

## **USING DISCRETE-EVENT SIMULATION TO ANALYZE THE PROCESS OF CATARACT INTER-VENTION AT A UNIVERSITY HOSPITAL OUTPATIENT DEPARTMENT**

Olav Götz  
Claudia Bullmann  
Maria Zach  
Frank Tost  
Steffen Fleßa

Ernst-Moritz-Arndt-Universität Greifswald  
Rechts- und Staatswissenschaftliche Fakultät, Wirtschaftswissenschaften  
Friedrich-Loeffler-Straße70  
17487 Greifswald, Germany

### **ABSTRACT**

The Health Care sector in general and the hospitals and outpatient departments in special have faced many challenges over the last years. Economic analyses of the processes inside the hospital systems like patient flow, pathways, workflow or utilization of resources are getting more and more into the focus.

We constructed a stochastic discrete-event simulation model to represent the cataract inter-vention. The model is based on empirical data, gathered in a time study (2nd of May until 30th of May 2011). We verified and validated the basic model by using animation, tracing and de-bugging, interviews and testing against historical data. Afterwards we analyzed the effects of changes to that model by including several scenarios with different policies, e.g. different appointment policy or new personnel. The results of the simulation model showed that it was possible to represent the patient flow of a cataract intervention in the basic model including the corresponding times close to the observed times of the real system. Furthermore, changing the input variables represented through different scenarios showed effects on the total times in system, waiting times, times in operation and on the utilization rates of the personnel and locational resources. For example it was possible to reduce the utilization of the operation theatre by 22.72 % in comparison to the basic model by adding one additional physician in the preparation room.

The strength of our study is the use of real empirical data. This approach will be incorporated in further investigations by including the costs of resources, personnel and locations, to the simulation model or widen the focus to other interventions in a hospital or outpatient department. This will lead to a deeper understanding of the patient treatment processes and help to focus on the success of a hospital and its outpatient departments in the future.

We conclude that DES provides a powerful tool to monitor the important questions inside the health care sector. It helps to analyze processes and can support decisions of the involved policy-makers.