Improving the Case Assignment System for Elective Surgeries Using Discrete Events Simulations

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Operating theatre (OT) surgical case assignment is an essential process which involves assigning surgeries to OT slots to allow planned surgeries to be carried out smoothly and ultimately, providing optimal patient care.

Open Access (OA) Policy is a form of Modified Block Scheduling Policy with resource pooling. A discrete event simulation model was used to evaluate the performance of the OA policies for OTs.

Sensitivity Analysis
Objective: To determine the effects of increased demand on OT Utilization (OTU) and Wait Time to Surgery (WTS) and, the limits before congestion occurs
- Demand increased artificially for selected OTs
- Utilization reaches a plateau of about 93% whilst Wait Time to Surgery increases at a faster rate (congestion)
- Limit to utilization due to system configurations and inherent uncertainties

Open Access Scenarios
Objective: To evaluate the effects of different lengths of the open access period on average OT utilizations and patient waiting time to surgery (for OTs and disciplines involved in the open access policy)
- Increase in utilization for affected OTs
- Decrease in wait time to surgery for affected specialties
- Reduced impact on utilization and wait time to surgery as open access period increases

Potential Applications
- Evaluate the optimal period and Discipline-OT clusters for OA
- Support target setting for OT utilization and waiting times
- Evaluate the impact of better predictive models for surgical durations and demand
- Development of a decision support tool for optimal slot assignments

Conclusions
The study provides evidence on the following:
- OA policy will be effective if the number and types of OTs-disciplines, as well as the length of OA periods are defined appropriately
- Optimal OA period for current implementation appears to be 120 hours from the simulation model
- Significant cost efficiencies will result with increase utilization rates, allocation of inpatient bed capacities

* Every 1% increase in utilization rates can be translated to more than $9W of cost efficiencies based on ballpark extrapolation to 50 support OTs in the system.