MobiHealth – Shaping The Future Of Healthcare

www.mobihealth.org

innovative GPRS/UMTS mobile services for applications in healthcare

The MobiHealth Project (IST-2001-36006) is funded by the European Commission under the "Information Society Technologies" Programme
What is MobiHealth?

MobiHealth is a mobile healthcare project funded by the European Union. The MobiHealth consortium unites 14 partners from five European countries and represents all the relevant disciplines. Partners include: hospitals and medical service providers, universities, mobile network operators, mobile application service providers and mobile infrastructure and hardware suppliers. The project started on May 01, 2002 and runs for 22 months until the end of February 2004.

What are the objectives of MobiHealth?

MobiHealth aims at developing and trialing new mobile value-added services in the area of healthcare, thus bringing healthcare to the patient. The MobiHealth system allows patients to be fully mobile whilst undergoing health monitoring. The patient wears a lightweight monitoring system – the MobiHealth BAN (Body Area Network) – which is customized to their individual health needs. Physical measurements such as blood pressure or ECG are measured by the MobiHealth BAN and transmitted wirelessly from the BAN to their doctor, the hospital or their health call centre.

MobiHealth significantly contributes to addressing the healthcare sector's increasing problems of resource management and is expected to decrease disease- and care-related costs. Moreover, it helps to satisfy patients' growing need for mobility and personalized care. For industry and a range of other organizations active in healthcare, MobiHealth offers the opportunity to gain experience with mobile services and creates new business opportunities.

Who benefits from MobiHealth?

Among the most important potential areas of application of these new services are:

- MobiHealth provides easy, convenient and ready-to-use services which benefit:
  - Healthcare payers through:
    - Reduction in disease and care costs
    - Better management of resources
    - Significant health-economic improvements
  - Patients by giving:
    - Increased freedom and improved quality-of-life
    - Flexible, individual and effective treatment and therapy
    - Peace-of-mind
  - Healthcare providers through:
    - Better management and monitoring of patients' therapy
    - Prevention as well as fast and professional handling of emergencies
    - High service differentiation with low investment in technology and time
  - Commercial service providers through:
    - Open and standardized mobile service platform
    - Proven functionality and usability
    - Convincing business models

Remote monitoring of chronically ill patients
Remote assistance and monitoring in a home-care setting
Remote assistance in case of accidents and emergencies
Remote physical state monitoring in sports and even
Remote management of clinical trials
How do the MobiHealth services work?

The MobiHealth service and application platform enables monitoring, storage and transmission of vital-sign data coming from the patient BAN within a secured environment (based on standard encryption, authorisation and authentication technologies). The platform supports flexible personalization of services and ensures appropriate intervention in response to certain conditions or combinations detected in the vital-sign measurements.

How are the MobiHealth trials being conducted?

Randomised controlled trials are performed in Germany, the Netherlands, Spain and Sweden from July 2003 onwards. These trials are being conducted in the areas of acute trauma care, chronic and high-risk patient monitoring and monitoring of patients in home-care settings.

The trials are evaluated in terms of accuracy and validity of measurements, usability of the GPRS and UMTS networks, business and market potential and also for social and ethical effects.

How are the MobiHealth trials designed?

Nine field trials representing some key focus areas of healthcare are carried through between July and November 2003 to test and validate the system and present the results of this EU-sponsored project.

All trials are designed to determine that with today's technology of wireless communications (GPRS and UMTS) such services can be enabled.

The detailed evaluation results will be ready by February 2004 giving additional information on the user-friendliness and profitability of MobiHealth.

Trial 01 Germany — Telemonitoring of patients with cardiac arrhythmia

The target group in this trial is patients with ventricular arrhythmia who are undergoing drug therapy. Cardiac arrhythmia is very common and in many cases is related to coronary heart disease. Around one million patients suffer from coronary heart disease in Germany today.

In patients suffering from arrhythmia, ECG measurements have to be taken regularly to monitor the efficacy of drug therapy. In order to save time and reduce costs, the patient is able to transmit ECG and blood pressure via GPRS from home or elsewhere to the health call centre, where the vital signs are monitored by a cardiologist. The intention is that irregular patterns in these vital signs will be detected quickly and appropriate intervention can be initiated.

This trial is to evaluate how both patients and the cardiologist gain time and cost advantages, as well as to document processes for implementation.
Monitoring of vital signs: The patient is mobile and secure!

In this trial, patients are monitored from home using the MobiHealth BAN and the (maternal and foetal) biosignals are transmitted to the hospital. An additional objective of the trial is to evaluate if such a solution postpones hospitalisation and reduces costs.

All trials in The Netherlands sponsored by Vodafone

**Trial 02** The Netherlands — Integrated homecare for women with high-risk pregnancies

The trial will use the MobiHealth BAN to support integrated homecare for women with high-risk pregnancies.

Women with high-risk pregnancies are often admitted to the hospital for longer periods of time because of possible pregnancy-related complications. Admission is necessary for the intensive monitoring of the patient and the unborn child. Homecare with continuous monitoring is desirable and can postpone hospitalisation and reduce costs, as well as offering more security for the mother and unborn child.

**Trial 03** The Netherlands — Tele trauma team

MobiHealth BANs will be used in trauma care both for patients and for health professionals (ambulance paramedics). The trauma patient BAN will measure vital signs which will be transmitted from the scene to the members of the trauma team located at the hospital. The paramedics wear trauma team BANs which incorporate a video camera, an audio system and a wireless communication link to the hospital.

The purpose of this trial is to evaluate whether use of mobile communications can improve quality of care and decrease lag-time between the accident and the intervention. When using telemetry technology, time can be saved and thus treatment and chances for patient recovery improved. Faster intervention is expected to increase survival rates and decrease morbidity.

Parameters to be measured are breathing frequency, oxygen saturation, pulse rate, blood pressure, pupil size and reactions and amount of fluids infused. Video from the scene will be transmitted assuming UMTS availability.

**Trial 04** Spain — Support of home-based healthcare services

This trial involves use of GPRS for supporting home-based care for elderly and chronically ill patients including remote assistance if needed. Patients suffer from co-morbidities including chronic respiratory problems (COPD). The MobiHealth nurse-BAN will be used to perform patient measurements during nurse home visits and the MobiHealth patient-BAN will be used for continuous monitoring during patient rehabilitation at home, or even outdoors.

It is very important to facilitate patients’ access to healthcare professionals without saturating the available resources, and this is one of the main expected outcomes of the MobiHealth remote monitoring approach. Parameters to be measured are oxygen saturation, ECG, spirometry, temperature, glucose and blood pressure.
The patients involved in this trial are chronic respiratory patients who are expected to benefit from rehabilitation programs to improve their functional status. The study aims to check the feasibility of remotely supervised outdoor training programs based on control of walking speed enabled by use of the MobiHealth BAN. The physiotherapist will receive online information on the patient’s exercise performance and will provide feedback and advice.

The group of patients involved in the trial suffer from respiratory insufficiency due to chronic pulmonary diseases. These people need to be under constant medical supervision in case they suffer an aggravation of their condition. Besides needing regular check-ups, they are also dependent on oxygen therapy at home, which means oxygen delivery and close supervision.

The use of the MobiHealth BANs is designed to enable the early detection of this group of diseases but also to support homecare for diagnosed patients by detecting situations where the patient requires intervention. The expected benefits are a reduction of the number of check-ups and hospitalisations needed, thus saving both time and money. Parameters measured include heart rate, oxygen saturation and signals from a motion sensor (accelerometer).
Home care services and the possibility of monitoring health conditions at a distance are changing the way of providing care in different situations. If suitable, home-based services are provided and patients do not need to be in hospital, for example if they are recovering from intervention. By investing in home care, hospitals have been able to significantly reduce pressure on beds and on staff time dedicated to the kind of patients named above.

This trial tests transmission of clinical patient data by means of portable GPRS/UMTS equipment to a physician or a registered district nurse (RDN) from patients living in a rural, low-population-density area. The expected benefit is that this solution will reduce the number of unnecessary patient visits to the hospital.