

## Teledi@log – Telerehabilitation of patients with heart disease

### Background

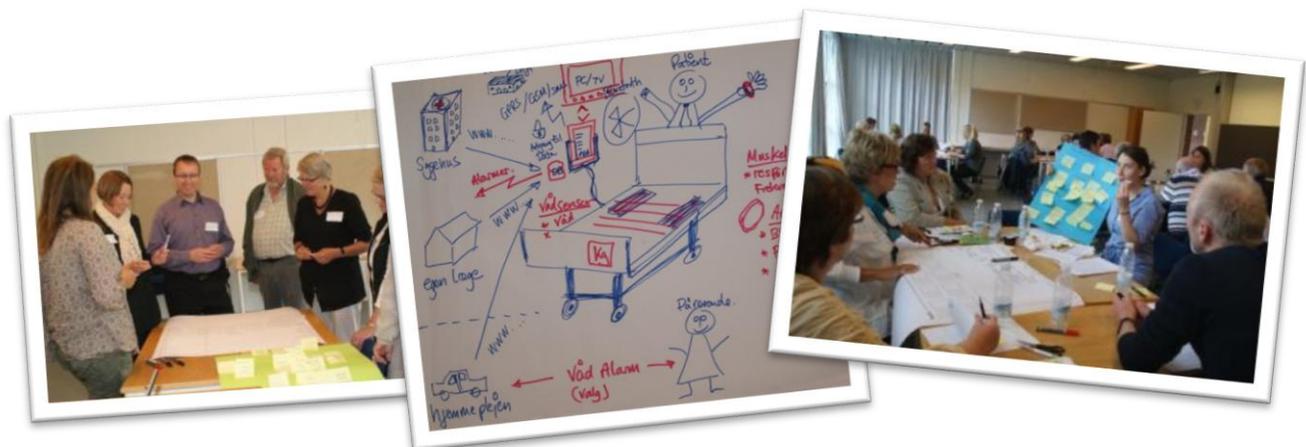
*"Heart patients do not come for rehabilitation... only 3% of the more than 86,000 Danes hospitalized for heart and respiratory illnesses each year are offered full rehabilitation. The patients are overlooked, without any follow-up treatment. This leaves them with a daily life where they risk becoming more sick, being re-admitted to hospital and in the worst case die too early," says Peter Clemmensen, who along with his post as chair [of the Danish Heart Association] is head physician of the coronary department at the Danish National Hospital" (Dagens Medicin, 23 February 2009).*

### The purpose of the research project is:

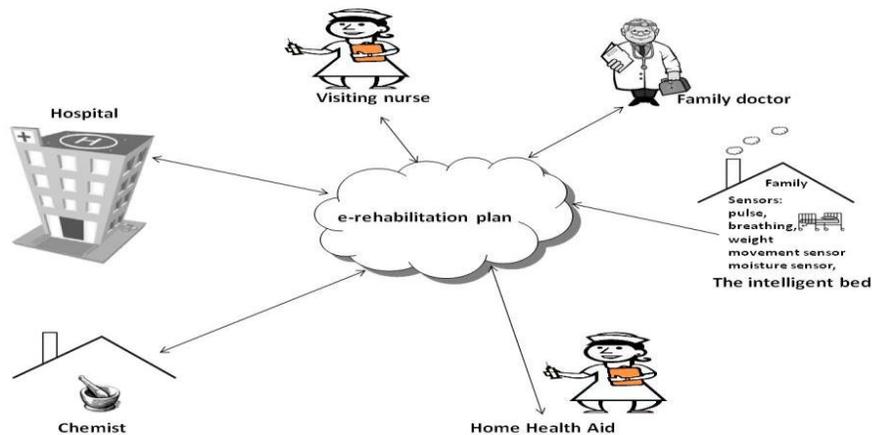
- To map the needs of patients and their family members for rehabilitation and telerehabilitation in the health care system;
- To develop a telerehabilitation program for heart patients and their families;
- To prevent re-hospitalization of heart patients through a more individualized rehabilitation effort by using telerehabilitation technologies;
- To research heart patients and their families as actors in their own rehabilitation process using new technologies;
- To research the experiences of heart patients, family members and health professionals in using telerehabilitation technologies, including social media.

### User-driven innovation as platform

User-driven innovation has been the point of departure for identifying the heart patients' experienced and non-experienced needs for participation in rehabilitation. An interdisciplinary team has visited the heart patients in their own homes. Workshops have also been held with representatives from private firms, public organisations and with researchers. Through this process, two scenarios have been identified for the telerehabilitation of heart patients: 'The very ill heart patient', and 'The free and active heart patient'.



## The very ill heart patient



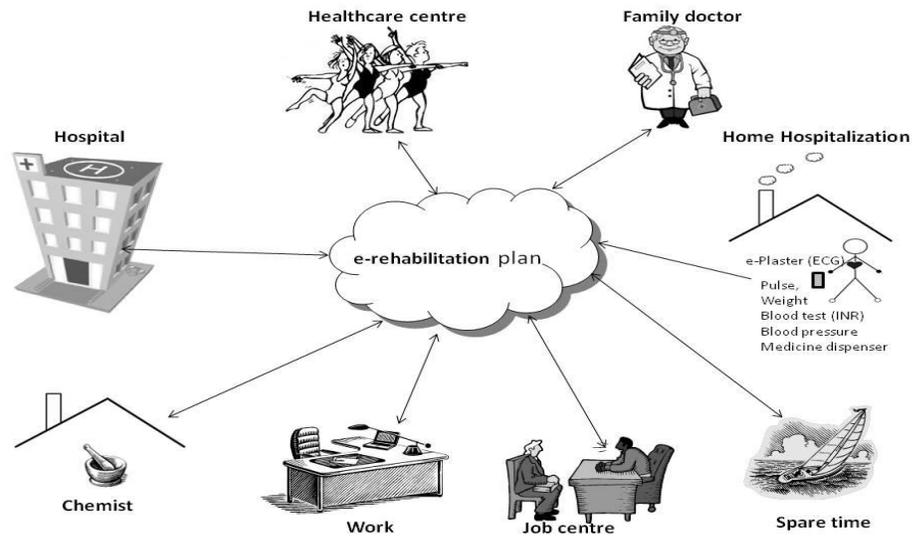
### Objectives:

- To further develop and test the "intelligent bed" for home use among severely ill heart patients in their own homes;
- To prevent re-admissions of severely ill heart patients;
- To increase the quality of life and security for severely ill heart patients in their own homes using the intelligent bed;
- To improve the working environment for home care staff, so that as to free up time for restructured work routines;
- To develop a business case for the use of the intelligent bed in home care.

**Target group:** Patients with chronic heart disease are divided into 4 groups, the fourth group being those patients with the most severe symptoms. Patients in group 4 often suffer from one or more derivative diseases and can have severe symptoms (surplus water in the body, fatigue, irregular heartbeat, etc.), that can cause them to be partially bedridden at times. The goal is that 6-8 patients can test the intelligent bed for two months at a time.

**Scenario:** Marie Nielsen, aged 72, has been hospitalized several times because of water in the lungs and irregular heartbeat. Marie has had a hospital bed in the home because her own bed could not be sufficiently elevated at the head and foot ends. Marie suffers from rapidly swollen legs, perspires profusely and has a tendency to shortness of breath because of her bad heart. She cannot walk very far. She has been hospitalized many times at the medical ward of the Vendsyssel Hospital. A home health aide visits her 3-4 times each day, in order to help her with her personal needs, and a visiting nurse visits her twice daily to administer her medicine and observe her, as she can rapidly develop symptoms of lung edema. Marie has a daughter who works a lot, and she cannot always come when Marie phones her. This has meant that Marie sometimes feels uneasy in her home. Marie was offered the chance to try out the intelligent bed with the following functions: safety, weight, oxygen, breathing, moisture and movement sensors and speaking function. Data from the functions can be viewed on the nurse's tablet computer in the day, evening and night shifts. Depending on Marie's condition, the functions can be set to measure and send data whenever Marie's own doctor finds it relevant. Marie does not have the desire to monitor the measured values herself, but she appreciates the speaking function because she can now come into contact with the visiting nurse without pressing the 'help' button and without having to contact her daughter first. Both Marie and her daughter feel comfortable with the new technology, which makes Marie feel that she is being closely looked after. If Marie develops symptoms of lung edema, this is caught early, as the visiting nurse can more quickly come and examine Marie and alert the on-call physician, if necessary, so that Marie can receive more diuretic medicine, and avoid hospitalization. During the night, a visit from the night nurse may not be necessary if the measurements sent by the intelligent bed sensors indicate that Marie is in good condition: that is, she is breathing well, has a good oxygen and normal heartbeat. At the clinic, the visiting nurse monitoring the sensor data can then cancel the visit. In the opinion of the visiting nurse, the intelligent bed helps to create a feeling of security for Marie and fewer visits are not necessary.

## The free and active heart patient



### Objectives:

- To promote early, rapid and effective rehabilitation of heart patients so that they can return to their everyday life and work;
- To research heart patients and their families as actors in their own rehabilitation process with the use of new technology;
- To research the implementation of a telerehabilitation program on a larger scale viewed in an inter-organizational perspective;
- To assess the health economic potentials of implementing a telerehabilitation program for heart patients across the cardiological and cardio-surgical specialties, sectors and municipal boundaries.

**Target group:** The target groups are patients with heart conditions, heart attack or patients who have had a heart valve surgery at Aalborg University Hospital. Patients must reside in Hjørring or Frederikshavn municipalities and be 18 years or older. The goal is to have 228 heart patients participating in a randomized trial.

**Scenario:** Henning has just returned home from the hospital following a heart attack. At the hospital, he received a large amount of information about his condition, and he has had some trouble remembering it all. While he was hospitalized, he had some questions that he did not ask. Now that Henning has come home, the situation is a more relaxed, and he has some unanswered questions. He therefore logs on to [www.aktivthjerte.dk](http://www.aktivthjerte.dk) on his tablet device, where he can find general information about his illness in the form of images, text and sound. For example, there are video segments where other heart patients talk about their experiences. Henning is comforted knowing that he is not alone with the problems that he has. Henning also has the option of accessing his e-rehabilitation plan, where he can view his personalized schedule for his rehabilitation along with his measured blood pressure level, pulse, weight and stride. Henning is somewhat unsure about how much he can move around. He therefore uses the e-rehabilitation plan to contact the health center physiotherapist, who is familiar with Henning and his condition. Henning receives a quick reply via the e-rehabilitation plan and now feels more confident to carry out his daily physical activities. Henning's wife, Gitte, would also like to know more about Henning's disease. She also uses the e-rehabilitation plan, where she reads about the disease, medication, diet and exercise. Gitte has also contacted the health center via the e-rehabilitation plan. She was a bit nervous that Henning was doing too many things during the day and whether he was getting enough rest. Through the e-rehabilitation plan, she was able to reach a nurse and have her questions answered.

## FACTS about the Teledi@log project

The project's first phase ran from 1 May 2011 - 31 August 2012 and was funded by UNIK (DKK 1.5 million) with co-financing from partners. The total budget was DKK 3 million. Read more at [www.unikparternerskabet.dk](http://www.unikparternerskabet.dk)

The project's second phase runs from 1 September 2012 - 30 June 2014. This phase is being financed by EIR Business Park, AAU (DKK 1,481,970), Vendsyssel Hospital (DKK 472,500), the Share Play Fund (DKK 265,000), UNIK (DKK 560,000) with co-funding in the form of hours worked by the partners (DKK 3,384,815). The total budget is DKK 6,164,285 DKR.

*Total budget* for the Teledi@log project including 2 doctoral students is DKK 13 million.

Partners *Parterne*: KMD; IBM; Tunstall Healthcare; Oscar Film; Linak; Roche Diagnostics; SOS International, KR-Hospitalsudstyr; Zibo; Medical Center, Cardiology Department, Vendsyssel Hospital, Hjørring; Heart-Lung surgery department, Aalborg University Hospital; Center for Clinical Research Vendsyssel Hospital; Health Centers in Hjørring and Frederikshavn Municipalities; Institute for Psychology, Århus University; Department for Medicine and Health Technology, Aalborg University.

*International advisory board*: Translantic Telehealth Research Network: Cleveland Clinic, Ohio, UC Berkeley & UC Davis Medical Centre, USA.

Read more at [www.teledialog.dk](http://www.teledialog.dk) & [www.eirbusinesspark.dk](http://www.eirbusinesspark.dk)

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