

metabo

Controlling Chronic Diseases related to Metabolic Disorders

1 Upcoming Events

After the success of International Conference on Advanced Technologies & Treatments for Diabetes, ATTD, we have the pleasure to announce the **second ATTD world meeting. It will be celebrated In Athens, Greece, on 25th-28th February 2009**



2nd ATTD World Meeting

Athens, 25th-28th February 2009



METABO will launch two posters:

- **For In-Vehicle System:** "An on-board multimodal platform for predicting hypoglycemic events on diabetic drivers".
- **For METABO Central System:** "Diabetes metabolic modeling and personalized treatment based on a multi-parametric monitoring platform".



On the other hand, we are proud to present the **IV Physics an Medical Engineering Day, organized sequentially in Tampere, Helsinki, Oulu and Kuopio, Finland. This meeting is arranged by the Finnish Society for Medical Physics and Medical Engineering, and will be celebrated on 12th February 2009.**

The purpose of the society is to arouse and maintain towards medical physics, medical engineering and biophysics in Finland.

The society also aims to strengthen the development of research, education and industry in these disciplines

The University of Kuopio will join this event and present a METABO poster.

During the day, a poster competition where the best Master's theses graduated in the year 2008 from the field of medical physics and medical engineering is held. More information (in Finnish) about the Day and about the society can be found from <http://www.lfty.fi>

2 Introducing Metabo

You are reading the first issue of the METABO Newsletter. New issues will be published within the next three years with the primary aim to inform you about the progress in our activity and the results produced, as well as all related and interesting events undertaken during the course of the project. Each issue will be available in pdf format in the project website: www.metabo-ue.org.



METABO stands for "93Controlling Chronic Diseases related to METABOLic Disorders"94 and it is an ICT project co-funded by the European Commission, addressing objective 1a from challenge in the 7th Framework Program: Personal Health Systems for Monitoring and Point-of-Care Diagnostics.

3 Mission and Scope of the Project

Mission: Contribute to the improvement of the diabetes disease management

The aim of METABO is to set up a comprehensive platform, running both in clinical settings and in every-day life environments, for continuous and multi-parametric monitoring of the metabolic status in patients with, or at risk of, diabetes and associated metabolic disorders. To provide an extensive user-oriented validation of the METABO platform and to better delineate this situation-driven application of the METABO close-loop paradigm, six major application scenarios (called SEGMENTS) and two series of scientific pilots will be considered.

Sudden hypoglycemia prediction:

One of the most important problems related to hypoglycemia is the fact that after living with the disease for some time, diabetics tend to lose awareness of the early, autonomic symptoms (reacting to glucose fall) of hypoglycaemia. This can lead to dangerous situations, especially in circumstances like driving, when reflects become vital for safety. The indirect study of early hypoglycemia signs is an innovative approach to prevent hazardous conditions.



Lack of motivation:

In Diabetes Mellitus there is the need to deal with a very important psychosomatic complex that can lead to an instable metabolic state with serious health consequences. Its comprehension, as well as understanding of the specific situations and behavior patterns that influence individual patients' self-management and compliance to therapy, is vital to provide the patients the adequate support and care.



Changes in the environment:

This segment is dedicated to the study of the conditions in which diabetic patients are exposed to changes in their usual environment or lifestyle, no matter what these changes are, that cause a disruption in their treatment routine, or a need to adjust the routine to the new conditions

Physical Activity:



This segment intends to focus on the effects of physical activity (both high-end physical training and low-end lifestyle-related activities) on glucose metabolism and diabetes control..



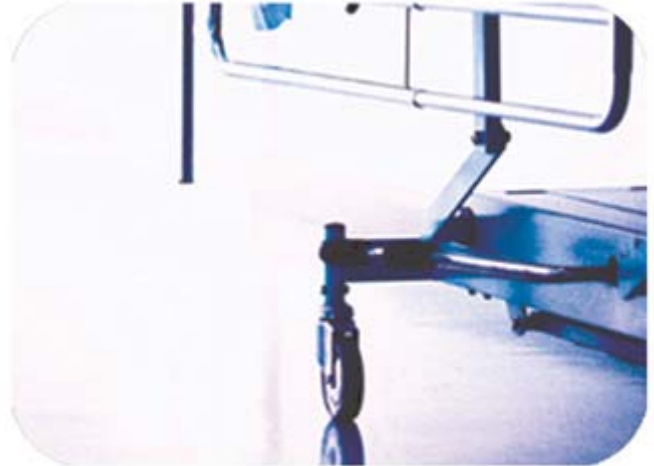
Unstable diabetes control:

METABO addresses the case of patients who cannot reach metabolic stability despite the best available treatment strategy has been put in place. METABO focuses in isolating the different factors that should be monitored in these cases, such as food intake, physical activity, lifestyle, insulin intake, glucose in blood, etc.



Comorbidity disease management:

Patients with comorbidities (i.e. concurrent presence of one or more major diseases related or not to diabetes) represent a significant challenge for clinical medicine as one disease may affect progression and response to treatment of the other.



These six Segments will be used as conceptual framework around which implementing the METABO platform, that will then be trained and validated by three different series of scientific pilots addressing wearable monitoring and environmental monitoring.

4 Diabetes

Open issues on metabolic control in diabetes:



About 6-8% of the population has diabetes (95% of them type 2).

70-90% of diabetics has insufficient glycaemic control (HbA1c > 6.5-7%).

Major cause for inadequate control is a mismatch between lifestyle and treatment, but < 10% of type 1 diabetics are trained to adapt insulin doses to food/exercise and self-dosing training is not available for type 2 diabetics.

SHE are estimated responsible for 2-4% of deaths (car accidents).

Optimal glycaemic levels increase severe hypoglycemic episodes (SHE) of 2-3 times and about 10% of diabetics are unaware of symptoms.

Non-continuous monitoring (current usual widespread methodology) does not enable the identification of the individual factors affecting metabolic processes (cause-effect relation between nutrition, lifestyle, stress level, drug intake and insulin levels).



Diabetes has become a worldwide epidemic, with increasing costs for health and welfare system and for

The high cost of diabetes

The International Diabetes Federation (IDF) estimates that the equivalent of an additional 23 million years of life are lost each year to the disability and to reduced quality of life caused by the preventable complications of diabetes;

In Europe IDF estimates (IDF Diabetes Atlas 2007) that the yearly cost of diabetes is around 67 Million International Dollars.

5 Metabo Scientific And Technological Objectives

METABO faces the following challenges:

↳ **Scientific Challenge:** to find solutions to implement continuous glucose monitoring, identify and refine a reliable personal model of metabolic behaviour, to achieve an optimal individual patient's care and prevent unpredicted risks and danger situations to empower patients in personal care.

↳ **Technology challenge:** to develop technical solutions i.e. an integrated technological platform enabling the integration and interoperability of different monitoring devices acceptable by patients and effective for health professionals for the implementation of the continuous monitoring and modelling concept and the natural access and usage of technologies and devices for a safer and less restricted life.

↳ **Social and psychological challenge:** to create non-invasive and easy-to-use integrated solutions motivating patients to use them to improve their quality of life.

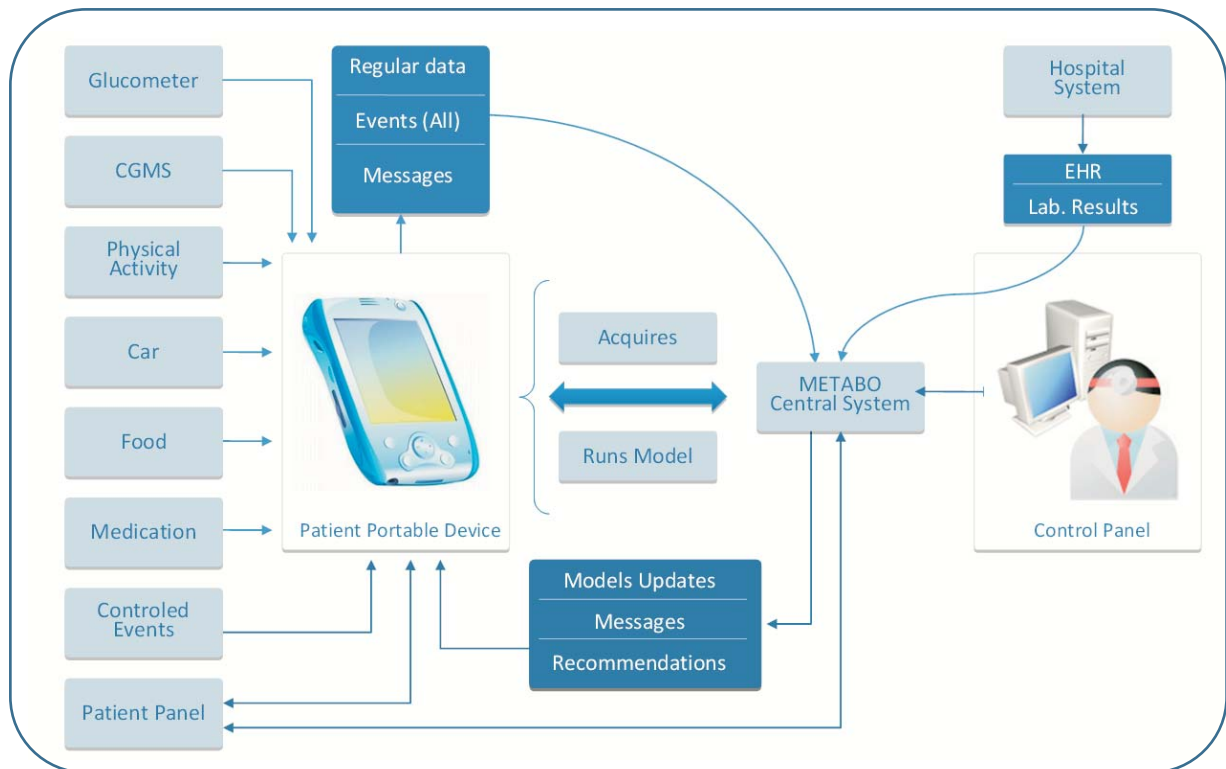
↳ **Economical challenge:** to demonstrate that the solution is affordable for citizens, convenient for the healthcare and welfare system and that the technical research leads to the widening of market opportunities for business actors.

METABO has the objective to address these challenges in one integrated project.

From the technical perspective, METABO addresses the following technical issues:

Use and integration of available sensors and medical devices to collect body and health parameters, environmental and contextual data, behavioural responses to stress and life situations to identify and detect the effects on personal metabolic process.

Personalisation and adaptation of sensors and other equipment (cameras, electronic and mechanical components of cars, etc.) and of the underlying software to detect and record the necessary body and physical data.



Design and implementation of a technical platform arranged for interoperability and data transfer among different monitoring devices, based on shared semantics.

Design of algorithms for detection and analysis of facial expression, eye movements, body posture and movement characteristics for early prediction of hypoglycemic episodes.

Building of a scientific database of significant body and environmental parameters and its matching with existing knowledge and empirical expertise for the study of diabetes.

Design, evaluation and practical application to individual care process of models of personal metabolic response based on the collected monitoring parameters and personal health and genetic data.

6 Metabo first review

METABO is completing now its first reporting period and will be holding its first technical review next 18th -19th February in the European Commission premises in Brussels, Belgium.



7 Metabo validation

The final step in METABO scientific activities will be to test the use of the system against the non-use (the current clinical practice) to assess the effectiveness of METABO platform in changing clinically relevant outcomes.

This phase will be a full-size pragmatical randomized clinical trial (RCT) that will take place after the full system will be completed and available and all the operators will be trained and experienced in its usage. For these reasons phase 2 will

start close to the end of the METABO project timeframe and will continue after the end of the project as main clinical exploitation activity.

8 Pilots



The overall METABO paradigm will be thoroughly tested and validated in a number of clinical scenarios that collectively cover all major exploitability areas for the project. In particular, different solutions for metabolic monitoring are required by different patients or different phases of the disease in the same patient. In this context, we identified representative of six different challenges that can occur to diabetic patients and that can be potentially supported by

the use of a flexible metabolic monitoring platform enabling the acquisition of specific knowledge. In addition to this scenario-oriented approach, a three step validation strategy has been identified, aiming at the acquisition of relevant data to set-up and train the system and at the testing activity on the platform and its clinical impact. six major scenarios ("93segments"94) of use

The METABO scientific strategy for training, testing and validating the METABO platform and concept can be delineated as follows:

•07 Phase 1: System training. Implementation of a multi-centric observational study collecting real-life (free-living) data of diabetic patients. The large study will be completed by selected substudies (which will be conducted in order for collected data to be synchronized with the larger group) with the aim of collecting specific information. This phase will also serve as the first concept validation with patients. This step is performed in a real-life environment with an assessed METABO monitoring system, providing feedbacks to patients with established care protocol/model. Patients

will adopt a "93personal"94 wearable monitoring tool set which will be enriched with equipment continuously monitoring also physical activity. Immediate alerts and feedbacks are foreseen and actions to be taken also suggested. This step leads to the implementation of personalized therapy and to the building of personal models. In addition, specific sub-pilots will be used to collect data under controlled situations whose purpose is to collect out of normal-life "93extreme"94 data, simplified data or Segment-oriented data.

This phase and the following ones will be deployed in 5 different centers:

The **phase 1 will start next April 1st** with the organization of the first subphase of pilots involving from 5 to 10 patients in each center. **Phase 1.5: System validation** (usability). This phase will be used to test the system inside the clinical context and therefore will serve also to validate the personalized METABO approach as for applicability. **Phase 2: Clinical validation.** The final step in METABO scientific activities will be to test the use of the system against the non-use (the current clinical practice) to assess the effectiveness of METABO platform in changing clinically relevant outcomes. This phase will be a full-size pragmatically randomized clinical trial (RCT) that will take place after the full system.



9 Metabo in other 7fp Projects

METABO coordination team has collaborated in other 7FP in several workshops organized during year 2008:

PHS2020: Producing a policy oriented RTD roadmap for ICT supported Personal Health Systems. More information in www.PHS2020.com

SIMPHS: Strategic Intelligence Monitor on Personal Health Systems. More information in www.SIMPHS.com

10 Metabo Press Releases

My Doctor in the PDA

(ABC Journal. Original version– spanish)

Pioneer system for the Diabetes Monitoring

(Press Release. Original versionñ spanish)

Pioneer system for the Diabetes Monitoring

(ADN-science web site. Original version– spanish)

UPM participates on a European clinical research on Diabetes Monitoring

(Diario Mé'e9dico Journal. Original version– spanish)

UPM participates on a Pioneer project on Diabetes Monitoring

(Ecodiario.es. Original versionñ spanish)

Pioneer System on Diabetes Monitoring

(Sistema Madri+d. Original versionñ spanish)

11 Join us

If you would like to contact us and receive our news, invitation to our workshops, information on the progress of the project, or you just want to give us your opinion, please fill in the contact form below and send it to the METABO communication partner, MEDTRONIC by email at: alejandra.guillen@medtronic.com / carla.cudos@medtornic.com

12 Links

METABO website:

www.metabo-eu.org

Other related projects

<http://www.metabo-eu.org/relevant-links/related-projects>

Cordis: <http://cordis.europa.eu/fp7/ict>

American Diabetes Association:

<http://www.diabetes.org/home.jsp>

International Diabetes Federation:

<http://www.idf.org/>

European Association for the study of Diabetes:

<http://www.easd.org/#welcome.html>

Metabo Consortuim List

21 Partners from 9 EU member states (E, I, D, F, GR, FIN, CZ, L, MT)

Project Coordinator

MEDTRONIC – Spain
www.medtronic.com



Industrial Technology Partners

FERRARI – Italy
www.ferrariworld.com



SATE – Italy
www.sate-italy.com



MEGA – Finland
www.megaemg.com



Industrial IT Partners

IDS – Czech Republic
www.ids-scheer.cz



MICRODATA – Greece
www.microdata.com.gr



DDS – Greece
www.dds synergy.gr



SWORD – Luxembourg
www.sword-group.com



R&S INFO – Italy
www.rsinfo.it



Worldmatch – Malta
www.wmsoft.com



Healthcare Organization Partners

AUSLM (Regional Health Agency Italy)
www.ausl.mo.it



Training organization

ORT France – France
www.ortinnovation.com



Diabetes Clinical Partners

Clinic Hospital San Carlos Madrid – Spain
www.hcsc.es



Charles University – Czech Republic
www.lf2.cuni.cz



University of Parma – Italy
www.unipr.it



Technical University Partners

University of KUOPIO – Finland
bsamig.uku.fi



University of Patras – Greece
www.upatras.gr



University of Augsburg – Germany
mm-werkstatt.informatik.uni-augsburg.de



Polytechnic University of Madrid – Spain
www.upm.es



UPVLC – ITACA – Spain
www.upv.es



ICCS-NTUA
Institute of Communication and Computer Systems of National Technical University of Athens – Greece
www.image.ece.ntua.gr

