

# Patient Engagement System for the Improvement of Healthcare Quality

## ***Justas Trinkunas***

*Vilnius University Hospital Santaros Klinikos*

*Vilnius Gediminas Technical University*

*Vilnius, Lithuania*

*justas.trinkunas@santa.lt*

## ***Roma Purnaite***

*Vilnius University Hospital Santaros Klinikos*

*Faculty of Mathematics and Informatics,*

*Institute of Data Science and Digital Technologies, Vilnius University*

*Vilnius, Lithuania*

*roma.purnaite@santa.lt*

## ***Andrejus Cernovas***

*Vilnius University Hospital Santaros Klinikos*

*Department of Public Health, Faculty of Medicine, Institute of Health Sciences, Vilnius*

*Vilnius, Lithuania*

*andrejus.cernovas@santa.lt*

## **Abstract**

Patient-reported experience and outcome measures may serve well for the public interest to improve the quality of healthcare by identifying existing obstacles in the organization of care, as well as assessing patients' healthcare priorities. The project will result in the development of an integral tool for patient engagement in quality management, which will be integrated into the quality management and eHealth systems of a healthcare institution.

**Keywords:** electronic health records (EHR), quality, patient engagement system, eHealth

## **1. Introduction**

Patient engagement in their treatment process and the management of healthcare services is a complex issue of multidisciplinary research and practice. Our project aims to improve patient engagement in the management of healthcare quality by developing a prototype of an integrated instrument for eHealth that combines the assessment of the quality of life of patients after treatment and their experience with the healthcare system. The project will bring together researchers from social and biomedical fields, healthcare professionals, and patient organizations for qualitative and quantitative research to achieve the following tasks: (a) to analyse patient journey in the Lithuanian healthcare system along with identification of significant obstacles faced at each stage that will be further examined in large scale representative population survey; (b) to develop a new, original and integrated patient engagement system compatible with existing eHealth framework that will be adjusted to the national healthcare system, taking into account international experience and scientific research on the instruments of patient-reported outcome measures and patient-reported experience measures; (c) to conduct field research for pilot testing of the tool in patient groups and to create a prototype (database). Aim of the study to provide an overview of tools for patient engagement and patient-reported measures (patient reported outcomes and experiences) types, content and methodological development, aspects of their application and interpretation taking into account different healthcare services, and their use and integration to improve the healthcare quality.

Step (a) is already completed and part of the results are published in a literature review of patient-reported measures to improve healthcare quality [1]. In this paper we move towards step (b) and we will describe a vision of patient engagement system.

## 2. Patient engagement system

Healthcare organizations are facing the challenge of delivering personalized services to their patients in a cost-effective and efficient manner [6]. Therefore, those organizations require advanced healthcare process support for covering both organizational procedures and knowledge-intensive, dynamic treatment processes to meet patients' needs. In this section, we describe integrated patient engagement tool compatible with existing national eHealth framework.

Vilnius University Hospital Santaros Klinikos is one of the major hospitals in Lithuania encompassing the provision of medical care in almost all key areas covering practical and scientific medicine, education of students, residents and physicians. The institution has developed hospital information system (SANTA-HIS), which integrates electronic health record, laboratory, picture archiving and communication system (PACS), staff and resource management, document management, quality management system, adverse events system, patient reported outcome measures (PROM) / patient reported experience measures (PREM) system and many other systems that are necessary for effective health care services. Figure 1 shows basic architecture of the system.

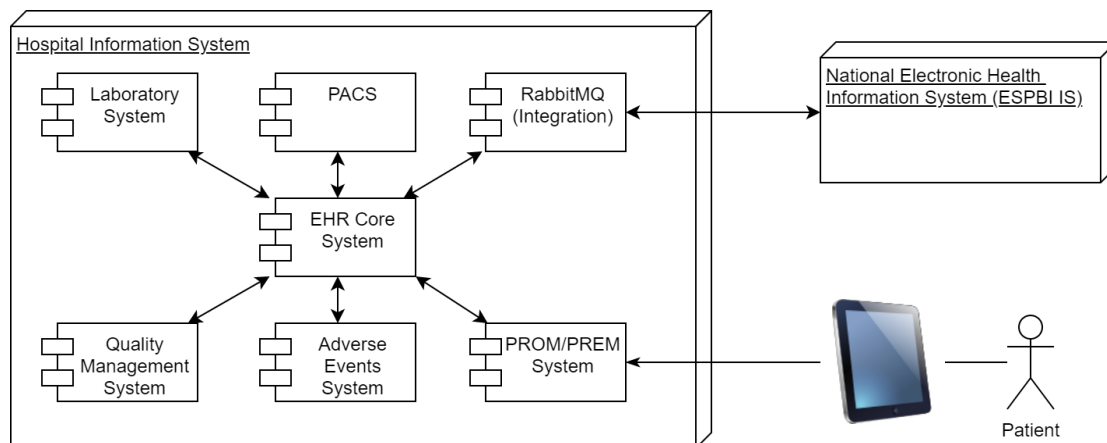


Fig. 1. Integrated Health Information System Architecture

SANTA-HIS system is integrated with Lithuanian national health information system which is called Electronic Health Services and Cooperation Infrastructure Information System (ESPBI IS). The systems were integrated using an open-source message-broker software (RabbitMQ). ESPBI IS was launched for patients and practitioners from 2015 [5]. Since then, data about patients is collected in the central system. The structure of the ESPBI IS is based on a repository database. It consists of databases of patients' EHRs, medical devices, classifiers, medical images, e-prescriptions. The aim was to create ESPBI IS as a single data centre, which will electronically store medical records of each resident of the state and would also integrate all internal IS of healthcare institutions into a unified system. Detailed hospital information systems integration to national electronic health record system is described in [7].

Our idea is to use PDCA Cycle (Plan, Do, Check, Act) in order to improve the system. First of all, we have to develop a plan for changes in order to make improvement. We already have electronic quality management system where all quality attributes and processes are described. We have to identify the biggest issues we want to solve and do some changes in the system to test them. In order to check if the changes are working as expected we will collect data from patients using PROM/PREM system. Also, we already use adverse events reporting system which collects all data about adverse events in the hospital. Having these data, we can check our progress towards our goals. Finally, we can act to get greatest benefits from already made changes.

We believe that we can benefit from the systems integrations because we will have all needed data in one place and we can make detailed analysis and have very detailed picture of the system.

Figure 2 shows the frequency of adverse events recorded in our institution's adverse event system from the third quarter of 2014 until the third quarter of 2021. We see that the number of adverse events has been growing every year until it has peaked since the onset of the COVID-19 pandemic in 2020 and the frequency of adverse events currently ranges from 15 to 20 adverse events per 10 000 patients. With the introduction of new tools, the rate may increase for some time due to newly identified problems reported by patients through the patient engagement system. However, in the long-term period, the positive effects of changes in the health care system should lead to a reduction and stabilization of adverse events because of changes in the quality of health.

Implementations of tools to improve health care with adverse events or harms identification shows promising positive results [2,3,4]. These tools were based on monitoring the condition of patients and analysis of electronic health records. In our project we plan to pay attention to the patient's reported outcome and experience measures.

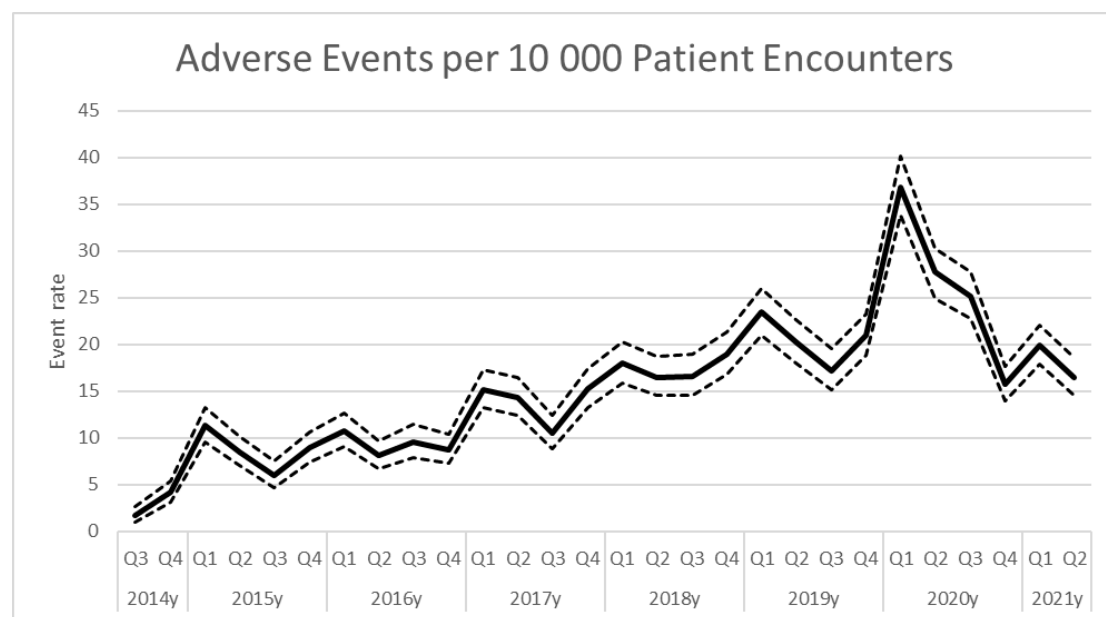


Fig. 2. Adverse Events per 10 000 Patient Encounters

### 3. Conclusions and future work

In the paper, we described integrated patient engagement system. The key outcome of the project will be a new interdisciplinary scientific product. New instruments will be designed and tested for patient engagement in the healthcare process.

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