

Experimentation site Poland - Cancer Rehabilitation System and Applications

The motivation

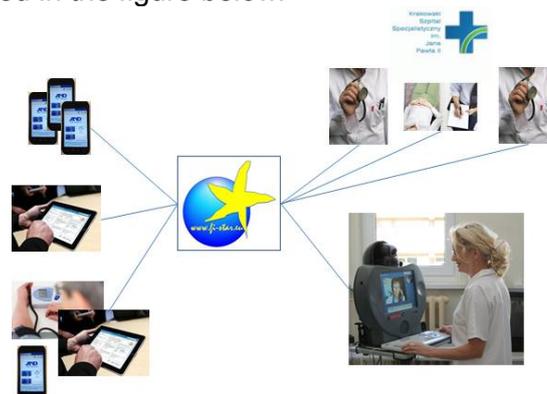
The Cancer Rehabilitation use case scenario (“Telecare”) will be realized in John Paul II Hospital, located in Malopolska Voivodship in the historic city of Krakow, in southern Poland. The hospital fosters collaboration with state-owned, regional, local and academic institutions. As one of the best-equipped hospitals with the highest qualified medical personnel it offers 550 beds for treatment of a spectrum of diseases. In 2009 the number of hospitalized patients was more than 22 000 and it is still growing. Similarly, the number of out-patients is growing; in 2009 there were 90 000.

Motivation for Cancer Rehabilitation (“Telecare”) use case scenario is the rising number of patients, who are receiving chemotherapy during the cancer treatment. The treatment includes hospitalization (usually 1-2 days) when the chemotherapy is applied and the time which patient spend at home between chemotherapy cycles. This time spend at home is difficult for patients and their families, because they need to face up new, unusual problems. There are physical problems, related to the illness itself and the side effects of chemotherapy. Moreover, patient may be in a bad mental condition. The JP II hospital has already performed preliminary experimentation with telecare (functionalities limited to a call center in the hospital) for cancer patients and the outcome was very positive.

In order to improve quality of life of patients who are taking chemotherapy treatment experiment aims at continuing medical care in between chemotherapy cycles at home. Thus, addressing problems, some of which patients may be experienced during the chemotherapy treatment.

The main idea behind “Cancer rehabilitation” experiment

The patients participating in an experiment will be equipped with dedicated hardware (life monitoring sensors, tablets, cameras) and software (knowledge portal, treatment diary, mobile application, video conferencing client). The connection between patients and hospital will rely on the public Internet connectivity at patients’ premises. Moreover we plan to provide number of sensors that will enhance the tele-monitoring capabilities of the experiment/platform (adhering to the IoT paradigm). These sensors will bring in the additional potential for ease of online data collection and its further correlation (to enhance medical analysis capabilities of big data). We also consider that the web portal “*Knowledge Portal for Patients*” as well as the portable application will be developed and provided to end-users for improved user-experience. The key components of the envisioned system architecture are presented in the figure below.



The key functionalities of the experiment

The main functionalities envisioned by the experiment are briefly characterized below:

- *Tele Diagnosis* – this module provides patients with the possibility of audio or audio/video conversation with the doctor or Call center (e.g. when the doctor is not available to record a request); audio contact with Call center will be available 24h/7 days, audio/video conversations will be available between 8.00-15.00; this module will be related to *Tele Monitoring* module; Patient needs to introduce the result of

sensor measures within 4-6 days after chemotherapy through a dedicated website (or automatically via IoT GE). In the next days only if he/she is not feeling well such data needs to be provided. Moreover every 2-3 days patient needs to introduce information on electronic pain scale (VAS) either in case of pain increase. On that basis the doctor will decide about the dose of medicines. Patient needs also to introduce information about the nausea and vomiting on a dedicated scale every day in a week after chemotherapy;

- *Tele Monitoring* – this module realizes functions of reading data from sensors, data correlation and location capabilities; it is related to *Mobile Application* and can be used by patient and the doctor;
- *Tele Consultations* – provides patients with possibility of consultation with the doctor, individual, audio/video, or using Forum/Chat to consult with other patients or families; contact with medical personnel could help in dealing with the following problems:
 - Physical problems related to the illness,
 - Side effects during the chemotherapy treatment,
 - Psychological problems;
- *Knowledge Portal for Patients* – will include:
 - general information about the illness, available methods of treatment, side effects;
 - Frequent Asked Questions – e.g. about everyday life, chemotherapy, how to prevent infections associated with cancer treatment, about the anemia in cancer patients or about the medical tests,
 - e-Guide – information how to take care of patients, how to deal with side effects and other problems,
 - Patient's Account with the full information about the plan of treatment, planned medical tests, surgeries, tests results;
- *Mobile Application* – will have access to the knowledge portal data, can be equipped with connectivity to sensors; will provide the “Reminder application” – informing patient about medicines, tests, doctor's visits; the mobile version of e-Guide will also be provided.

The planned system architecture and system functions will be realized using FI-STAR applications and also Generic Enablers elements exposed by the Consumer Edge FI-STAR platform (e.g. for managing data from medical devices and so on).

Experiment details

The detailed parameters of the experiment are presented in the table below.

	Group 1	Group 2
Patients	Patients covered by the treatment of cancer (lung cancer)	Patients under pulmonary rehabilitation prior to surgery resection of pulmonary parenchyma caused by lung cancer
Number of patients in one cycle	15	6
Total number of patients	15 (one cycle)	30 (5 cycles)
Duration of the cycle	4-5 months	2 weeks
Medical personnel engaged	The doctor, Nurse, Psychologist	Physiotherapist
Technical requirements	Internet access (high speed)	Internet access (high speed)
Vital Life Parameters to be measured at the patient's house	blood pressure, pulse, saturation, temperature, ECG	blood pressure, pulse, saturation,
Devices/equipment for the hospital	Portable device with the camera	Computer with the camera + 6 monitors

Link - John Paul II Hospital's website - <http://www.szpitaljp2.krakow.pl/>