

Telehealth care in Central Denmark Region

In Central Denmark Region (CDR) we offer a wide range of digital solutions for our citizens. We have succeeded in engaging them in their own health management by systematically using patient reported outcome on health status and by applying home monitoring combined with educating our patients in better understanding their own health. The result is high quality in treatment, high patient security and empowerment of the patients. Here is a selection of examples of solutions, that empower our citizens and support a coherent and well coordinated patient pathway.

Telemedicine for patients with COPD

Home monitoring for patients with severe chronic obstructive lung disease (COPD) brings higher quality and flexibility in treatment, better patient safety, improved patient empowerment and a higher health-related quality of life.

Home monitoring reduces the number of readmissions and burdening outpatient visits. By empowering patients, the number of readmissions to hospitals is lowered as early signs of exacerbations may be discovered and treatment commenced earlier.

This large scale implementation is based on experiences from several projects in CDR as well as across the country.

Hospitals, municipalities and general practitioners (GP) find new ways of co-operating with patients across sectors and have customized their working procedures to the use of telemedicine.

Empowering patients with telePRO while reducing outpatients visits by 48%

Tele-patient-reported outcome (telePRO) implicates that patients report on their symptoms and provide a status on their health in questionnaires completed by the patients at home. The information is used to decide whether a patient needs an outpatient visit or the visit may be postponed.

With AmbuFlex (telePRO solution) our patients experience more flexibility, increased knowledge of their own disease as well as a more patient-centered care. Also the staff is

satisfied using telePRO as it allows them to be well prepared prior to outpatient visits and focus on complex patient needs as opposed to using time on routine visits.

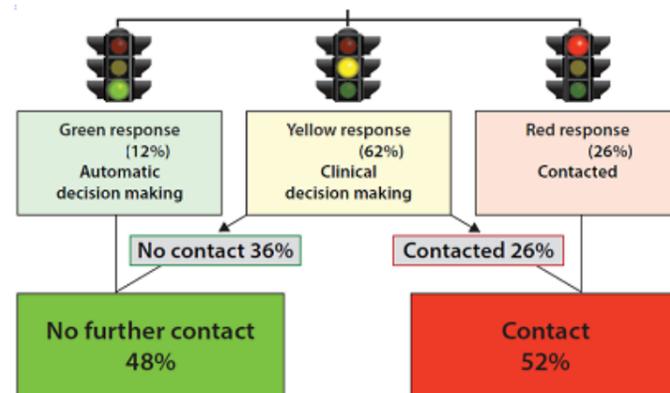
Our region has demonstrated that close to every second outpatient visit for patients suffering from epilepsy can be substituted by telePRO. Subsequently we have discovered, that this is also the case for many other patient groups.

Tele-PRO with AmbuFlex

AmbuFlex is in use for 45.391 patients in CDR and 109.451 patients in Denmark and the number is constantly growing. The system is used by more than 30 different patient groups. Top 5 usage of AmbuFlex (TelePRO-solution):

1. Sleep apnoea
2. Before treatment with chemo
3. Epilepsy
4. Follow up after breast cancer
5. Lung cancer.

The Tele-PRO system used consists of three generic elements: PRO data collection (digital questionnaires), PRO-based automated decision algorithm and PRO-based graphic overview for clinical decision support.

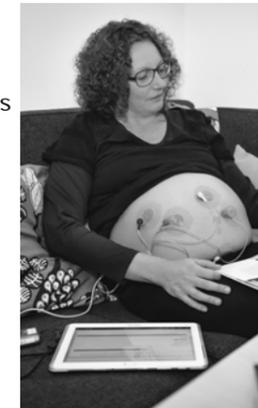


Patients with Epilepsy in AmbuFlex TelePRO system
Patients with epilepsy have on average reduced their outpatient visits by 48%. TelePRO in CDR in general reduces the number of face-to-face consultations for outpatients.

Telemedical solution for complicated pregnancies

We also offer home monitoring of women with complicated pregnancies for example when the water breaks before due date. This patient group was previously hospitalised - some even from week 22 of their pregnancy. By monitoring clinical key indicators and using customized electronic questionnaires, hospitalisations can often be avoided or shortened. The solution also allows the patients to monitor the heartbeat of the unborn baby.

The patients experience a sense of security and reduced uncertainty due to the fact that the frequent remote monitoring is followed by a close dialogue with the hospital via phone or the built-in secure messaging system. The patients learn more about their health condition and costs have been reduced with 77% compared with traditional patient treatment that could involve hospitalisation for several weeks.



Intravenous home treatment with antibiotic

Patients suffering from infections that require long term treatment with IV antibiotics used to be hospitalised for treatment for several weeks. This patient group is now administering their own IV-treatment at home, supported by telemedical homemonitoring.

Patients, at the age of 21-85 years, are thoroughly trained to inject antibiotic into their veins at home. They also monitor their infection values (CRP) and temperature and send the monitored data to the hospital together with answers on health related questions.

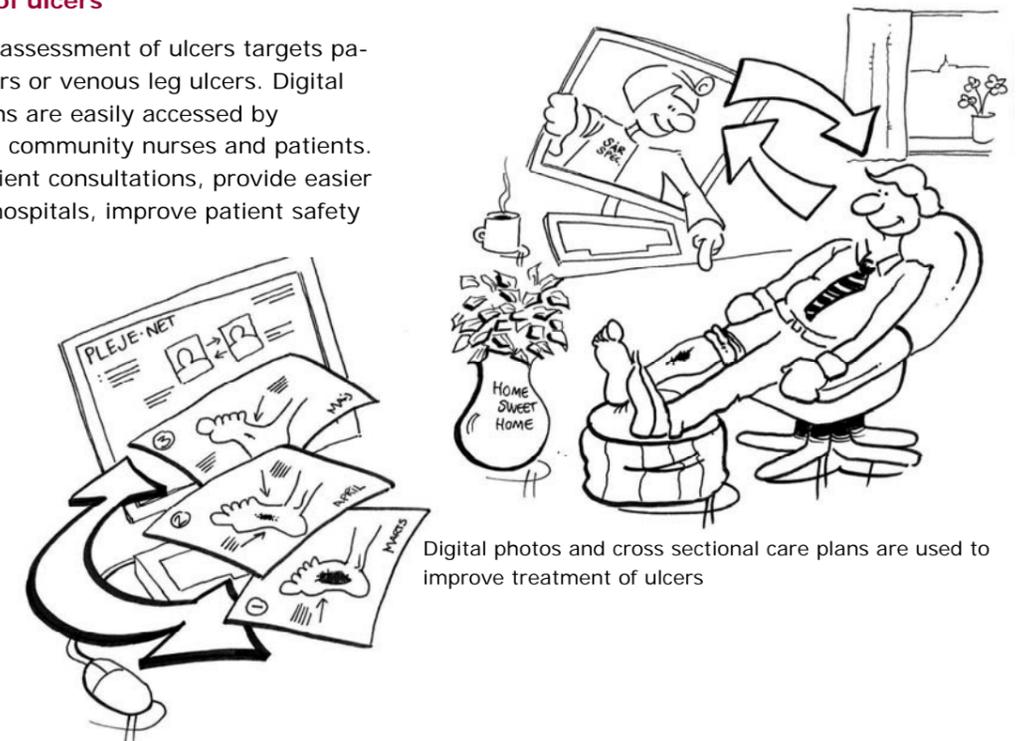
The initiative has shortened hospital admissions by 19 days on average, improved patient empowerment and quality of life for the patients due to the fact that they avoid a long term hospitalisation.

Same technical solution for both patient groups

Telemedical assessment of ulcers

The initiative of telemedical assessment of ulcers targets patients with diabetic foot ulcers or venous leg ulcers. Digital images and shared care plans are easily accessed by healthcare staff in hospitals, community nurses and patients. The goal is to reduce outpatient consultations, provide easier access to specialists at the hospitals, improve patient safety and enable patients to save time for transportation.

A shared care record, Pleje.net, is used for exchanging photos that are accompanied by descriptions of the ulcer. Patients also have access to photos and descriptions and an overview of their care plan.



Digital photos and cross sectional care plans are used to improve treatment of ulcers

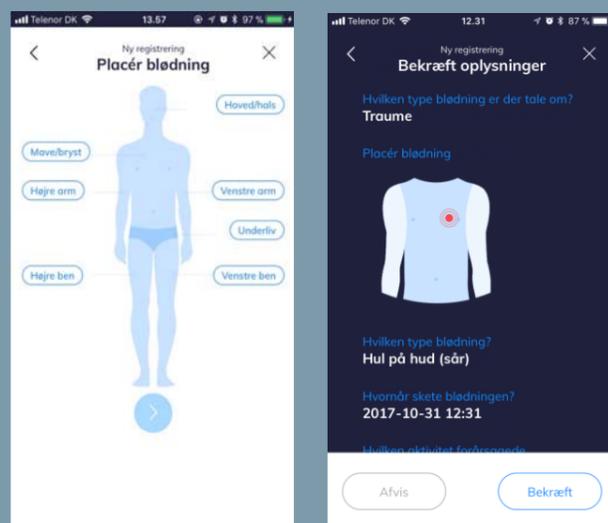
Digital Decision Support in Hemophilia Treatment

Hemophilia is a chronic disease that requires life long treatment. Patients and relatives take on a tremendous responsibility in the daily treatment of their disease with regards to keeping track of their use of medicine (factor therapy) and maintaining their personal bleeding incidence record.

A digital solution secures more accurate information on patient's bleedings and the use of factor treatment. Furthermore the solution provides a tool for more qualified dialogue between patients and health care professionals.

The concept encourages patient empowerment. A better adjustment of the expensive medication is also an anticipated impact of the improved and user-friendly registration. Thus a saving of DKK 12m over 5 years is anticipated.

The app was developed in close cooperation with The Danish Hemophilia Society, the Capital Region of Denmark and the company Jounl.



Screen shots from the app. With one touch, patients keep track of location of bleedings and other data on their bleeding. The app also allows easy recording of use of medication.

Improved coordination across sectors for emergency patients

In CDR we are developing a system that will provide a shared overview of emergency patients across sectors to secure more coherent clinical pathways for emergency patients, improve patient safety and ease coordination across sectors. The system will be shared by hospitals and primary care units. It will show health services accessibility and availability of resources both in hospitals and in primary care for emergency patients.



Public health care in Denmark

In Denmark there is a universal coverage and free and equal access to public healthcare. Central Denmark Region is one of the five Danish Regions responsible for the greater part of public health service in Denmark.

The regions' primary tasks are the operation of hospitals, general practitioners and practising specialists.

The 98 municipalities in Denmark are responsible for homecare, nursing homes, rehabilitation and prevention. To ensure a coherent public health care system co-ordination and agreements between regions and municipalities are mandatory according to The Danish Health Care Act of 2007.

A Wide Range of Internet Based Treatment programmes

Our region also delivers a wide range of treatments in an internet based format. Instead of face-to-face therapy with a psychologist the patients work through online treatment programmes at home. The programmes contain videos including patient stories, texts explaining about symptoms and treatment supplemented with exercises designed to help the patients cope with their illness. The programmes are often accompanied by remote dialogue with the psychologist over the phone or by email or a chat function.

Examples of internet delivered treatments:

- Acceptance and Commitment Therapy for Severe Health Anxiety and Bodily Distress Syndrome
- Cognitive behavioral therapy for adolescents with anxiety disorders
- Treatment for gambling addiction
- Treatment for work-related stress
- Treatment for insomnia.

Research shows that the internet based format offers the same treatment effect as face-to-face therapy.

Modular IT-platform for digital solutions

CDR has built a new platform for telemedical applications and other digital solutions. The platform allows a safe and legal transfer of health data with patients as well as across sectors. It also implies a shift from monolith to module based solutions.

The new platform will consist of services or modules, which are easily built together. Each module solves a small task and all modules fit together and compose a larger picture.

The modules follow international standards, which will make it easier for companies developing medical equipment to integrate the different services in their products.

It is much easier and faster to build solutions based on modules, and more importantly, it is much faster to make changes, corrections, adaptations, and updates to the design.

Furthermore we are also establishing a national Danish IT-infrastructure, which will provide a generic foundation for seamless exchange of information across systems and sectors. The platform from CDR is compatible with the national infrastructure.



A Shared Service Centre takes care of Support & logistics for telemedicine

In CDR we have established a shared service centre to provide services such as technical support, logistics and maintenance as well as hotline for users - both patients and healthcare professionals. With a shared service centre healthcare staff will be able to dedicate most of their time to core tasks such as treatment and care.