

The EBMC₂ Project: Description

Business Case: The Evidence-based Medical Compliance Cluster project (EBMC₂) (see <http://ebmc2.univie.ac.at/>) aims at the analysis of skin cancer treatment processes. The project has been conducted as joint funding and effort between the Medical University of Vienna and the University of Vienna, more precisely, the Department of Dermatology, the Center of Medical Statistics, Informatics, and Intelligent Systems, and the research groups Data Analytics and Computing, Knowledge Engineering, and Workflow Systems and Technology.

Goals:

Analysis goals refer to the treatment of patients as well as to the performance of the institution (hospital). With respect to the treatment of patients the following KPIs are of interest:

- Survival time of patients
- Compliance of patients with preventive medical check-ups

For performance of the institution we will consider the following KPIs:

- Compliance of the institution with the international melanoma guidelines
- Organization of internal work processes

Data Task:

The data sources are data repositories at the local department, the Austrian Cancer Registry, and data from the Austrian Social Insurance System. Data are different with respect to temporal granularity, the quality of information and its completeness as well as its structure (structured and semi-structured data). Hence, we need a flexible data model which allows the integration (i.e. linking of data) according to the analysis goals of interest. Such linking also allows additional quality considerations.

The following template shows the details for the business and data understanding task.

Data Understanding

Application Environment

With respect to size, we look at a certain department of a hospital and a specific illness (melanoma) over a longer period of time. This involves many different activities by the hospital and different reactions of the patients. The reference to the global environment is of utmost importance such as the international comparison of comparable institutions and their embedding into the public health care system. In this case the BI scenario is mainly monitoring the strategy performance of the department.

Business Perspective:

Corresponding to the different goals we consider all business perspectives. The process owners are the Department of Dermatology, the process subjects are patients, and the process actors are defined by the staff of the hospital.

_ BI-Views: All three BI views are used depending on the analytical goals. For measuring the effectiveness of the check-up and the treatment we use the crosssectional view, for issues of survival time the state view and for the process oriented analytical goals the event view.

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Analytical Goals:

Corresponding to the initial formulation of KPIs a number of analytical goals can be formulated.

- Effectiveness of preventive medical check-ups
- Regression model for survival time of patients
- Compliance analysis for the treatment process

- Organizational mining for hospital staff

Assessment of Data:

Each analytical goal needs a specific data excerpt, which is obtained by data integration and transformations of the data, for example, crosssectional summaries of the event view. Data description has to be done for each data excerpt and data quality has to be checked as well. Important issues are completing missing information and improving temporal resolution.

Survival Data

In order to understand the duration of melanoma until death 305 patients are considered which have been registered with malignant melanoma of the skin from 2006 – 2010. For all persons the variables diagnosis time of malignant melanoma, age at diagnosis, sex, and stadium with three values localized, regional and disseminated are known. Furthermore, occurrence of other types of tumors for the patients is recorded. Overall for the 305 patients 137 events occurred in the observed time period.