

**Partnership for the heart:
using eHealth to reduce mortality and
hospital admissions for heart failure
patients**

Friedrich Koehler, MD

**Health Executive Summit Paris
20.05.2010**



Charité-Universitätsmedizin Berlin

Facts

- ▶ Founded in 1710
- ▶ 11 Nobel prize winners
- ▶ 14.500 employees
- ▶ 7.265 students
- ▶ 107 departments
- ▶ turn over 2008: 1.1 billion €
- ▶ scientific budget 2008: 233 million €



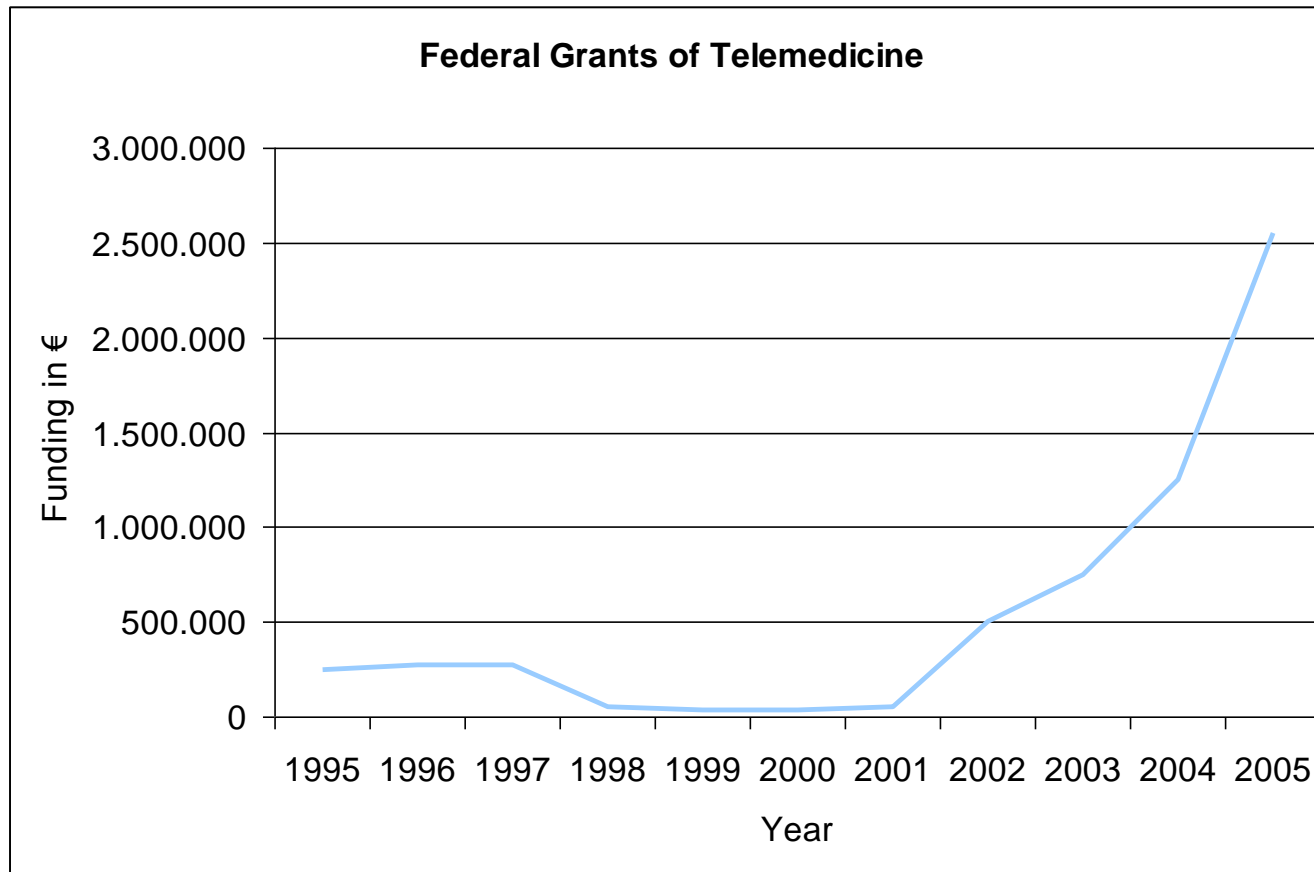
Definition: Telecardiology

Connectivity over Long Distance for Cardiological Content

- 1) „doc2doc“ Systems – Connectivity between Health Care Providers
- 2) „doc2patient“ Systems – Remote Patient Monitoring

**Know-how Transfer Programme between
Germany and the Baltic States (Estonia, Latvia and Lithuania)
in the Treatment of Patients with Congenital Heart Defects (CHD)
using modern information technologies**

Telemedicine Funding by Federal Grants



Source: www.foerderkatalog.de

Congenital Heart Defects (CHD) – epidemiological Background



- ▶ CHD are the most frequent malformations
- ▶ 1 Per cent of all newborns suffer from CHD
- ▶ CHD influences the infant mortality
- ▶ Natural Course of Disease (80 Per cent mortality)
- ▶ „Gold Standard“ is the Cardiac Surgery during infancy (85 per cent Survival)

Telemedicine-Bridge“ (Charité-Tartu) 7.11.2000



Educational-Programme

17 Visits of Estonian Experts in Germany
32 Operations in Estonia, 5 Operations in Germany



Results Estonia

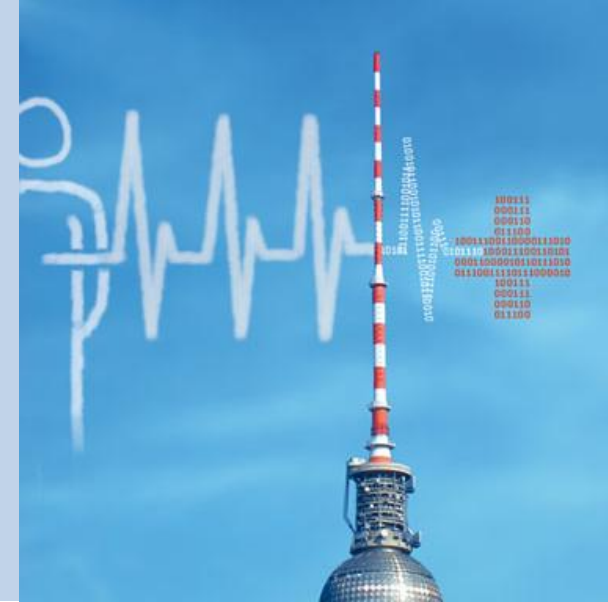


	2000	2005
Population	1.4 Mio.	1.33 Mio.
Life-Births	13.067	12.218
CHD-Patients/a	99	95
Surgery for CHD (Uni Tartu)	56	61
Infant-Mortality	8,42 ‰	6,11 ‰

„Partnership for the Heart“

Remote Patient Monitoring in Heart Failure (2005-2010)

Research and Development Project of the
German Federal Ministry of Economics and Technology (BMWi)



Chronic Heart Failure – a Demographic Burden

Epidemiology

- ▶ **incidence approx. 1,2 Mio. patients** (every tenth German citizen over 65 years)
- ▶ ca. 200.000 new cases every year
- ▶ mortality in class NYHA II/III approx. 9 % /a

Morbidity

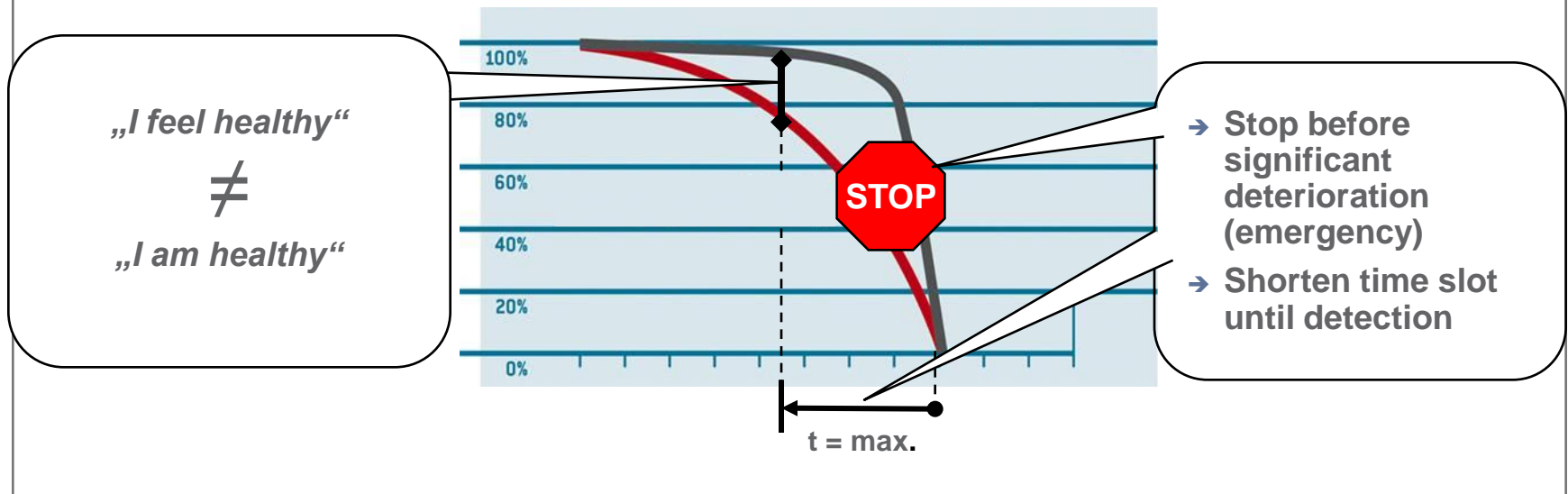
- ▶ **major cause of hospitalization (approx. 375.000/a)**
- ▶ non-cardiovascular comorbidity (renal failure, COPD; depression)

Costs

- ▶ **therapy costs – 3 billion EUR/a**
- ▶ approx. 85 % of the costs for hospital stay

Why remote patient monitoring in CHF?

Gap between objective deterioration and subjective perception of cardiac function



Trends in remote patient monitoring systems since 2000

▶ Evidence of Effectiveness

Journal of the American College of Cardiology
© 2005 by the American College of Cardiology Foundation
Published by Elsevier Inc.

Vol. 45, No. 10, 2005
ISSN 0735-1097/05/\$30.00
doi:10.1016/j.jacc.2005.01.050

Heart Failure

Noninvasive Home Telemonitoring for Patients With Heart Failure at High Risk of Recurrent Admission and Death

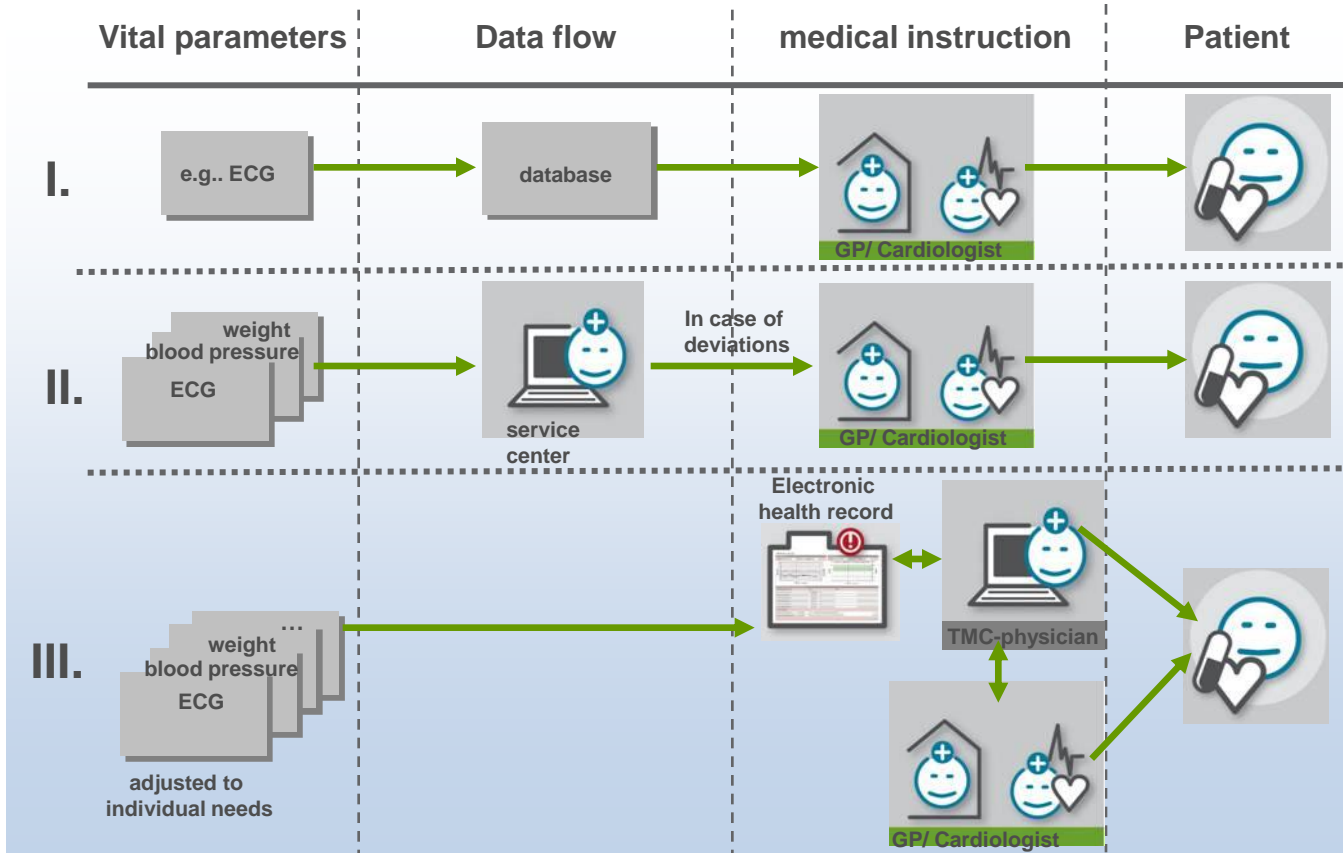
The Trans-European Network–Home-Care
Management System (TEN-HMS) Study

John G. F. Cleland, MD,* Amala A. Louis, MD,* Alan S. Rigby, PhD,* Uwe Janssens, MD,†
Aggie H. M. M. Balk, MD,‡ on behalf of the TEN-HMS Investigators

Kingston Upon Hull, United Kingdom; Aachen, Germany; and Rotterdam, the Netherlands

- ▶ Rapid Development in IT
- ▶ Decrease in Costs for Mobile Communication

3 „generations“ in the development of remote patient monitoring systems



BMW-Competition: „next generation media 2005-2008“



Federal Ministry of Economics and Technology (BMW-)



- Innovation program „next generation media“
- 11 projects in total, 2 health care projects
- www.nextgenerationmedia.de

BMW- Requirements

- ▶ **Platform-concept** : sensor devices produced by a wide range of different manufacturers must be integratable
- ▶ **Compatibility to the German e-Health Infrastructure**
- ▶ **Usability** for middle aged patients without an previous knowledge of IT
- ▶ **Expandable** to cover other cardiological and non-cardiological Indication

Project partners and responsibilities




Development



CHARITÉ
UNIVERSITÄTSMEDIZIN BERLIN
Project leadership

Clinical trial

BOSCH
Technical management

CHARITÉ
UNIVERSITÄTSMEDIZIN BERLIN
Clinical trial management

 <p>Actimon Wellness Your Health</p>	 <p>icw</p>	 <p>BOSCH</p>
<p>→ Sensor platform for data transfer</p>	<p>→ Platform for exchange of medical data (electronic patient record)</p>	<p>→ System integration → hardware, operation → Quality man.</p>

 <p>CHARITÉ UNIVERSITÄTSMEDIZIN BERLIN</p>	 <p>RIB BOSCH KRANKENHAUS</p>
<p>→ Study center 1 → (Open 24/ 7) → clinical trial management</p>	<p>→ Study center 2 (Open 7-21/7)</p>

Associated partners & grant

Associated partners

BARMER
GEK die gesund
exper ten

→ Support in patient recruitment

Bosch BKK

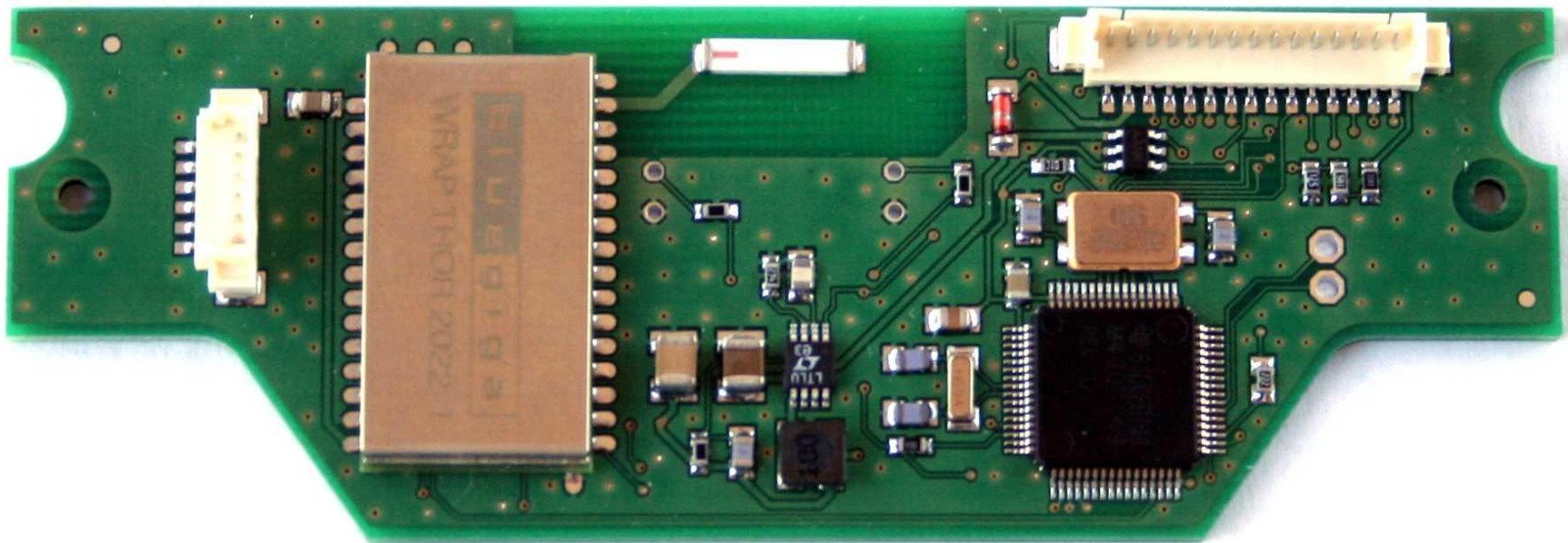
→ Cross-sectional contracts between patients, medical partners, health care providers, TMC

PfH – facts and figures

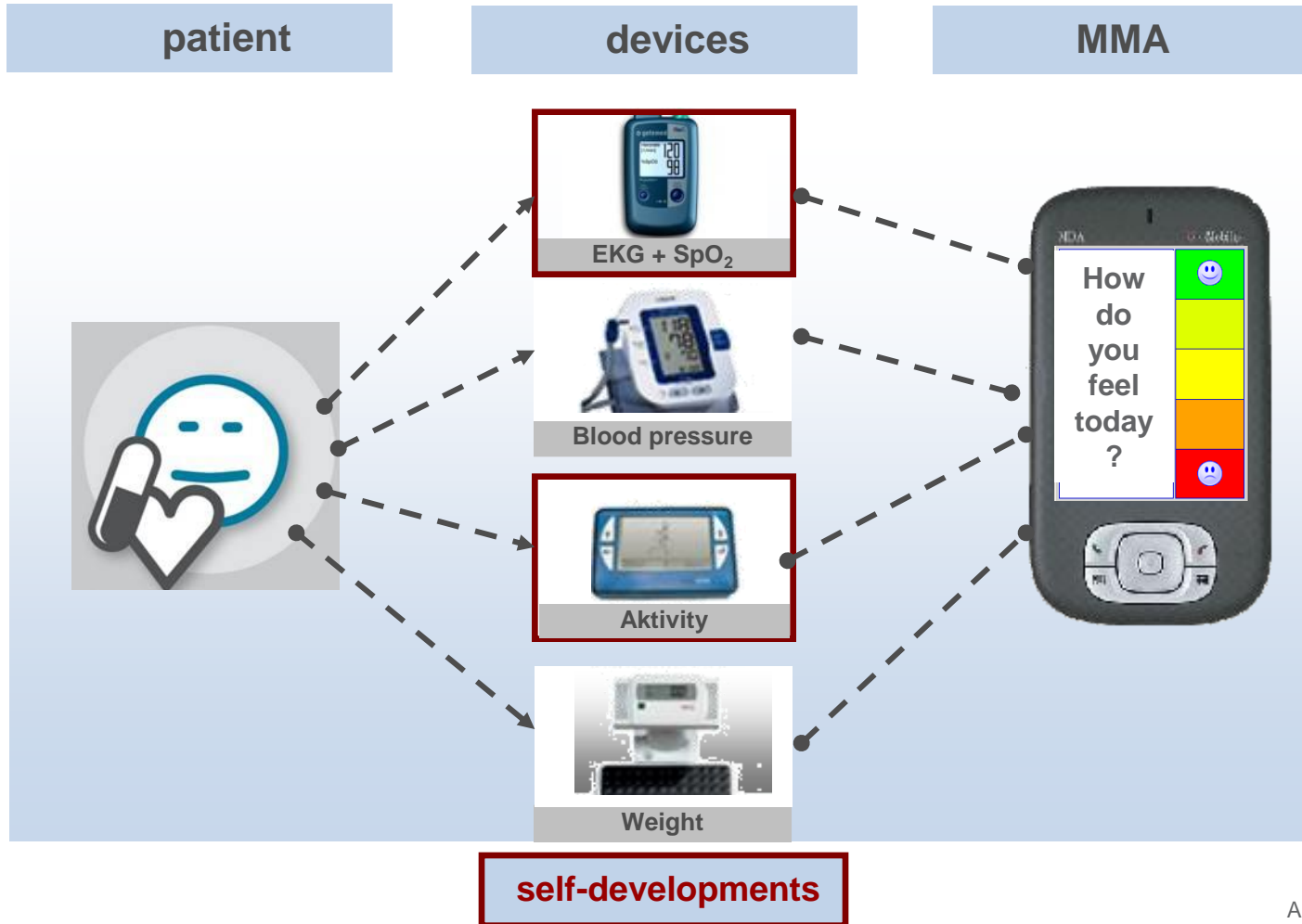


- Project: 01 MG532
- Federal Grant: 5 Mio €
- Total Volume: 12.2 Mio €
- Project Duration: 2005-2008,
- Clinical Trial: 1'08 - 12'08
- www.partnership-for-the-heart.de

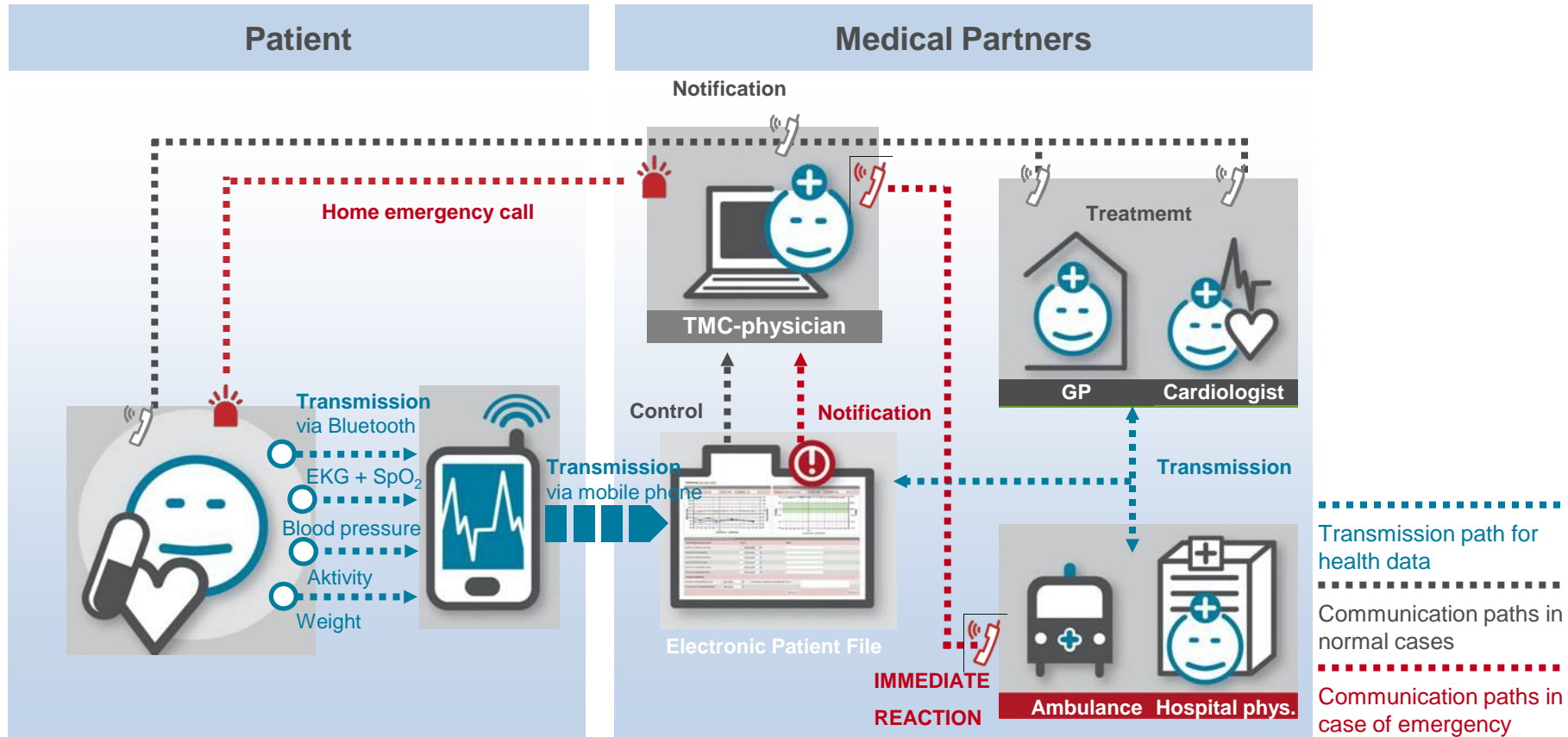
Secure sensor module



Patients' measuring devices



Systemarchitektur und Kommunikation im PfH-System



Telemedical Interventional Monitoring in Heart Failure (TIM- HF) Studydesign NCT

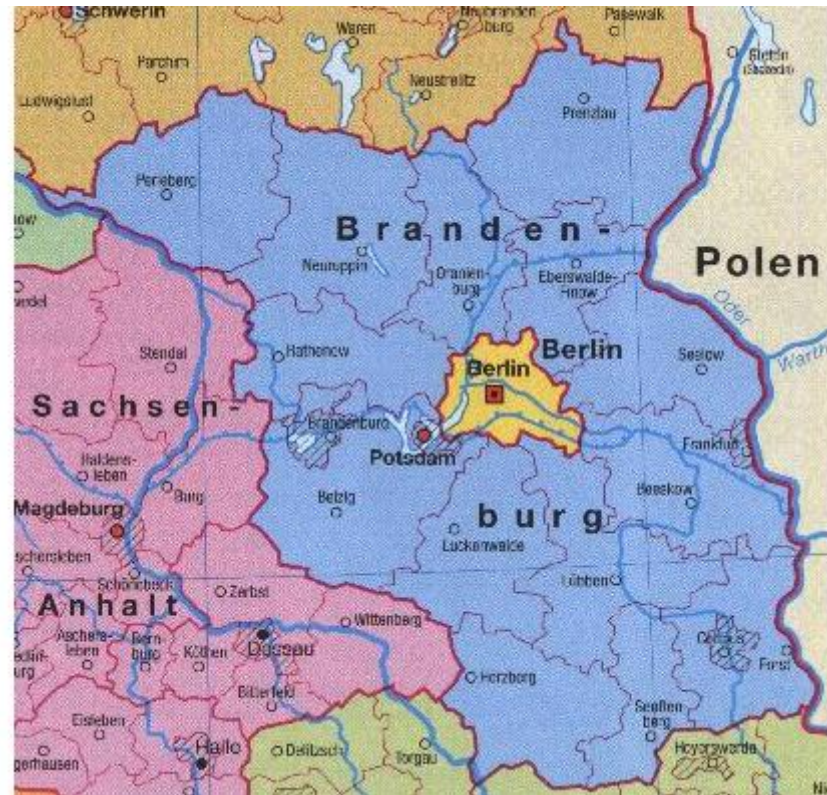


Objectives	Trial design	Endpoints
<ol style="list-style-type: none"> 1. superiority of remote patient monitoring compared with “usual care” in terms of <ul style="list-style-type: none"> ▶ mortality rate ▶ hospitalization ▶ cost effectiveness 2. superiority in terms of <ul style="list-style-type: none"> ▶ Life quality ▶ neurohumoral status 3. Relative meaning of variables in terms of trial aim 1 	<ul style="list-style-type: none"> ▶ randomised, prospective, controlled open, parallel, multicenter ▶ 710 patients (1:1) ▶ remote patient monitoring for at least 12 months ▶ therapy based on guidelines <div style="background-color: #cccccc; padding: 5px; text-align: center; margin: 5px 0;">Inclusion criteria</div> <ul style="list-style-type: none"> ▶ ejection fraction below 35% ▶ advanced CHF (NYHA II-III) ▶ hospitalization (cardiac decompensation) within 18 months prior to the study 	<p>Primary endpoint</p> <ul style="list-style-type: none"> ▶ overall mortality <p>Secondary endpoints</p> <ul style="list-style-type: none"> ▶ days alive and out of hospital due to heart failure ▶ cardiovascular mortality rate ▶ overall non-elective hospitalization ▶ cardiovascular hospitalization ▶ plasma level of NT-proBNP ▶ patients' quality of life ▶ cost effectiveness

Recruitment (region north-east)

Berlin/Brandenburg (6 million Inhabitants)

- ▶ 61 Study-Centres
- ▶ (82 % GPs)
- ▶ 6 „Back up“
Cardiologists
- ▶ 1-3 suitable Patients
per Center
- ▶ 133 Patients screened



Recruitment (region south-west)

Baden-Wuerttemberg
10.7 million Inhabitants

- ▶ 81 Study-Centres
- ▶ (96 % Cardiologists)
- ▶ 1-10 suitable Patients per Center
- ▶ 258 Patients screened


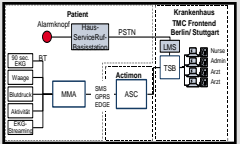
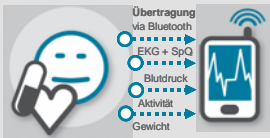



Outlook – Remote Patient Monitoring and PfH



2006 Clinical Trial	2010 Expanding of applications	2013 Roll-out
<ul style="list-style-type: none"> ▶ Largest Multicentre Telemedical Study in Europe ▶ The Evidence of Superiority as a <i>conditio sine qua non</i> to enter the Catalogue of Benefits of German health insurance 	<ul style="list-style-type: none"> ▶ Expanded System Architecture ▶ Innovative Sensors in Heart Failure (Wearable Sensors) ▶ Expanding to other cardiological (e.g. Congenital Heart Defects in Adults) and Noncardiological Indications (Nephrology, COPD, Pregnancy (T-Mobile Award 2006)) 	<ul style="list-style-type: none"> ▶ Innovative application fields („Patient on Tour“) <p>Ambient Assisted Living</p>

Features of the PfH-system

	Criteria	PfH
Aim 	<ul style="list-style-type: none"> ▶ Controlled Randomized Trial ▶ Health economics 	<ul style="list-style-type: none"> ✓ ✓
System architecture 	<ul style="list-style-type: none"> ▶ Open platform concept ▶ Compatibility on national level (telematics infrastructure) ▶ Communication (Incl. Education) to the Patients ▶ Expandable to other indications 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓
Patient 	<ul style="list-style-type: none"> ▶ Usability and acceptance by the target group (60 years +) ▶ Assessment around the clock 	<ul style="list-style-type: none"> ✓ ✓
Players in the health care system 	<p>Cross-sector integration:</p> <ul style="list-style-type: none"> ▶ GPs / Cardiologists / hospitals ▶ health insurance funds 	<ul style="list-style-type: none"> ✓ ✓

Assumption of the economic benefit of Telemonitoring in HF-Patients

only NYHA-III-Patients (incidence in Germany: 200.000)

- ▶ 20 % Reduction in HF- Hospitalisation

2.488,-- € in Berlin/Brandenburg p. a.

2.422,-- € in Baden-Württemberg p. a.

Reduction of cost: *ca.100 € Mio. p. a.*

Total cost I.50 (2006): *ca. 2,9 € Billion/a*

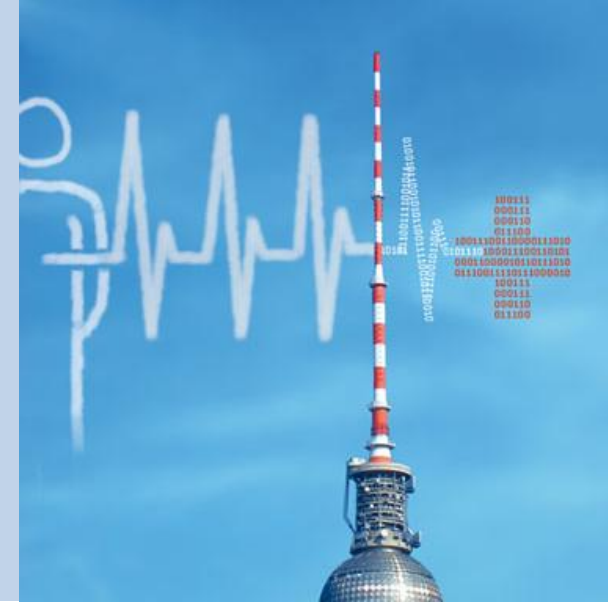
Source: Health Economic Data (2006) from a study-subpopulation (60/710)

Remote patient monitoring in heart failure for high risk patients

- ▶ should be a part of an integrated, cross-sectional care programme
- ▶ should be organized in the regions (1 TMC per 4 Mio Inhabitants)
- ▶ should a new task for a cardiological department
- ▶ could be profitable

„Partnership for the Heart“

Thanks to the project group



Head of the Telemedical Centre Stuttgart: **Dr. Michael Schieber** (Robert-Bosch-Krankenhaus Stuttgart)

Technical management: **Dr. Sascha Henke / Martin Bräcklein** (Robert-Bosch GmbH)

Electronic patient record: **Dr. Peter Heinze** (InterComponentWare AG)

Sensor platform: **Dr. Dominik Wegertseder** (Aipermon GmbH)

Project management and communication: **Dr. Stephanie Lücke** (Charité Berlin)

Further information: www.partnership-for-the-heart.de

