

ProM

process mining workbench

Conformance checking

Isala's
Question

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The Isala hospital is the largest top-clinical hospital in the Netherlands. The hospital has almost 1.000 beds and per year more than 550.000 patients visit the outpatient clinic. For the top-5 most occurring diagnoses at the urology department the hospital was particularly interested in identifying whether unnecessary or obsolete steps were performed. Amongst others, the following questions were addressed:

- Are there any obligatory medical steps that are not performed for patients?
- Are there any obsolete steps or steps that can be avoided?
- Do we adhere to internal or external guidelines?

Process Mining

The goal of process mining is to extract process knowledge (e.g. process models) from event logs produced by a wide variety of systems. Within a hospital, this can be an administrative system which take care of the documentation and billing of all services delivered to patients. One frequently applied type of process mining is *conformance checking*.

For a given model, it can be checked if the observed behaviour in the log conforms to the model and vice versa. The output consists of diagnostic information showing differences and commonalities between model and log. For example, a medical guideline may be checked stating that always a lab test and an X-ray needs to be done. For the patients that violate the guideline it can be seen which of the tests are not performed.

Results

Using process mining, the care process of five different patient groups has been analysed. Some of the results are the following.

Preoperative screening:

Before surgery, a pre-operative screening is obliged for each non-urgent patient. However, for 6% of the patients, this pre-operative screening examination has not been registered within the care trajectory. Even more, for one patient group, the pre-operative screening has not been registered for 10% of the patients.

Emergency treatment:

Also, for three patient groups only standard, non-complex care needs to be provided. On average, after surgery, for 9% of the patients an emergency treatment at the outpatient clinic of urology was needed. For one patient group this was only the case for 1% of the patients whereas for one patient group this appeared to be 13%. The urologists indicated that for the latter group typically more complications occur. In case the emergency treatments could have been avoided, this would have saved more than 30 medical steps. Also, on average, the total duration of the care trajectory would have been 6 days less for each involved patient.



Screenshot of the LTL-checker of ProM 6 in which the green-colored instances are the patients for which no pre-assessment has been performed.