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# End-to-end clinical process monitoring based on event logs

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## Introduction

Health care processes are nowadays heavily dependent on Information Technology (IT). IT-based monitoring of clinical pathways regarding quality, time and costs is one of the key management strategies of critical diseases such as heart attack and stroke. A thorough understanding about both the hospital IT-systems and clinical pathways is required, to identify workflow bottlenecks. Event-based approaches using event logs are a promising opportunity to measure the process performance, to monitor the clinical pathways, to improve the quality of care and benchmark the healthcare organization.

## Methods

We propose a novel event-based approach to standardized and automated retrieval of quality and performance metrics along the clinical pathway of time-critical diseases in the context of various clinical standards and systems. Therefore we analyze the hospital IT-systems, devices and communication standards regarding the event-based extraction of timestamps. Beside the consideration of the IT-infrastructure and interoperability issues, we introduce an event-based clinical reference process model. We use event log files, generated by modalities, to achieve complementary information about the sub-processes during imaging procedures in radiology departments.

## Results

We present the ability to use standardized and automated approaches with existing health care IT to capture process cycle times along the end-to-end clinical pathway. Therefore we integrate IT-events into our process model. Based on it, process cycle times can be determined. Furthermore, the degree of utilization (e.g. by monitoring modality procedures in the radiology department) can be measured and therefore help to save time and costs while improving the quality of care. Using techniques like process mining, clinical pathways can be monitored, optimized and automatically generated.

## Conclusion

With the enormous impact of IT, there is a major demand for standardization in health care. A process-oriented view of timestamps and events represents a promising opportunity to accurately monitor the clinical pathway over several departmental and system borders.