rate for GP surgeries has gone from a very low level of just 4% two years ago to the current figure of 80% of all surgeries. In October 2007 they sent 275,000 requests, corresponding to 79% of the total number of requests submitted.

Technology used

Conventional EDI is used via VANS, as well as EDIFACT and XML standards. MedCom EDI standards REQ01, REQ02 and REQ03 are used, along with PRODAT for updating analysis registers.

Communication between GP systems and WebReq takes place via the Internet in a 128-bit SSL-encrypted session.

Note the growth rate of 2,000% over the last two years.
All the pathology departments in Denmark are included.

The level of WebReq’s use has grown by 2,000% within a two-year period. A growth rate of this magnitude has never been seen before in MedCom projects.

Next step

The implementation of WebReq in the remaining laboratories will continue during 2008, along with the registration of the GPs who are still not connected. Specialists and private hospitals will also be connected in 2008–2009.

The status as of October 2007 is as follows:

- All biochemistry laboratories are included, apart from the laboratories in the former North Jutland, Ringkøbing and Funen counties, along with Frederiksberg Municipality. The latter will be included during the first half of 2008.

- All microbiology laboratories are included as of the end of 2007, apart from the laboratories in the former Funen County, which will start using the solution during the first quarter of 2008.

An enhancement to WebReq, intended to be used for carrying out external quality controls on laboratory tests in general practice, is expected to be implemented in 2008.

The request database is being implemented in every region and is expected to be gradually commissioned over the next two years.

MedCom will continue to employ a coordinator to support the remaining laboratories due to start using the system in 2008.

<table>
<thead>
<tr>
<th>WebReq</th>
<th>October 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>North Jutland</td>
</tr>
<tr>
<td>Clinical biochem.</td>
<td>2,238</td>
</tr>
<tr>
<td>Microbiology</td>
<td>19</td>
</tr>
<tr>
<td>Pathology</td>
<td>790</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

Who's involved %.
GP surgeries connected as of 1 November 2007.
Communication between laboratories

Electronic dispatch slips

The Mini-IRSK project enabled biochemical laboratories to receive EDI results electronically for samples sent for analysis at external laboratories. The samples being dispatched from the local laboratory are accompanied by a dispatch slip on paper containing a great deal of information about the sample ID and demographic data. This data is input manually at the laboratory which receives the sample for analysis.

A number of instances have been noted in the Mini-IRSK project where the data has been input wrongly, which makes it obvious that these dispatch slips should be replaced with an electronic request.

The purpose of this project therefore is to develop and implement a new dispatch module for the existing laboratory systems so that a MEDREQ can be sent automatically, identical to the one used in the WebReq projects.

The project includes the further development of the existing request standard with common prompt codes etc. so that all laboratory systems can handle the standard. This development is taking place as part of what is known as the “trilateral problem”, which supports communication of results and requests across the three types of specialised laboratories so that total electronic communication can take place between the specialties and not just in biochemical laboratories.

Results

At the moment, electronic dispatch slips are only used in Region Sealand where they are used between the former counties’ various biochemical systems and for dispatches to the Capio Diagnostik service laboratory.

Agreement has been reached on an adapted standard which covers this trilateral problem. The use of different number systems etc. can now be handled.

The biochemistry and microbiology laboratory system providers reviewed the standard at the MedCom course and tested the feature for communicating across specialties. As a necessary element in the trilateral problem, the laboratory results had information added about which laboratory had produced them. This information can be displayed later on in an EPR.

Next step

In 2008/2009 projects are being proposed which involve a massive dissemination in communication between laboratories so that the whole country is covered. The prerequisite for this dissemination is that all the laboratory systems are modified so that they can handle the new easily adapted standard.

One of the challenges here is to agree on plans and a strategy for using a national numbering system for laboratory samples.

National short names and analysis classification

Laboratory results are displayed nowadays in a wide variety of sequences and contexts in electronic systems. No two hospitals or GP systems display them in a uniform presentation format, which makes it difficult to see which analyses have been carried out.

Another fundamental problem is that, although IUPAC codes are used, analysis names are often assigned locally and many of the former counties have their own analysis names. There is also the fact that MedCom has issued a short name table as well, with recommendations for presentation and naming conventions.

This gives rise to confusion and lack of clarity, and with the creation of the regions, a standard naming convention is required, along with a considerable improvement in presentation. For this reason, the purpose of this project is to establish a common, national naming convention and presentation format so that the sequence in analyses can always be recognised and the analyses are called the same, no matter where they have been carried out in Denmark.

Results

MedCom’s laboratory healthcare group has drawn up a proposal and guidelines on how to name analyses with IUPAC codes. The proposal has been discussed in the professional healthcare

Technology used

Conventional EDI and VANS are being used. EDI solutions are reused for receiving requests. MedCom’s XML standards can also be used.
Requests from hospitals to a request database

The development of the WebReq system has now also led to a request database being established. It is primarily intended for specialists who simply order blood tests which patients can have carried out by their own doctor.

The specialist will automatically receive the test results and the patient's doctor can receive them too. The same solution can be used for patients who are being treated in hospital outpatients departments. In this instance, patients often go to their own doctor to have samples taken, which have been ordered in the outpatients department. The outpatients department usually completes a paper request, which patients take with them to their own doctor. These are often request slips, which are not used in the patient's own GP surgery, but only in specialist departments at the hospital.

If the hospital uses the Labka hospital package or WM-Data's BCC request system, they can send, with only a minor program change, an electronic request to the WebReq request database. The patient's own doctor can then easily find the request when the patient pops in. Analyses which are not usually taken by a patient's own doctor are automatically highlighted and can be easily found by the doctor to ensure that the correct samples are taken.

Project

All laboratories using a request module, such as the Labka hospital package or WM-data's web-based request module, will automatically be able to send a copy of the electronic request to the WebReq request database.

Technology used

Conventional EDI via VANS is used where the Labka hospital package sends a copy of the request via the EDIFACT standard REQ01 to the WebReq request database. In future it will be possible to use the Health Data Network's DIX and XML standard XREQ01.

MedCom's laboratory healthcare group has drawn up proposals on how to present laboratory results better on sundhed.dk. The presentation aspect is being included in a provider proposal for sundhed.dk's steering group, along with financing proposals.

Next step

Implementation of short names on sundhed.dk. They are scheduled to make an appearance in 2008/2009 as part of the effort to improve how laboratory results are presented on sundhed.dk.

Use of the recommended short names and groups. The National Board of Health will publish national short names along with IUPAC codes and take care of their future maintenance.

Key facts

Proposals have been drawn up for short names for 3,500 analyses within clinical biochemistry etc. The short names are defined along with the IUPAC codes and the IUPAC naming convention. The proposal for the new format for presenting laboratory results on sundhed.dk can be seen on MedCom's website.

Key figures: Number of dispatch slips for biochemistry requests in October 2007

Between Region Sealand and Capio: 796
Between Region Sealand and WebReq database: 92
Internally in Region Sealand: 292
Expanding the use of electronic referrals

Since MedCom’s consolidation project was implemented in 2000–2002, it has been possible to send referrals via EDI for hospital treatment and X-ray examinations.

The growing use of EDI referrals has been observed in some of the former counties, while others have not progressed as far with this deployment. Only 50% of all referrals are sent electronically at the moment.

It is possible to send referrals to specialists, but complete dissemination is expected when the referral database is implemented in 2008. This also applies to referrals to physiotherapists and psychologists.

GP systems will need to be reprogrammed to be able to send all these types of referral.

For this reason, regional dissemination projects are being set up, with the aim that:

- all referrals for hospital treatment from the primary sector will be sent via EDI
- all referrals for X-ray examinations from the primary sector will be sent via EDI
- all referrals from GPs to specialists, physiotherapists and psychologists will be sent electronically using the referral database about to be set up
- GP systems will be developed further to be able to handle all types of electronic referrals

Results

Several regions were fairly late starting the task of extending the practice of sending referrals to hospitals electronically. The remaining hospitals had systems implemented by 15 November 2007 so that they can receive referrals. The task now is to disseminate this use in each region.

The use of EDI referrals has doubled during the MedCom 5 period.

The referral database has not been set up yet by Danish Regions, but will be in 2008. 90% of GP systems have developed the use of referrals during the project period so that they can cover every area and are ready for the referral database to be put into operation.

Next step

Region of Southern Denmark, Capital Region of Denmark and Mid Jutland Region are in the midst of dissemination activities in the hospital sector, focusing on huge dissemination of the use of electronic referrals in 2008. Once the referral database has been set up, it is expected that dissemination activities will be launched at a regional level in the second half of 2008.

EDI referrals per month

- 60,000 = 40% of all hospital referrals/month
- 35,000 = 65% of all X-ray referrals/month
- 40,000 = 35% of all specialist referrals/month
- 4,000 = 10% of all physiotherapist referrals/month

Technology used

Referrals are sent using the conventional EDI method via VANS, based on MEDREF standards. The referral database will use the conventional EDI method, as well as offering the additional option of read access for referrals via the Internet using a digital signature.
Completion of Mini-IRSK project

The purpose was to complete the Mini-IRSK project by:

- disseminating the use of electronic referrals sent from hospitals to private hospitals, as well as between hospitals
- disseminating the receipt of laboratory results electronically from service laboratories
- disseminating the use of correspondence messages in hospitals

According to the plan, the Mini-IRSK project should have been implemented in 2005, but it was delayed due to missing and defective deliveries of IT modules and the limited focus on implementing it in a number of the former counties. All the modules were therefore only delivered on 31 October 2006.

The counties which had signed an agreement to implement Mini-IRSK were supposed to disseminate the solutions to all hospital departments in November-December 2006, so that after this date referrals and discharge letters would no longer be sent between hospitals on paper.

**Results**

All hospitals have now had the software installed and can use it. In actual fact, only a few of them are using it, but a slow dissemination process is in progress.

All hospital systems – PAS – can receive and send messages, including correspondence messages. As a result of the creation of the regions, more or less all the key staff in the project have changed job, which has slowed down implementation.

**Technology used**

Totally standard EDI messages are used in the project, which are sent via the VANS network. A few individuals use XML format internally.

**Next step**

No further measures are planned in terms of disseminating the use of this solution.

### Number of messages sent by hospitals in September 2007.

<table>
<thead>
<tr>
<th>From/to Region</th>
<th>North Jutland</th>
<th>Mid Jutland</th>
<th>Southern Denmark</th>
<th>Zealand</th>
<th>Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Jutland</td>
<td>53</td>
<td>1,638</td>
<td>34</td>
<td>1,797</td>
<td>6</td>
</tr>
<tr>
<td>Mid Jutland</td>
<td>8</td>
<td>122</td>
<td>124</td>
<td>654</td>
<td>230</td>
</tr>
<tr>
<td>Southern Denm.</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Sealand</td>
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<td></td>
<td></td>
<td>95</td>
<td></td>
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<tr>
<td>Capital</td>
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<tr>
<td>KPLL</td>
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<td></td>
</tr>
<tr>
<td>SSI</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capio Diagnostik</td>
<td>22</td>
<td>374</td>
<td>635</td>
<td>1,046</td>
<td>703</td>
</tr>
</tbody>
</table>

- **Discharge letter**
- **Outpatients discharge letter**
- **Casualty discharge letter**
- **Radiology report**
- **Biochemistry results**
- **Microbiology results**
- **Pathology results**
- **Correspond. sent**
- **Prescriptions**
- **Appointment confirmation**
- **Further referral**
- **Further X-ray referral**
- **To local authorities**

**RPT01 – biochemistry results between regions, August 2007.**
**ECG standardisation**

A significant number of ECGs are carried out both internally in hospitals and at GP surgeries. Most ECGs are now recorded and stored electronically and can be displayed on a screen and usually also printed on paper. ECGs are stored in local databases in most cases and are displayed in the relevant provider’s presentation software.

At the moment, ECGs cannot be exchanged between the various ECG equipment providers’ devices as each provider uses its own software, which cannot be read by other providers’ equipment.

The purpose of this project therefore is to:

- establish a national ECG exchange standard to be used in the future when exchanging basic ECGs within the healthcare sector
- develop and offer an open source ECG viewer, which can display and carry out a simple analysis of the selected standard
- guarantee information for and agreement with providers of ECG equipment on the Danish market enabling them to support the selected standards

A standard for exchanging ECGs has been developed at European level: the SCP standard, while an HL7 XML standard for ECGs is currently used in the US. Many providers can use one of these standards.

**Key figures**

More than 200,000 ECGs are carried out in general practice each year. Over 2 million diagnostic ECGs are carried out in hospitals each year. There are more than 10 different providers of ECG equipment in Denmark.

**Technology used**

ECGs can be sent via the Health Data Network (SDN) and can be based on a number of formats, including XML. MedCom’s recommendation for wrapping/packing XML standards is being used. There are two formats:

1. American: HL7-XML
2. European: SCP

All systems in the US must be able to support HL7-XML.

**Results**

The project is being implemented in cooperation with Capital Region of Denmark. Implementation was originally scheduled for 2007, but has been postponed until 2008.

**Next step**

A new timetable is being drawn up in December 2007, with a series of meetings starting in early 2008.

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**SEI – National Board of Health’s electronic reporting system**

In 2007 MedCom cooperated with the National Board of Health on using MedCom’s standards for Service-Oriented Architecture. The purpose of this cooperation was to give system providers the opportunity to achieve integration of SEI reports with automatic data capture in their own systems in the primary and secondary sector.

As part of this, MedCom’s Good Web Service (DGWS) and Dynamic Form (DDB) standards were proposed as technical standards which could support integration. However, it has transpired that these were not advanced enough to support, for instance, cause of death reports. Both standards will therefore be reviewed by the end of 2007.
**SOR – Healthcare system organisation register**

The Healthcare system organisation register (SOR) will replace both the hospital department classification and the Partnership table. The Partnership table, used for EDI messages, is the key to addressing all EDI communication in the healthcare sector, with over 10,000 numbers allocated.

Some GP EDI systems use data from the Partnership table and update the GP system’s electronic address register with this information every other week.

Introducing the SOR will make it possible to download all the information using the Good Web Service.

MedCom has agreements with all the GP system providers to update all the EDI address details from the SOR register. Rollout was planned for October 2007, but has been postponed until summer 2008.

**Key facts**

Replacement personal ID numbers (EPNR) have 10 digits and are made up as follows:

- Digit 1 = 4–9
- Digit 2–9 = 0–9
- Digit 10 = A–Z

Example: 401234567D

**Technologies used**

Web services, Health Data Network (SDN), DGWS, digital signature.

**EPNR – new national replacement personal ID number**

A working group set up by the Coordinating Committee for Personal Data, with participants from MedCom, Capital Region of Denmark, Region of Southern Denmark, the National Board of Health, Danish Regions and the CPR Office (central office of civil registration), has drawn up a proposal for establishing a national system for allocating replacement personal ID numbers. The proposal has been approved by the Coordinating Committee after consultation in all the regions and by the National Board of Health.

Replacement personal ID numbers are allocated by the CPR Office using a web service on the CPR Office’s server. This is used when a personal ID number is required for a person who is otherwise not entitled to a proper personal ID number according the regulations under the CPR law.

This facility is based on a stand-alone number allocation procedure without any connection to the CPR system and has been in operation since July 2007.

The next step is to implement the facility in all the systems in the healthcare sector.

**Key facts**

Replacement personal ID numbers (EPNR) have 10 digits and are made up as follows:

- Digit 1 = 4–9
- Digit 2–9 = 0–9
- Digit 10 = A–Z

Example: 401234567D

**Technology used**

Web service, digital signature.
MedCom International –
an independent division of MedCom

MedCom International was set up on 1 January 2007 to develop the important international cooperation within healthcare telematics.

MedCom International was initially involved in developing international activities from Funen County. These activities were carried out at the Danish Centre for Health Telematics before the structural reform. Since then MedCom International’s business activities have expanded to include international consultancy for all MedCom partners. MedCom International is 100% self-financing, primarily through project resources from EU projects or in the form of revenue earned from carrying out specific tasks.

Better Breathing:
Telemedicine solutions will improve COPD patients’ quality of life

COPD patients are going to have fewer and shorter admissions to hospital, along with greater peace of mind and a better quality of life. This will be achieved by using digital equipment and measuring devices in the patient’s own home.

Four different regions in Europe – Catalonia, Wales, Northern Norway and Region of Southern Denmark – have been using different telemedicine solutions in parallel, which all have the purpose of improving COPD patients’ quality of life. Funen Hospital in The Region of Southern Denmark is involved in a project where patients are given a briefcase containing equipment which they can use to hold videoconferences with the doctor from their own home and also take measurements themselves of their lung function, for instance, which are assessed on the spot. In other words, patients can consult the doctor from the comfort of their own armchair. This equipment has been developed by the consultancy firm Global IT Systems.

Four hospitals are taking part in the project and are each testing their own solution, which focuses on different stages in the disease’s progression. For example, the solution being used in Norway enables patients to receive rehabilitation and meet other COPD patients via the TV in their own home.

The project’s budget is just under €2 million and the project is being implemented between June 2007 and November 2008. MedCom International is the main coordinator for the project, with 10 partners taking part from six countries: Denmark, Belgium, Italy, Norway, Spain and the UK.

MedCom International offers the following services:

Development and preparation of applications for international projects
MedCom International offers support for the whole application process connected with submitting international applications, mainly within the various EU programmes, such as R&D (7th Framework Programme), regional fund programmes (Interreg A, B and C) and the various implementation programmes (CIP).

Establishing international networks and contacts
A key benefit from taking part in international projects is that it helps create technical, political and social networks between the agencies involved. It often results in cooperation which continues bilaterally once the project timeframes are past. If you want to get involved in international projects it is crucial for you to have a number of partners that you are familiar with and trust. MedCom International offers to use its extensive network to find relevant international contacts and help in establishing bilateral partnerships.

Project management and administration of international projects
Administering and managing both large and small international projects is a task that requires considerable insight into the administrative processes involved. You also need the right capabilities to drive the projects forward. The experience and skills which MedCom International has accumulated over more than 10 years in this area are available for all the parties supporting MedCom to use, according to what has been agreed.

The specific tasks are carried out on the basis of a cooperation agreement, which specifies the task and costs involved. At the moment, MedCom International has signed partner agreements with Region of Southern Denmark and Odense Municipality, but is keen to extend its cooperation with other regions, local authorities or interested parties.
R-Bay: Marketplace for X-rays

The R-Bay project involves establishing a secure platform for offering and requesting services and expertise across Europe’s national borders.

Many countries, including Denmark, are suffering from an acute shortage of radiologists. In contrast, other countries have a clear surplus of resources in this area. The R-Bay project offers hospitals with a shortage of radiologists direct access to specialist knowledge without any brain-drain taking place, whereby specialists are encouraged to leave their own countries.

R-Bay is a type of platform or to use the popular jargon, an eMarketplace, where users, for instance a Danish hospital, can look for radiology services, and where radiologists, for example from the Baltic countries, can offer their expertise.

The Baltic eHealth project has already gained good experience in requisitioning radiology services, such as in the form of analysing X-ray images, from hospital to hospital across national borders. This project is based on an open platform where all those connected can log on and deal in radiology services.

The project was launched by a consortium based around Carestream Health UK Limited, previously called Kodak. The project was handed over in autumn 2005 to MedCom International, which has since taken over project management on behalf of Region of Southern Denmark and has secured EU support for a pilot project, which was launched in August 2007 and will run until the beginning of 2009. As part of this, Funen Hospital in Svendborg and Sydvestjysk Hospital in Esbjerg will send X-ray images for analysis at East Tallinn Central Hospital in Estonia and Vilnius University Hospital in Lithuania.

The project has a budget of just under €2 million and includes 10 project partners from seven countries – Denmark, Estonia, Finland, the Netherlands, Norway, Lithuania and Czech Republic.

Current international projects

R-Bay (www.r-bay.org)
The R-Bay project is looking to establish a secure platform, enabling radiology services and expertise to be offered across Europe’s national borders. This means that the opportunity for specialist expertise is available, regardless of the patient’s geographical location.

Better Breathing (www.betterbreathing.org)
Market validation of home monitoring equipment and new types of IT-based services for chronic patients (COPD).

Interpreting service
This project involves testing ICT equipment with a view to improving interpreting services in Region of Southern Denmark. No outside support is being provided for this project, which is a collaboration between Region of Southern Denmark and Cisco Systems.

WHO/European eHealth Consumer Trends Survey
This is a European survey looking into consumers’ usage of and attitude towards the Internet in relation to health and the healthcare system.

PERSONA (www.aal-persona.org)
This is a welfare technology development project which will test technologies which can help elderly people remain in their own homes and neighbourhoods for as long as possible using IT support.

Health Optimum I.D. (www.healthoptimum.info)
The purpose of this project is to improve healthcare services using telemedicine in five European regions, including Region of Southern Denmark.

GAP, “Guard, Anticipation and Prediction”
This project intends to predict and intervene in the case of various health-related risks threatening the population of Europe.

Projects completed in summer 2007

@HEALTH (www.ithealth.org)
MedCom International is a member of a forum where the main focus is on building networks and exchanging experiences in the area of eHealth between partners in Europe and Latin America.

Baltic eHealth (www.Baltic-eHealth.org)
This project has connected up the national healthcare data networks in Denmark, Norway and Sweden with the regional networks in Estonia and Lithuania to create a Baltic healthcare network (BHN). This Baltic network has created new opportunities in the healthcare system.

INFOBIOMED (www.infobiomed.org)
This project has connected up biomedical and healthcare IT systems, with a centre which provides knowledge and develops standards where genetic data is sent to clinical databases. It has received EU support from IST, FP6.
Since it was set up in 1995, MedCom has been working on ensuring practical standards are in place for exchanging data between IT systems in the healthcare sector using nationwide network solutions. Until now the vast majority of communication has been based on MedCom’s specifications of the internationally established UN EDIFACT standards, which takes place courtesy of the healthcare sector’s VANS suppliers: KMD and Progrator.

The majority of EDI standards have been continually converted to OIO XML formats since 2004, following on from the decision to base all public data exchange operations on XML.

The whole standardisation process is supported by a test and certification function for IT providers.

The future poses new challenges in the form of setting up a Service-Oriented Architecture (SOA) in the healthcare sector, offering online and integrated data exchange with national services, based on standards including MedCom’s DGWS (Good web service) standard. It also involves developing the national Health Data Network (SDN) further, which is being used not just for exchanging data via web services, but is also already being used, for instance, for exchanging X-ray images, videoconferencing, sending reports for clinical databases and updating sundheds.dk.

Final decisions are expected from the board of SDSD (Coherent Digital Health in Denmark) concerning how the work on the technical infrastructure will be organised in the future.

Good EDI and XML letters

The document Good EDI letters provides a detailed description of MedCom’s EDIFACT standards and has gone through quality assurance and a technical review with the aim of improving EDI communication in the healthcare sector. Under each message type you will find the complete documentation required for developing and implementing the relevant messages, along with a number of test examples.

The document Good XML letters contains an XML translation of the EDI documentation for the protocol for standardising data in the public sector, OIO – Public Information Online. Namespaces for MedCom’s XML letters are published regularly in OIO’s information structure database.

EDI/XML test centre

When using MedCom messages to communicate, it is vitally important that both the sender and recipient use MedCom’s standards and that the syntax is exactly identical. If this is not the case, errors or a misunderstanding will arise when the message is received.

To guarantee this consistency, it used to be necessary in the past to test the standards in local pilot projects, for each provider in turn, and gradually adapt the systems.

This process, by its very nature, was particularly time- and resource-consuming for all the parties involved. However, the introduction of the Good EDI letters and Good XML letters guides marks an attempt to make the standards’ documentation so accurate that it would basically be possible to carry out the necessary standardisation process for the sender and recipient systems during testing before commissioning.

To support the IT suppliers’ development process, MedCom is providing an online testing tool. This tool can test EDI and XML formats in accordance with MedCom’s standards. All the documentation is supported when carrying out XML-EDIFACT conversions, MedCom has developed a web-based converter, available via www.medcom.dk or directly from http://web.healthtelematics.dk/xmledi

To support IT providers when carrying out XML-EDIFACT conversions, MedCom has developed a web-based converter, available via www.medcom.dk or directly from http://web.healthtelematics.dk/xmledi

Continued on page 38
List of MedCom's EDI and XML standards as of November 2007

A new version has been produced or corrections have been made to the message in MedCom 5. A new interface description has also been produced in XML for MEDRUC messages. The description covers all specialities. MedCom has also contributed to producing an XML version of the PLO (Organisation of General Practitioners) Exchange format.

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<tr>
<th>Lettertype DK</th>
<th>Version</th>
<th>BRVTYPE</th>
<th>Lettertype UK</th>
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<td>BinaryLetter</td>
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<td>*PsychologistLetter</td>
<td>XD1033L</td>
<td>XDIS10</td>
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</table>
for the XML standards has been integrated into the testing tool and can be downloaded from it. The providers can also use the tool to test conversion from EDIFACT to XML and vice versa.

Certification

The sender and recipient systems are standardised by offering all the systems houses the opportunity to test the transmission and receipt of a specific EDI/XML letter type. If the systems house complies with the standard for the relevant letter type, MedCom issues a sender or recipient certificate to the systems house. Approval is publicised on MedCom’s website under the menu option “MedCom-approved systems”.

The Good Web Service

The purpose of the Good Web Service (DGWS) is to support communication with XML-based web services between the various agencies in the healthcare sector, no matter which IT products and systems the relevant agencies are using.

The Good Web Service supports the creation of a Service-Oriented Architecture (SOA), which is recommended by the Ministry of Science, Technology and Innovation as the general model for a common IT architecture in the public sector.

Web services facilitate the exchange of data across IT products and system platforms, but also can be used in countless ways and do not guarantee per se that the products and systems can interact.

This creates therefore the need for a permanently defined utility model, a “profile”, which specifies how to use standards for communication and security and which format common data should have.

The Good Web Service defines a web service profile of this sort for the healthcare system.

The Good Web Service

- is a SOAP web service profile, which sets outs standards for authentication and communication of common healthcare information between organisations in the healthcare sector.
- specifies how OCES certificates can be used for authentication, integrity, non-repudiation and digital signature in the healthcare sector.
- facilitates the transmission of personal health-related information in a secure, flexible manner.
- enables the web service provider to select between four different security levels:
  4: ID card signed with MOCES employee signature
  3: ID card signed with VOCES company signature
  2: Username and password authentication
  1: No authentication
- specifies the security protocol for simple communication between two parties for one-to-many and many-to-many communication.
- requires a secure transmission channel, but is independent of the actual mechanism and can, for instance, be used both with VPN encryption on the closed Health Data Network (SDN) and with SSL encryption on the open Internet.
- sets out guidelines on how to set up services which will be robust when faced with timeouts and retransmissions.

When IT providers use the Good Web Service, they can use a number of tools supplied by MedCom. These tools will be supplemented by an online web service test centre from early 2008.

Common documentation for web services, accompanied by provider testing and certification, is a prerequisite for ensuring that a Service-Oriented Architecture is implemented in a uniform manner across the country, from a healthcare and technical perspective.

The practicalities of establishing web service standards can be split into four specific tasks:

- defining service functionality
- testing and certification of IT providers (compliance)
- updating the versions of web services
- supporting the use of established web services in a professional healthcare environment.

In contrast to the current situation, the tasks will primarily be aimed at supporting the use and dissemination of web services offered by other healthcare bodies, which are typically services offered by boards, regions and local authorities.

As of November 2007, the following MedCom standards are based on the Good Web Service (vers. 1.0)
The Good CPR Consultation Access

The Good Web Service Correspondence (sundhed.dk secure e-mail)

The Good Web Service Appointment Confirmation (sundhed.dk appointment book)

The Good Web Service Notification Master Data (sundhed.dk notification)

The Good Web Service Adverse Reactions Report

The Good Web Service Version 1.1 will be published early 2008 and will include feedback from the pilot trial of The Good Web Service 1.0 over the 18-month period from June 2006 until December 2007. DGWS 1.1 will specify how security information is exchanged in compliance with the Ministry of Science, Technology and Innovation’s guidelines for Public Information Online (OIO) and for using digital certificates (OCES).

The Dynamic Form

The purpose of the Dynamic Form (DDB) is to enable form providers to develop electronic forms which can be integrated and processed by IT systems without needing to adapt each IT system every time new forms are introduced.

For example, a local authority can start using a new form and send it electronically to a GP’s surgery. The GP can then print it out without any problem, fill it in and return it in a complete, integrated process where data which already exists in the GP’s system is reused to complete the form.

The Dynamic Form

- enables form providers to introduce new forms and new versions of forms all the time and the client systems to handle the forms in an integrated manner without the IT system first having to be adapted to suit the new forms.
- allows form providers control over the graphic presentation of forms in the client systems and allows client systems to print the form without needing to adapt their system first.
- enables client systems to gradually integrate ever-increasing volumes of form data in keeping with the fact that several form providers use the same input fields.
- makes it possible to collect quality and activity data efficiently and process the collected data mechanically.
- can also be used for non-form based communication, for instance, for reporting a major quantity of data.

When the Dynamic Form is used, an XML document is produced which can be used in the Good Web Service, for instance.

As of November 2007, the following MedCom standards are based on the Dynamic Form (vers. 0.99):

- The Good Rehabilitation Plan
- LÆ 121 and 125 Status certificate
- LÆ 141 and 145 General health certificate
- LÆ 251 and 255 Certificate confirming ability to take on work
- LÆ 131 and 135 Specific health certificate
- LÆ 132 and 142 Attendance certificates

Based on the feedback from the first version of the Dynamic Form standard, version 2.0 of the standard will be released in early 2008. The suggestion is being made that the new version of the form, along with the Good Web Service, should provide the basis for a future national reporting service, including integrated reporting to SEI and clinical databases.

Health Data Network (SDN)

The Health Data Network (SDN) can offer the entire healthcare sector new opportunities for communication. The SDN can be used, for example, to establish web service communication, consult external databases, exchange images and hold videoconferences. There is also the fact that the common public healthcare portal sundhed.dk uses the SDN as a channel for connecting to the basic systems in the healthcare sector.
This allows the SDN to supplement the VANS-based Health Data Network, which offers the option of using EDIFACT for communicating text messages.

The idea behind the SDN is for the agencies involved in the healthcare sector to meet all their communication requirements using the single same network connection. This makes the network the electronic collection point for communication in the healthcare system, regardless of whether the users belong to the public or private sector.

The SDN comprises a single central node which all the traffic passes through between the various agencies. This node is monitored 24/7 and is redundant. To connect to the SDN, users need to establish an encrypted VPN (Virtual Private Network) connection via the Internet or a permanent connection from their own secure network to the SDN’s node.

Migrating from message-based to online communication in the healthcare sector will, by its very nature, impose major, ever-growing demands on the capacity, stability, speed and central monitoring capability of the entire Health Data Network (SDN). This means that a radical upgrade will be required of the current Health Data Network. The practicalities of upgrading this network can be split into three specific tasks:

- uprating the network (capacity, monitoring and support)
- operation and maintenance of the SDN
- supporting the use of the SDN in a professional healthcare environment

In autumn 2007 the Board of SDSD (Coherent Digital Health in Denmark) launched the initial elements in MedCom’s process for upgrading the Health Data Network in order to be able to meet future communication requirements in a Service-Oriented Architecture. This involves:

- establishing a permanent high-speed connection from all the regions to the SDN.
- analysing the increased central accountability and improved monitoring with possible total responsibility for connections from the central node to and with the SDN’s edge routers at the connected agencies’ site.
- analysing increased support requirements by describing a “virtual machine room” and the first-line support that needs to be offered, along with a description of further problem management.
MedCom – The Danish Health Data Network

Number of messages sent from hospitals

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Number of messages per month

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Number of electronic messages as percentage of possible messages, October 2007

The total number of messages is 4,037,510.

Statistics

Prescriptions
Discharge
Lab results
Lab requests
Referrals
Billing
## Statistics

### MedCom projects – dissemination as a percentage

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GP and specialists’ systems

General practitioners

Specialists

Providers with EDI, October 2007:

- General practitioners
- Full-time specialists
- Part-time specialists
- Physiotherapists
- Chiropractors
- Psychologists

Number of messages sent by GPs

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### Local Authority Statistics 2007

- **Local Authorities, Hospitals, Pharmacies and GP Surgeries**

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*January is not included as the local authorities reform had not yet been implemented in the area of IT in January.*

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### Statistics

- **Discharge Letters**
- **Referrals**
- **Billing**
- **Correspondence**
- **Disposition**
- **Dispensing**
- **Prescription Renewal**
- **Discharge Report**
- **Birth Notice**
- **Home Care Status**

### Message Types

- *Feb.*
- March
- April
- May
- June
- July
- Aug.
- Sept.
- Oct.
- Total 2007
Healthcare DIX

Healthcare DIX:
Traffic volume via the Health Data Network’s (SDN) node in kbytes per month 2006–2007.
A list of those connected to the network is available at: www.medcom.dk/wm110045
Detailed statistics about the SDN’s usage are available at: www.medcom.dk/wm110451

SUP/e-record
Number of logins and authorisations given in hospitals and for access to patient records available in the database.
Link to more statistics: www.medcom.dk/wm110146

SUP/e-record

Number of logins/authorisations

Number of patients

Logins
Authorisations

Number of patients in database
Names/groups

Steering group

Head of Division
Peter Kjærgaard Pedersen,
Local Government Denmark

Head of Department
Vagn Nielsen, Ministry of Health and Prevention

Head of Division Mogens Køllner,
Ministry of Health and Prevention

Director Otto Larsen,
National Board of Health

Head of Division Arne Kverneland,
National Board of Health

Development Manager
Sven-Åge Westphalen,
National Board of Social Services

Project Manager Maria Antonsen,
Ministry of Finance

Head of Division Lisbeth Nielsen,
Danish Regions

IT Director Henning Bruun Schmidt,
North Jutland Region

IT Director Jan Kold,
Capital Region of Denmark

Director Niels Mortensen,
Region of Southern Denmark

Consultant Claus Nielsen,
Local Government Denmark

Henrik Bruun, Danish Pharmaceutical Association

Director Morten Elbæk Petersen,
sundhed.dk

Doctor Jens Parker,
PLO (Organisation of General Practitioners)

Centre Manager
Henrik Bjerregaard Jensen

Primary Group

Head of Department Carsten Rabe Kvist,
North Jutland Region

IT Consultant Karin Hedegaard,
North Jutland Region

Consultant Kate Kusk,
Mid Jutland Region

IT Manager Lars Gleerup,
Mid Jutland Region

Assistant Head of Division
Tove Lehmann, Region of Southern Denmark

Consultant Inga Rype,
Region of Southern Denmark

IT Specialist Jens Henning Rasmussen,
Region of Denmark

IT Project Manager Peter Jan Pedersen,
Capital Region of Denmark

Development Consultant Annette Lyneborg Nielsen,
Capital Region of Denmark

IT Group Manager Kirsten Skovrup,
Aalborg Municipality

Consultant Hanne Linnemann,
Aarhus Municipality

Director Henning Seiding,
Odense Municipality

IT Specialist Søren Skafte Jensen,
Lolland Municipality

Project Manager Merete Halkjær,
Copenhagen Municipality

IT Manager Niels Hornum, KPLL

Project Manager Karin Rokvist,
Capio Diagnostik a.s.

Application Solution Manager
Jeppe Hojholt Nielsen,
CSC Scandihealth

Director Ivan Andersen,
Ascott Software A/S/Eskulap

Sales Manager Kim Regin
Mortensen, KMD A/S

Consultant Claus Nielsen,
Local Government Denmark

Business Development Manager
Ole Lauridsen, Systematic
Software Engineering A/S

System Planner Michael Johansen,
WM-data Healthcare

Software Engineer, M.Sc. E.E.
Karina Husballe Munk,
Lyngsoe Systems

Key Account Manager
Tine Guldbaek,
PROGRATOR | gatetrade

Consultant Physician Steen Hoffmann,
Statens Serum Institut

Doctor Jens Parker, PLO (Organisation of General Practitioners)

Anaesthetics Specialist
Doctor Jens Norreslet,
Vejle Anaesthesia and Pain Clinic

IT Project Manager Lars Krarup,
Danish Pharmaceutical Association

Project team member Jens Rastrup Andersen, sundhed.dk

Nursing and Healthcare
IT Specialist Lene Asholm,
National Board of Health

Academic Executive
Claus Bo Jørgensen,
Danish Medicines Agency

Administration Manager Martin Bagger Brandt,
Danish Regions

Data Consultant Susanne Noesgaard,
Capital Region of Denmark

Centre Manager
Henrik Bjerregaard Jensen

Assistant Manager Ib Johansen

Head Consultant Lars Hulbaek

International Manager
Claus Duedal Pedersen

Consultant Jens Rahbek Nørgaard

Consultant Dorthe Skou Lassen

Consultant Rikke Viggers

Secretary Iben Søgaard

Project assistant
Gitte Henriksen

Consultant/Data consultant
Karin Demkjær

Infrastructure Group

Technical Manager Jacob Lind,
North Jutland Region

Operations Manager
Erling Wad Sørensen,
Mid Jutland Region – RM-IT

Network Specialist Peter Vej Nørgaard,
Mid Jutland Region

IT System Consultant Lars Holbaum,
Region of Southern Denmark
Names and publications

IT Security Manager Søren Nielsen, Region Sealand
IT Architect Anders Skovbo Christensen, Capital Region of Denmark
Special Consultant Søren Bonde-Andersen, Copenhagen Municipality
Healthcare IT Specialist Jan Petersen, National Board of Health
Consultant Claus Nielsen, Local Government Denmark
Consultant Martin Thor Hansen, Danish Regions
IT Project Manager Lars Krarup, Danish Pharmaceutical Association
Operations Coordinator Jakob Uffelmann, sundhed.dk
Head of Department Steen K. Christensen, KMD A/S
Presales Consultant Helene Yding Jensen, KMD A/S
Key Account Manager Tine Guld-bæk, PROGRATOR | gatetrade
Director Ivan Andersen, Ascott Software A/S/Æskulap
Sales Manager Freddy Christensen, EG Data Inform/MedWin
Director Erik Jacobsen, Data Group Vejle MultiMed ApS
Network Specialist Lars Haugaard, CSC Scandihealth
Division Director Martin Bech, UNI-C
Head Consultant Ib Lucht, UNI-C
Secretary Iben Søgaard
International Manager Claus Duedal Pedersen
Head Consultant Lars Hulbæk
Consultant Peder Illum

NB: MedCom’s representatives in the groups are marked in blue.

MedCom
Centre Manager Henrik Bjerregaard Jensen
Assistant Manager Ib Johansen
Head Consultant Lars Hulbæk
Consultant Dorthe Skou Lassen
Consultant Rikke Viggers
Consultant Jens Rahbek Nørregaard
Consultant Jacob Glasdam
Consultant Peder Illum
Consultant/Data Consultant Karin Demkjær
Project Assistant Gitte Henriksen
Accountant Anita Folleraas
Secretary Pia Reinhardt Juel
Secretary Iben Søgaard
Consultant Margit Rasmussen
Student Assistant Line Bjørnskov Pedersen
International Manager Claus Duedal Pedersen
Consultant Christina E. Wanscher
Consultant Janne Rasmussen
Consultant Ellen Kathrine Arve
Consultant Lisbeth Jørgensen
Consultant Claus Nielsen
Project Assistant Jennie Søderberg
Consultant Niels Rossing
Consultant Ulrik Schennemann
Consultant Ernst Kloosterman, NST
Project Consultant Hasse Petersen, Region of Southern Denmark, European Office in Brussels
Office Assistant Alis Jørgensen

Publications
General information about MedCom
Local authorities
Hospitals
Internet strategy
Prescriptions/medication
Guides and guidelines
Telemedicine

Individual titles can be viewed and publications downloaded from: www.medcom.dk/wm109941
At the moment, around 4 million messages a month are being sent. The bars indicate millions of messages per year.

2007 shows the figures up until October, with estimates being used for the last two months.