

00568 **Predictive Modelling of Surgery Durations for Operating Theatre Optimization**

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Aims: The allocation of operating theatre (OT) slots for surgeries is a complex decision process which involves the coordination of multiple resources. Uncertainties in the prediction of surgical durations may lead to under-utilization of OT resources and long waiting times to surgery. The aim of this study is to understand the factors affecting surgery durations in order to develop more accurate predictive models for surgery durations.

Methodology: A retrospective observational study based on 2 years of historical data was used to examine the factors associated with surgery durations. Patient-related information, clinical and surgical team characteristics for each surgical case were included in the analysis. Univariate analysis and multivariate statistical models were developed to identify meaningful factors and explain the impacts on the variations of operation time. Extreme Gradient Boosting Machine, Random Forest and other machine learning models were tested to derive the most accurate predictive model for the surgery durations.

Result: Electronic records on 41,759 surgical cases performed in SGH Major Operating Theatres (MOTs) and Ambulatory Surgical Centres (ASCs) that involved only a single surgical procedure from 1 January 2016 to 30 December 2017 were retrieved. A pilot analysis on 3 selected surgical departments (Colorectal, ENT and Gynaecology) was conducted. Preliminary results indicate that surgical case characteristics, such as surgical procedure table codes and method of operation are significant variables that affect surgery durations. Predictive capabilities exceeding 80% accuracies were observed for some of the disciplines.

Conclusion: This study reports the analysis of significant factors affecting surgery durations to aid the development of predictive models for the estimation of surgery durations. The understanding of important variables provides insights to improve surgery duration estimations for listing surgical cases and can enable more effective scheduling of such cases.