Motiva, MyHeart and HeartCycle:
Approaches to investigate and offer evidence-based solutions in Telehealth

The King’s Fund
International Congress on Telehealth and Telecare

Harald Reiter
HeartCycle Project Manager
Philips Research Europe
The Philips Ambition

The next generation Tele-monitoring services

Vital sign and symptom monitoring → Patient education → Patient empowerment → Compliance

Enabling benefits

Early detection of upcoming events → Timely interventions → Better control of therapy

Leading to improved care for HF patients

Better long-term outcome → Improved quality of life → Cost benefits → Reduced workload

Philips road

Existing product: Motiva
Research: MyHeart & HeartCycle
Motiva, MyHeart and HeartCycle

**Product**
- Motiva → Patient education

**Clinical studies**
- TEN-HMS
- HartMotief
- CARME

**Research**
- MyHeart → Advanced sensors for early prediction
  - MyHeart Clinical study

**Clinical study**
- HeartCycle → Compliance and effectiveness
  - HeartCycle Clinical study
Enabling Patients to manage their disease state

- **Knowledge**
  - Videos: Diabetes and Heart Disease

- **Timely Reminders and Goal Setting**
  - Messages
    - Dear Bill,
      - How are you doing on your goal to eat less salt? You may want to review your 'Nutrition for Diabetes' video. Remember how important it is for you to control your blood pressure since

- **Personal Healthcare channel on Patient TV**
  - Check-ups
    - During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
      - **Not at all**
      - A little bit
      - Moderately
      - Quite a bit
      - Extremely
    - To pick a response use 1, then 2 or 3

- **Feedback on Goals**
  - Logbook: Weight
    - Last 30 readings
      - 96
      - 92
      - 88
      - 84
      - 80
      - 76
      - Target Range
      - 85.0 kg
      - Mon. Mar 22 05:42AM
      - To see a reading, add reading, return
Using Media to improve health behaviour:

- Monitor and encourage adherence
- Instill confidence that success is possible
- Give incentives for good self-management
- Increase engagement through multi-media learning
- Facilitate interactive feedback with caregiver
- Attract and sustain attention
- Increase knowledge and skills
- Change attitudes
- Build confidence
- Provide behavior support
Next generation of tele-monitoring systems

Philips is leading two major European integrated projects

**MyHeart**
IST-2002-507816
- 30 European partners
- Budget: 30 M€
- Duration 72 months

**HeartCycle**
FP7-216695
- 21 European partners
- Budget: 22 M€
- Duration 48 months

**Goal:** Improved patient-centric disease management
MyHeart

Aim: Clinical proof of

• Novel easy-to-use sensors for patient self-measurement at home:
  • wearable vital body monitor (15 min a day)
  • unobtrusive bed sensors
• Algorithms to detect signs of upcoming decompensation
  • several days ahead
  • via trends of daily measurements of vital parameters/symptoms in patient’s home

Technologies:
Smart clothes, innovative sensors, on-body electronics, algorithms, patient devices, professional platform

→ MyHeart Heart Failure Management System
The Heart Failure Management System

- Bio-Impedance Monitor
- Alarm/alert algorithms
- Improved workflow
- Weight Scale
- PDA
- Blood Pressure Meter
- ICD
- Web Portal
- Bed-Side Monitor
**MyHeart Clinical trial**

**Objectives:**
- Detect trends in measurements prior to medical events
- Compare non-invasive sensors against an implant

**Observational Study**
- 150 patients
- 6 clinical sites in Europe
- Start: October 2008
- End: June 2010
- 12 months patient follow-up

<table>
<thead>
<tr>
<th>T-shirt</th>
<th>Smart Bed</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-impedance</td>
<td>ECG</td>
<td>Weight</td>
</tr>
<tr>
<td>Respiration</td>
<td>Pressure</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>ECG</td>
<td>• Heart Rate</td>
<td>Implant</td>
</tr>
<tr>
<td>Activity</td>
<td>• Respiration Rate</td>
<td>• ECG</td>
</tr>
<tr>
<td></td>
<td>• Activity</td>
<td>• Activity</td>
</tr>
</tbody>
</table>
Expected outcome from MyHeart study

Indications on

– Analysis of quality and use of measurements for decompensation detection
  - Bio-Impedance Monitor
  - Bed-Side Monitor (BSM)
  - Weight, HR, Blood pressure measurements, Symptoms
– First multiparameteric analysis for decompensation detection.
– Analysis of link between depression and HF.
– Analysis of implantable vs wearable sensors.
– Analysis of usability of the MyHeart system.
Aim: Clinical proof of

• Efficient workflow for professionals \(\rightarrow\) Decision support technology
  • Alert/alarm detection and handling support for nurses in case of alerts/alarms

• Patient empowerment \(\rightarrow\) Patient Loop
  • Getting the patient to manage their own illness with ‘light’ medical support
  • Patient-driven personalised care

• Identifying unmet needs
  • Maximise use of guideline-based therapy
  • Optimise the use of medication

Technologies:
Managing algorithms, decision support algorithms, smart clothes, innovative sensors, on-body electronics, patient devices, professional platform
HeartCycle process

Create insights
- Interviews with patients and professionals
  (25 patient interviews, 13 professional interviews)
- Workshops for consolidating the results
  (patient workshop, professional workshop each 3 days)
- Confrontations with stakeholders → Use cases as results

Alignment and focus
- Selection of use cases to concentrate on

Start HeartCycle development process
- Defining requirements, writing specifications, ........
  implementations, confrontation, verification and validation

Clinical trial
- Last year: For the selected use cases → Validation in clinical trials
  → requires technology compliant to regulations
HeartCycle approach

Patient Loop: the patient@home
• To support patients in their daily routine
• To improve patient compliance to therapy by remotely monitor patients at home, show effectiveness of medication and lifestyle, and motivate, educate and coach patients

Professional loop
• To identify the variables / parameters optimal for monitoring HF patients
• To generate new knowledge based on multi-parameter monitoring
• To allow dynamic care plan management
• To support guideline-conform medication management
Medical HF experts in HeartCycle
guarantee that all application aspects are based on clinical excellence and
the medical expert knowledge

Prof. John Cleland       University of Hull
Chief Medical Officer HeartCycle
Key opinion leader for tele-monitoring in Europe
Former Chairman of ESC (European Society of Cardiology)

Prof. Patrick Schauerte
University Clinic Aachen

Prof. Christian Zugck
University Clinic Heidelberg

Dr. Josep Lupón Roses
Hospital Germans Trias i Pujol – Barcelona

Dr. Antoni Bayes-Genis
HeartCycle Validation

• Study Population
  – Recently hospital discharge after an worsening heart failure
  – Three clinical sites in Europe
  – 120 patients
  – Start May 2011
  – 12 months follow-up

• Expected Outcomes
  – Clinical experience of utility of clinical algorithms and decision support
  – Development of training packages for patients and health professionals
  – Development of a system to be deployed in a definitive trial
  – Utility of improved diuretic management on symptoms, blood pressure and renal function
  – Better understanding of influence of daily life on patient measurements
  – Improved outcome compared to historical control.
Conclusions

Future tele-monitoring solutions provide support to
• Patient education
• Patient empowerment
• Compliance improvement

Motiva, MyHeart and HeartCycle are Philips approaches to investigate and offer evidence based solutions

Clinical studies already prove knowledge increase and behavioural change of Motiva patients

Current large research projects MyHeart and HeartCycle will pave the way to improved patient self management at home, actively include patients in their own care and allow professionals to manage more patients in a more effective way