Systemic Conceptual Modeling of Patient Flow in a Hospital Emergency Department: A case example

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Introduction

• Surveying the literature of modeling patient flow in emergency departments, the works found do usually not how their conceptual models have been constructed.
• This paper suggests a formalized methodology for constructing the conceptual model of a complex system such as the emergency department of a hospital.
• Furthermore, improvement in computer hardware has given modelers more and more options of how to conceptualize a system.
• This highlights the usefulness of a structured conceptual model building approach, as following such an approach will be useful to exploit this potential.
Research design

- Empirical case: The Emergency Department (ED) of Stavanger University Hospital (SUS); a medium-sized Norwegian hospital.
• The purpose tree is expounding on what the key variables of the model are and not only the purpose of it. The identified variables might be targeted to be a part of a dashboard in the modeling software.
The interface diagram shows the interfaces between the patient flow subprocesses of the ED in a systemic manner.
Interface diagrams illustrating (left): the interfaces between the patient flow subprocesses of the ED (right): on the overall organization of the ED, here the patient flow process as a subprocess.
Flow chart of the patient flow process in SUS’ ED.
It’s the most common tool, however, here it functions as a basis for the other steps in the suggested methodology.
• Sequence diagram helps showing the patients full sequential pathway throughout the system across time.
• Can also highlight the multitudes of different possibilities of patient flow.
Sequence diagram - Case

- Sequence diagram showing the full pathway of patients in the patient flow process of SUS. Emphasizing the multitude of patient pathways.
Conclusion

- This project exemplifies a rigid use of SE methodology as a basis for making a firm conceptual model for use on patient flow in ED. The results of this project might be adjusted for other applications and thus work as an outlet for other projects.

- We believe that this paper delivers an answer to the question posed by Mass (1986, p. 78): “How does, or should, a model structure evolve through iterative formulation testing, and analysis?” This proposed methodology yielded a good outset for the formulation step in the case project.