

Process Mining in Public Hospitals

Public hospitals face immense pressure to provide patients with efficient treatment and a rapid discharge from hospital.

An effective process structure is essential to systematically ensure appropriate levels of care for patients being discharged across shifts and care providers. These processes benefit both patient and care providers, and gaps in a process can have significant impact on a patient's health outcomes, and lead to future readmissions.



Reduced readmission rate

> Comprehensive understanding of the patient journey

> > Provision of groundwork for newly defined routines

Identification of further readmission factors

setting

Apromore partnered with a 600+ bed medical facility that manages over 28,000 emergency hospitalizations per year. There are over 30 beds in the cardiac medical ward and during the period analyze, there were over 1,300 admissions for Acute Coronary Syndrome (ACS) to this hospital.

An essential factor in avoiding readmission is modification of a patient's behavior and providing information on preventative behavioral changes is an important part of the discharge process. The hospital's challenge with the discharge process was to understand how to meet patient needs while extending the routines of hospital care in a systematic way to home care.



Understanding Acute Coronary Syndrome discharges in a hospital

Shining Light on the Patient Process

Members of the Apromore team and digital health academics from a School of Computing and Information Systems, in conjunction with hospital staff, started creating a picture of the processes at work by analyzing the experiences of ACS patients along their journey.

The team wanted to help the hospital answer the questions: "What is the typical experience of someone who is discharged unsuccessfully?" and "What is the difference between patients who are readmitted and those who are not?"

The Analysis

The team used a three-stage approach to bring understanding to the data in a meaningful way. The first two stages involved a review of medical records and interviews with patients at key time points in their hospital journey (from immediately predischarge to post discharge) in order to give more context to the medical records.

The third stage was a process mining project. The team was able to match a patient's experience gathered from the interviews, with that person's hospital journey as captured in the patient's digital medical record extracted from the hospital's patient management system.





Initial Findings

Capturing differences and commonalities between the ACS patient journeys (readmitted and not readmitted) using Apromore's unique features:

- >> Automated process model discovery
- >> Process variant analysis

difficult for them to hear all the them at home."





"The first few days the patient is in shock after the life threatening event, and it is information from the nurse in relation to diet and exercise and 'make it stick' with

Results and Benefits

Together, the three sources of data provide a rich picture of what factors have an impact on successful discharge. The analysis of the patient journey revealed a highly complex process and a broad range of factors that contribute to patients returning to the hospital post-discharge.

One of the most important observations from the process mining analysis was that non-readmitted patients received a nursing assessment for discharge just before being discharged, while readmitted patients received a medical assessment for discharge.

The process mining analysis suggests not just that this nursing assessment should occur, but that it should be focused on individual small patient needs and stressors. It also shows that small changes in process, which were not evident to the patient or perceived as significant to the hospital staff, can be linked to readmission.

The Apromore team verified the findings through a focus group with nursing staff from the ward where the study was conducted. The staff agreed with the findings and put forward process improvement suggestions. Information obtained from process mining projects can support staff on the ground just as much as it can support higher level strategic decision making, clarifying for all parties how a process is operating.





Looking Ahead

Armed with this data, the next steps towards reducing readmission is a routinization of the person-centered approach at the hospital. Although tension exists between the requirements of operational efficiency and demands of a person-centered care approach towards discharge, readmission incurs its own costs (human and financial).



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The result of over a decade of extensive research and innovation from leading universities, the Apromore platform includes no-code features and a simple UI that continuously delivers new insights into operational performance and compliance.

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