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INCREASING SURGICAL PRODUCTIVITY AT ERASMUS MEDICAL CENTER

MAARTJE ZONDERLAND
AND AD BOGERS

ERASMUS MEDICAL CENTER (EMC) is one of the largest hospitals in the Netherlands, situated in the densely populated region of Rotterdam-Rijnmond. During the first wave of the COVID-19 pandemic early 2020,

EMC served as the national crisis centre from which hospital capacity in the Netherlands was centrally coordinated. As a tertiary university hospital, EMC's Thoraxcenter is a supra-regional referral centre for



cardiology and cardio-thoracic surgery. The Thoraxcenter experiences fierce competition, since eight other cardiac surgery centres are situated within an 80km radius. In order to attain economy of scale and to be able to provide the necessary regional cardiac surgical service, the EMC decided to increase the number of open heart surgeries (989 in 2015) with 150 extra in 2016, 2017 and 2018 (450 in total). After successful budget negotiations with EMC's prevalent healthcare insurer, for 2016 a goal of 150 additional surgeries was indeed set. Here we describe how we were able to increase surgical productivity. For more detail, please see Zonderland et al (2020).

THE CHALLENGE: INCREASE MARKET SHARE AND INTRODUCE CAPACITY MANAGEMENT

As in many hospitals, paradoxically staff experience high work pressure, while at the same time a significant part of capacity is unused. Long and highly variable surgery durations, many

(10%) urgent patients and the intensive surgical preparation of patients (for example: dental sanitation, additional diagnostics, physiotherapy sessions and adjustment of medication) is typical for this patient cohort, thus introducing additional patient flow issues. Also, EMC's market share for open heart surgery was only around 50% within EMC's catchment area, compared to 85% for other cardiac surgery centres in their catchment area. Increasing EMC's market share to 85% would mean an additional 450 open heart surgeries per year. In addition to attracting the additional referrals required to receive these additional patients, capacity management was required to increase utilisation, reduce work pressure and improve operating room (OR) patient planning. Also, the long access time (defined as the time between the request for surgery and the day the surgery takes place) of 12–14 weeks had to be decreased to 2–3 weeks.

THE APPROACH: INTERVENTIONS ON

SEVERAL LEVELS, COMBINED WITH STRICT PROJECT MANAGEMENT

Two external consultants were hired for project management, problem analysis and implementation of necessary interventions. The project started with a thorough examination of the waiting list. Patients who weren't eligible for surgery anymore were removed from the list. As a result, the waiting list was reduced by 15%. For a sustainable increase in the surgical production, more referrals were required. This was achieved by the cardiac surgeons reaching out actively to referring cardiologists in the hospitals surrounding the EMC and discussing the advantages of referring cardiac patients to the Thoraxcenter.

From a capacity management perspective, the most important intervention was increasing capacity by extending OR opening hours. This was enabled by hiring additional OR staff and anaesthesiologists. The extension of opening hours had two main advantages: long surgeries (more than eight hours) could more often be finished within regular working hours, thus reducing the probability of staff working in overtime. Also, with an average surgery duration of almost five hours, the original 8-hour shift was usually too short to perform two surgeries. With the new 10-hour shift, this problem was eliminated and thus capacity was used more efficiently.

To improve the scheduling of urgent cases, a queuing model (see Zonderland et al (2010)) was used to calculate the required number of OR slots for this patient category. Using this model, a trade-off between cancellations of elective patients on the one hand and unused OR time due to excessive reservation of OR time for

urgent cases on the other hand can be made. As a consequence, one (out of four) ORs was earmarked for urgent patients. When no urgent patients were present, two elective patients were placed in so-called 'open-ticket beds' on the Medium Care Unit (this is a 'step-down' unit, where patients are placed who need close monitoring of their vital functions, but do not need the high-complex care that is provided on the Intensive Care Unit). These patients were awaiting and ready for surgery. Thus, empty slots in the earmarked OR would be used for elective surgeries, creating high accessibility for both urgent and elective patients, and optimal usage of capacity at the same time.

Another important intervention was the introduction of the new role of 'surgeon of the day' (SOTD). All cardiac surgeons were regularly scheduled for the SOTD role, being the central point of communication for referring cardiologists, having the mandate to decide upon the final OR schedule of that day. Introducing this new role, with a clear mandate, reduced

the fuzzy communication between the surgeons, anaesthesiologists, planning office and OR staff about changes in the schedule and the scheduling of urgent patients significantly. The SOTD also hosted a daily planning meeting at 10.00am, where the progress of ongoing surgeries and possible changes in the schedule were discussed with the anaesthesiologist on call and coordinators from the OR and clinical wards. This also improved the decision-making process.

Finally, patient preparation was improved by concentrating all pre-operative preparation activities at the outpatient clinic and scheduling them on the same day if possible. The number of times patients would need to visit the hospital decreased, and the overview of the process was improved.

The implementation of these measures was accompanied by strict project management, involving a weekly project group meeting and bi-monthly steering group meeting with all stakeholders represented. Four workshops were organised to align patient flow in the cardio-thoracic care

chain. Member of the project group: "I liked the clear analysis of the problem and transparent communication. There was good interaction with people on the shop floor so we could implement change."

THE RESULTS FOR 2016: AN INCREASE IN SURGICAL PRODUCTIVITY AND DECREASE IN ACCESS TIME

In all months of 2016, a higher production than in 2015 was achieved. The total increase in the number of open-heart surgeries performed in 2016 was 165 (+17%), more than originally intended. As the total number of surgeries performed increased by 186 (+12%), most of the increase was related to the increase in the number of open-heart surgeries (89% of the total increase). Access time decreased from 12–14 weeks to 2–3 weeks in the first quarter of 2016 and remained relatively stable in the remainder of the year.

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REFLECTION: A CONSTANT DIALOGUE WITH STAFF AND THE INVOLVEMENT OF CLINICAL LEADERSHIP IS CRITICAL

Four critical success factors can be identified that determined the success of this project (see Figure 1). The required process changes could only be implemented since there were two surgeons in the project group who were closely involved in the decision-making process and in turn discussed

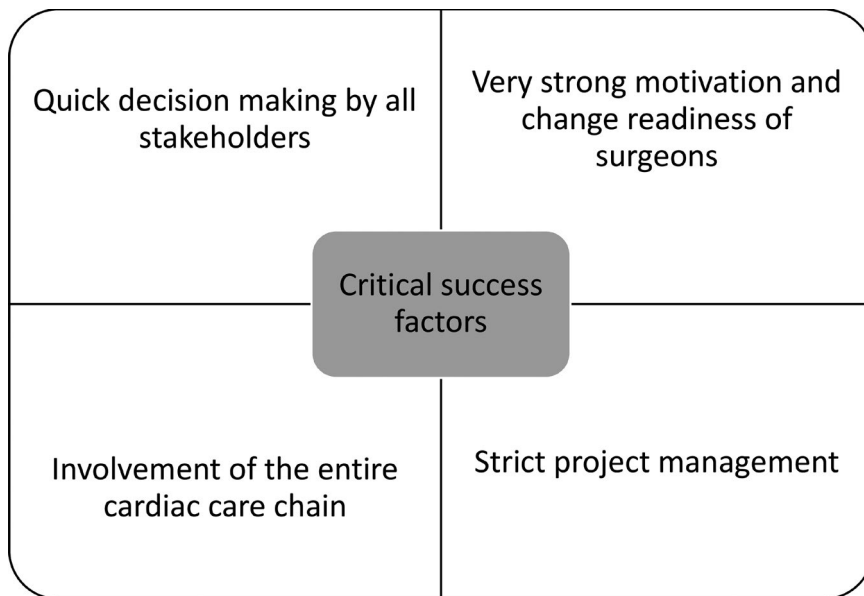


FIGURE 1 CRITICAL SUCCESS FACTORS.

the required interventions with their fellow staff members. Having a dedicated project team, in which all stakeholders are represented (and involved!), was essential in the success of this project. The quick decision making in the weekly project group meetings and the involvement of the two external consultants continuously fed the sense of urgency perceived. As one team member said: “Good project management skills and leadership. I like that they can take over work that keeps us from doing our daily jobs and provide us with the tools to resolve issues.” Since the interventions

were discussed thoroughly, they were easy to understand and easy to implement. During 2020 and into 2021, the demands for heart surgery have decreased because of the COVID-19 pandemic, but the schedules implemented will enable to

Thoraxcenter to scale up again when demand increases.

the demands for heart surgery have decreased because of the COVID-19 pandemic, but the schedules implemented will enable to Thoraxcenter to scale up again when demand increases

Maartje Zonderland is an expert in the optimisation of healthcare processes using quantitative modelling and data science techniques. She holds a PhD degree in Operations Research and Statistics and works currently as a self-employed management consultant, serving healthcare organisations throughout Europe.

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FOR FURTHER READING

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