## Optimizing sterilization logistics in General Hospital Izola (SBI - Splošna bolnišnica Izola)

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## Abstract

The cost of health care in developed countries is around 10% of gross domestic product and is expected to increase. Hence, health care cost places an increasingly heavy burden on national and individual budgets, and many developed countries are implementing policies to (stimulate health care providers to) cut cost. There is a widespread belief that the cost effectiveness of health care can be improved. Different authors claims that a cost cut in health care by 10 to 20% is possible. The larger part of the cost reduction can be achieved by relatively straightforward measures such as adopting uniform work processes, standardizing materials, quantity discounts, optimizing the process of transport, disinfection time, assembling time networks, time sterilization, storage and transportation et cetera. In addition, better planning, and appropriate use of information technology are identified as valuable improvement opportunities.

In this paper, we explore opportunities for improvements of material flow in hospitals, i.e., the flow of sterile instruments. The improvements are based on an aligned combination of improvements in work processes and information technology.

As mentioned before, hospitals are currently under pressure to become more effective. Moreover, it is widely recognized that cost reductions in secondary processes free assets to improve the primary processes of patient cure and care. Consequently, attention for optimizing the logistic processes involved in sterilization logistics, focused on the central sterilization department has increased.

This paper discusses the optimization problem that of redesigning the sterilization processes for improving material availability and reducing cost. We consider changing the logistic management principles and optimization of operation sets' sterilization in SBI.

The basic problem of the client, which led to the search for new solutions has been spatial restructuring in SBI and the consequent intention to build a new central sterilization area.

Process of sterilization in SBI is currently conducted primarily in close proximity to the operation rooms. Due to the planned introduction of a central unit for the entire sterilizing instruments in SBI, the aim of the paper is to determine the effects of changes in the sterilization process and supply of sterile materials. This must consequently be rearranged along the rest of the logistics processes, such as: the process of transport, disinfection and sterilization, operation set assembly, storage, and delivery to the required departments.

In the first phase of the client's problem, we analyse the current inventory of sterilization material and the sterilization process for a given period, based on simulated central sterilization area. Data base covered more than 2100 different operations in the period of two months, where we defined the exact place and time of the operation, from the preparation of operating rooms to the very conclusion. This

required linking about 300 different required operation sets with the performed operations. The bulk of operations requires specific combinations of different operation sets, among which many of the combinations can be replaced by alternative ones.

With the acquired data and spatial analysis for acquiring delivery routes, the simulation of the central sterilization process was performed, which was used to acquire the lead times of operation set sterilization. The second part of the simulation was used to analyse the feasibility of operations by considering the delays due to the reorganized sterilization process. The initial results reveal that the operation schedule may not be fully executed with the limited operation set inventory, however rescheduling the operations or acquisition additional operation sets allows for following through the operation program.

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