

OLDES – Prague Pilot

The Prague part of the OLDES (Older People's E-services at Home) project is focused on older persons suffering from Type 2 diabetes mellitus (DM2). Diabetes mellitus is a chronic metabolic disorder characterized by glucose intolerance and hyperglycaemia which leads to development of acute and long-term complications (cardiovascular, cerebrovascular, renal, ophthalmic...). These complications seriously alter the patient's physical and psychical status resulting in significantly decreased quality of life. Type 2 diabetes, the prevailing type (appr. 95% of all cases) of diabetes mellitus, is connected with overweight and is present especially in the elderly. Nowadays, with the worldwide epidemics of obesity, the number of type 2 diabetics is growing rapidly and is becoming a serious medical, social and economical problem. In order to improve this, novel innovative approaches to all aspects of care for diabetic persons are to be developed.

The main aim of Prague OLDES pilot is to provide a low-cost and easy-to-use health care platform designed to improve the health status and ease the life of older patients with DM2. The "A and O" of reducing diabetic complications is a tight glycaemic control with blood glucose as close to physiological levels as possible and with minimal risk of dangerous hypoglycaemia. Such kind of compensation requires frequent control of blood glucose, but especially older persons have problems with accomplishing a strict regimen like that. Therefore, the core of the developed platform will consist of a continuous glucose monitoring system, which will measure glycaemic values throughout the time and display them on-line. Sensors for monitoring of other vital parameters, like heart rate, ECG and accelerometers will also be incorporated into the platform, providing a complex view of the patient's actual health status. All measured data will be transferred wirelessly to a low-cost computer and further via internet to the patient's health provider. This will enable a better surveillance of the patient's health status and more efficient adjustment of therapy. An independent on-line monitoring of patient's health data will give the physician the possibility to act immediately and appropriately even in case of patient's unconsciousness or other conditions disabling proper communication. All this will lead to a better compensation of diabetes and other accompanying diseases, reduction of acute and chronic complications and a more effective prevention of emergencies, resulting in the reduction of the frequency of hospitalizations and increased quality of life. A better health status and decreased number of hospital stays will also markedly decrease the health care system expenses.

Another critical issue of diabetic compensation is the diet. Diabetic patients require a strict follow-up of nutrient and energy intake, which tends to be a problem especially for older persons. Therefore, a programmable interactive scale is planned to be incorporated into the OLDES platform. The scale will be able to calculate the amount of energy and nutrients encompassed in a particular piece of food. Its memory will store data about calories, saccharides, proteins and lipids intaken throughout the day and calculate the maximal daily dose of various food sorts which the particular person is allowed to consume, helping so to maintain a balanced diet.

The Prague pilot will be carried out by 2 partners of the OLDES consortium – Electro-technical Faculty of the Czech Technical University and 3rd Department of Medicine – Department of Endocrinology and Metabolism of 1st Medical Faculty of the Charles University. The first stage of the project will include the development of the platform – adaptation and integration of sensors, scales and other hardware, development of communication and security protocols and software tools for transferring, processing and visualizing obtained data. The wearable parts of the system should be designed ergonomically, disturbing the user as little as possible. The communication between sensors and the processing unit should follow wirelessly using radio waves technology (Bluetooth or Zigbee). The data will be transferred into a low-cost and from there send via a secure

Internet connection to patient's health care provider and visualized and stored there under consideration of privacy policy rules.

The clinical evaluation of the platform will follow in the second project stage. The clinical performance, reliability and user friendliness of the system will be tested over a group of 10 diabetic elderly patients. The testing will be performed during the second half of the project duration and improvement of glycaemic compensation, reduction in the number of hospitalizations and comfort of wearing will be evaluated.