

Two Telemedical Centers (TMC)

A "mobile medical assistant" (a type of pocket PC) automatically transfers the data that has been gathered for each patient to one of the Telemedical Centers. The patient's record is available at that center and contains all relevant electronic information to support ongoing patient care (e.g. medications, medical history, previous findings). The data for patients in the Berlin/Brandenburg region are recorded at the **TMC in the Charité Hospital in Berlin**; in the Baden-Wuerttemberg region, applicable patient data are recorded at the **TMC in the Robert-Bosch Hospital in Stuttgart**. In both hospitals, medical personnel assess the recorded data based on each patient's medical history and initiate various steps: For example, they obtain additional information from the patient about his/her current state of health, and provide this information to the patient's GP and to an Emergency Room physician, if required.

Inclusion Criteria

Patients ...

- ▶ With advanced Congestive Heart Failure (NYHA stages II-III)
- ▶ On therapy based on current guidelines
- ▶ With a LV ejection fraction < 35%
- ▶ Who have had a hospitalization as a result of cardiac decompensation within the 18 months prior to the start of the study
- ▶ Who have provided informed consent to participate in the study (note: the patient has the right to revoke this consent at any time)


Advantages of the New System


- ▶ Mobile measuring devices provide the patients with the largest possible freedom of movement
- ▶ No technical know-how required, easy to use
- ▶ Outpatient physicians have time off at night and on week-ends: TMC physicians assume responsibility for the assessment of the patient's level of cardiac compensation
- ▶ Regional integration of the TMC guarantees optimum cooperation between the medical partners: physicians know each other personally


- ▶ The impact of Remote Patient Monitoring in patients with CHF is compared with that of standard patient care in a randomized controlled clinical trial
- ▶ The use of Remote Patient Monitoring can be expanded to other clinical indications [e.g. high risk pregnancies, chronic obstructive pulmonary disease (COPD), diabetes, congenital heart disease]
- ▶ The technology used is independent of any manufacturer (open platform concept)
- ▶ The technology is compatible with the telematics infrastructure of the German health care system


Project Partners

 **CHARITÉ** Project management; clinical trial management; site of the TMC in Berlin
www.charite.de

 **ROBERT BOSCH KRANKENHAUS** Site of the TMC in Stuttgart
www.rbk.de

 **Actimon** Development of the technology for transferring data measured by various patient devices into electronic patient records; www.actimon.de

 **BOSCH** System integration; technology management for the consortium
www.bosch.com

 **icw** Software for the telemedical workplace and electronic patient record; personal health record
www.icw.de

Associated Project Partners

 **BARMER** Deutschlands größte Krankenkasse www.barmer.de

 **Bosch BKK** BOSCH www.bosch-bkk.de

Support Remote Patient Monitoring in cooperation with the TMC in Berlin and Stuttgart and with the attending physicians

Technology Program: "Next Generation Media"

Next Generation Media is a technology program of the German Federal Ministry of Economics and Technology (BMWi). The aim of this program is to support cooperative research and development projects that test and demonstrate new opportunities for the intelligent networking of objects and information. Healthcare is one of the innovation areas to be assessed and the project "Partnership for the Heart" is one of the test programs.



www.nextgenerationmedia.de

"Partnership for the Heart": Facts and Figures

- ▶ Support from BMWi: 5 million Euros (project no.: 01MG532)
- ▶ Total project cost: 12.2 million Euros
- ▶ Project duration: 3 years (2005-2008)
- ▶ Clinical trial: 450 patients with Congestive Heart Failure (CHF)
- ▶ Duration of the trial: 1 year (2007-2008)

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Research & Development Project "Partnership for the Heart"

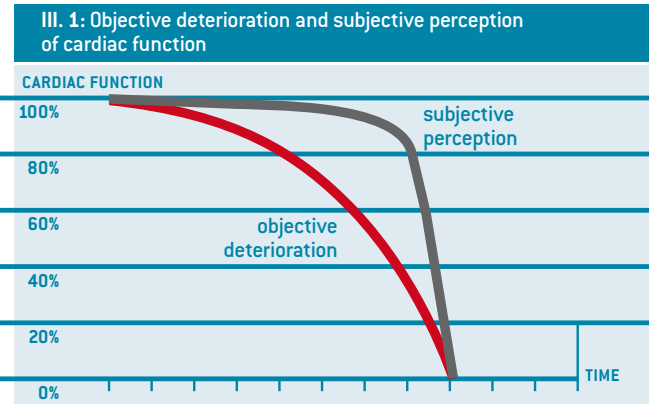
Remote Patient Monitoring for Patients with Congestive Heart Failure



Background

Approximately 1.2 million people in Germany suffer from Congestive Heart Failure (CHF), a condition in which the heart's ability to pump blood efficiently has been compromised. It is difficult for patients to detect worsening CHF until there has been significant deterioration of cardiac function; however, deterioration can be detected at an earlier stage if objective measures are analyzed (ill. 1). Remote Patient Monitoring offers an objective "early warning system" for cardiac deterioration and enables the timely adjustment of therapy.

The project "Partnership for the Heart" develops such an "early warning system". The aim is to treat patients who have been diagnosed with CHF in their home environment. The use of home-based devices that measure pre-specified parameters and of telecommunications for transfer of the data from these devices helps to detect cardiac deterioration and other complications early; this allows early initiation of the appropriate therapy.



Technical Development

Special measuring devices equipped with sensors (e.g., portable ECG, weight scale) wirelessly transmit the patient's data daily to a Telemedical Center (TMC). Physicians at the TMC are available around the clock to react to any data changes with a variety of responses including: contacting the patient, and referring him to his GP or cardiologist, notification of an ambulance in case of emergency. An integrated emergency call system, which establishes immediate contact to the TMC physicians, provides additional security.

"Partnership" between Physicians

All participating physicians have access to the medical data of their own patients (note: all applicable data protection laws are observed); as a result, knowledge is shared by all the physicians taking care of a patient. Patients still have access to their own GP, cardiologist and hospital - the TMC is a "safety net" in case the attending physician is not available (see ill. 3).

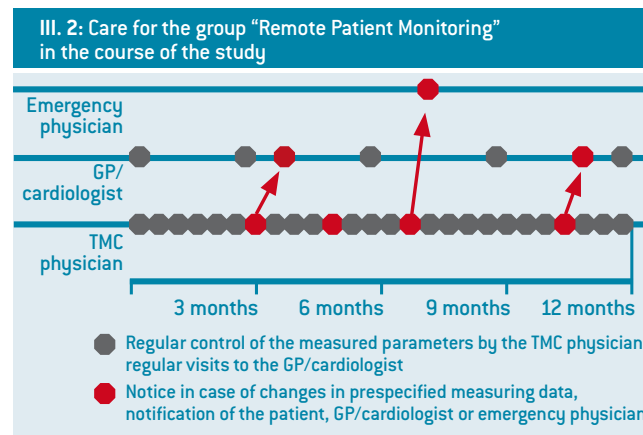
Clinical Trial

The new Remote Patient Monitoring system is being tested in a clinical trial to answer the following question: In comparison to usual care, does Remote Patient Monitoring in patients with CHF:

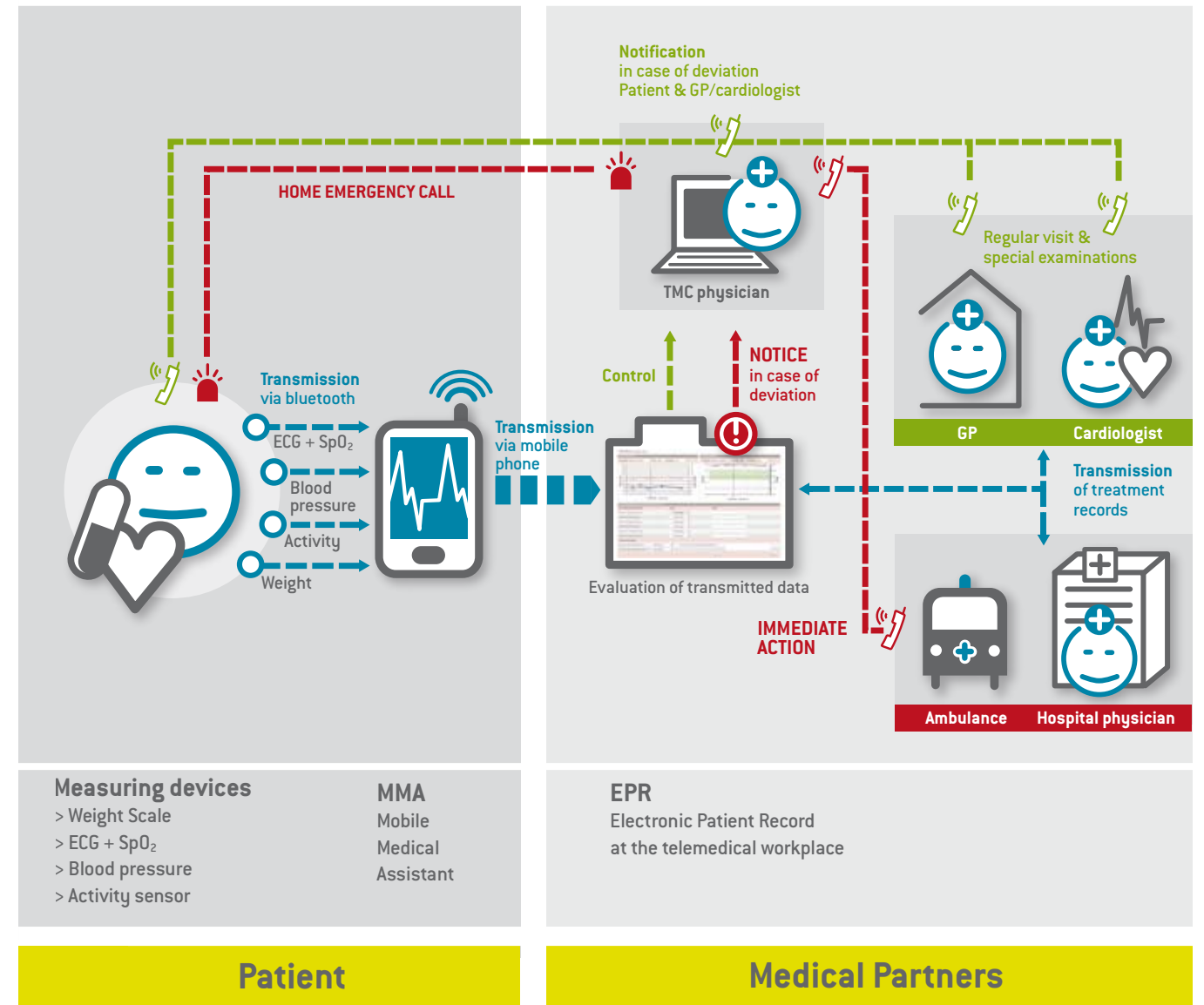
- ▶ increase patients' quality of life?
- ▶ reduce hospitalizations?
- ▶ reduce the mortality rate?

Trial Design

The clinical trial assesses 450 patients over a period of 12 months (July 2007 until June 2008); all participants will continue to receive usual care from their GP. All patients will be examined at the beginning of the study and will undergo a check-up every 3 months. Three hundred of the patients will be randomly allocated to receive devices for Remote Patient Monitoring which will measure various parameters on a daily basis (e.g., weight, blood pressure, heart rate). The devices are mobile and can be used at home or elsewhere (ill. 2).



III. 3: The complete Remote Patient Monitoring system



- Communication paths in normal cases
- Communication paths in case of emergency
- Transmission path for health data