# Improving the Access to Operating Room

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The operating room is considered one of the most expensive and critical hospital assets since a high percentage of hospital admissions in the ambulatory or inpatient services require surgical interventions.

Operating Room planning and scheduling are usually considered a 3-level decision-making process (Guerriero & Guido, 2011). At the first level, the case-mix problem reflects on the capacity to respond strategically to the current and projected surgical demand or even satisfy the requirements of unique services and specialties. The capacity is allocated to the surgical specialties at a second level, and a master surgery block schedule is published. In the third-level, patients on the waiting list are selected and scheduled for a given surgical session and distributed within the assigned timeslot (Cardoen, Demeulemeester, Beliën, 2010).

When surgical demand exceeds the operating room capacity, waiting lists build-up, leading to unacceptable waiting times, particularly for patients requiring acute surgical intervention. While the admitted patients from the emergency room to inpatient or critical care units need to be operated on as soon as they are medically fit to preserve their health and quality of life, the response timeframe strongly correlates to efficiency and resource utilization. Occupying a bed for several days trying to access the operating room is a typical inefficiency in the healthcare systems.

One of the most effective approaches when selecting patients that should receive the services first is prioritization methodology. This methodology ensures that patients with higher urgency need to receive services before those with less urgent need. Although prioritization is commonly used to manage the access to care in critical or life-saving situations, its use in elective (non-urgent) setup is advantageous (Sobolev, Levy, & Kuramoto, 2013). On the other hand, a significant challenge associated with patient prioritization is how to assess and compare a patient's priority based on their condition and the extent of the benefits expected from services for which they are waiting to receive.

In response to the access constraint, the United Arab Emirates government has intended to increase the system's capacity by building new mega hospitals across the seven emirates to minimize the waiting time, simultaneously providing concrete interventions to those requiring rapid interventions.

### **MATERIALS**

This improvement project is based on qualitative and quantitative data collected from the surgery booking requisition form at Shaikh Shakhbout Medical City (SSMC). Each surgery should be scheduled in a priority category. This prioritization methodology includes elective and four levels of emergency categorization:

<b>Emergency Level</b>	Definition
Level (I)	Limb/ life-threatening condition, shall be operated on within one hour.
Level (II)	Patient condition will deteriorate significantly if not operated within two hours.
Level (III)	Case cannot wait until the next day elective schedule, and it should be operated
	within 8 hours.
Level (IV)	Inpatient admitted in the hospital and should be operated on as urgent before
	discharge.

### **MATERIALS**

The operating room management is a very complex process: the use of mathematical, simulation models, and quantitative techniques plays a crucial role. A literature review was conducted for related articles from Pubmed, Cochran, and Springer research engines.

Surgery waiting time is defined by the time from the decision for the surgery or procedure to having the surgery/procedure: how long patients waited from deciding with the surgeon to proceed with surgery to having the surgery.

Data validation: retrieved data from the paper surgical request form linked to the electronic order and the scheduling module's case entry. The timings were captured precisely to reflect the actual decision for surgery, list receiving by the OR, and the surgery start time. Data were entered and analyzed in excel statistical solution.

Assessment: After a thorough evaluation and data analysis, most interviewed surgeons were unsure of the prioritization criteria that put an unnecessary burden on the operating room to accommodate all cases within the target time frame. The same group of surgeons declared that they used to send all emergency bookings as a level I or II to ensure that it will be accommodated during the dayshift. Overall, it was a multifactorial case driving the 64% of level I & II emergencies, not merely the patient factors.

There are two emergency rooms allocated at SSMC 24/7 to accommodate all emergency needs, alongside, level 4 emergency cases are absorbed in the elective list. The main challenge was not responding to emergency needs on time due to the volume of emergency bookings as level I & II.

### **OBJECTIVES**

### The main objectives of this project are:

Improve access to the operating room within the priority target time frame to respond to the patient's needs.

Achieve an optimal utilization of resources, simultaneously delivering surgery at the right time.

Maximize profitability (i.e., patient flow) without incurring additional costs due to patient waiting time and occupying a bed for days to access the

### **Actions and Recommendations:**

• Consider opening an additional room on weekends to clear any backlog before starting a new week • Data transparency and presentation in the Surgical and Procedural Committee (SPC)

 Raising staff awareness about emergency scheduling and utilization • The perioperative senior leadership team drives the change management

 Regular audits and monitoring with real-time intervention Single case review and Non-compliance counseling

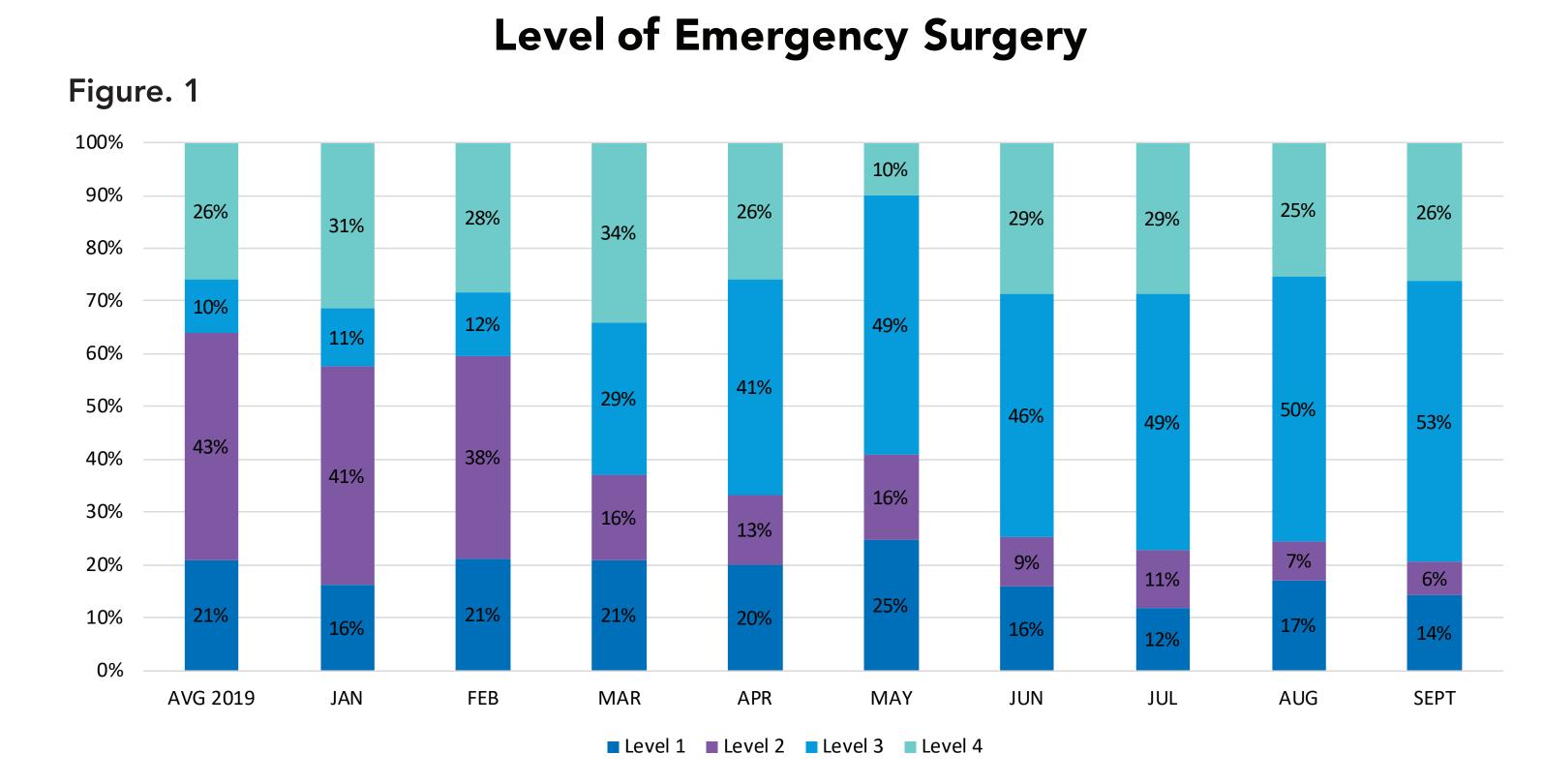
**RESULTS** 

During the nine months from January to September 2020, 3366 emergency surgeries were completed at SSMC. The daily average number of emergency cases ranged from 12 to 22 cases.

The percentage of emergency cases that were performed during each month is shown in Figure. 1. Also depicted are the changes over the same period in the percentage of level II and level III emergency cases after the intervention. There was a statistically significant increase in the proportion of cases booked during working hours for priority level III cases, with a concomitant decrease in level II emergency cases.

There has been a significant drop in the combined level I & II from 64% in January to 20% in September. This drop has reflected on the response to emergency cases time-frame in compliance with the prioritization methodology. The target time frame's compliance increased dramatically from 25% to 84% within eight months, shown in Figure. 2. Remaining 16% of non-compliance are attributed to other contributing factors such as the surgeon's availability, an influx of emergency cases, the patient's refusal of surgery, change in the treatment plan, physician's compliance with the scheduling policy, and patient clinical status.

It is imperative to highlight the COVID-19 artifact in the percentage of emergency cases during the second quarter of 2020, specifically in May. This descending trend is linked to the hospital policy to suspend all elective surgeries and mandating a negative COVID result within five days



### Trends in the emergency level:

The total percentage of Level (II) emergencies decreased dramatically from 41% in January to 6% in September that accounts for a 35% decrease (41%-6%) in level II emergency cases, while Level (III) emergencies increased from 11% in January to 53% in September accounting for 42% increase (53% - 11%), the 35% reduction in level II shifted to level III giving the OR flexibility to respond to the emergency need on time within the target time frame. Figure. 2. Level (IV) emergencies increased during the working hours due to the absorption in the elective list. Still, this natural increment relates to the increased volume across services along with the business acceleration plan post-COVID-19.

### **RESULTS**

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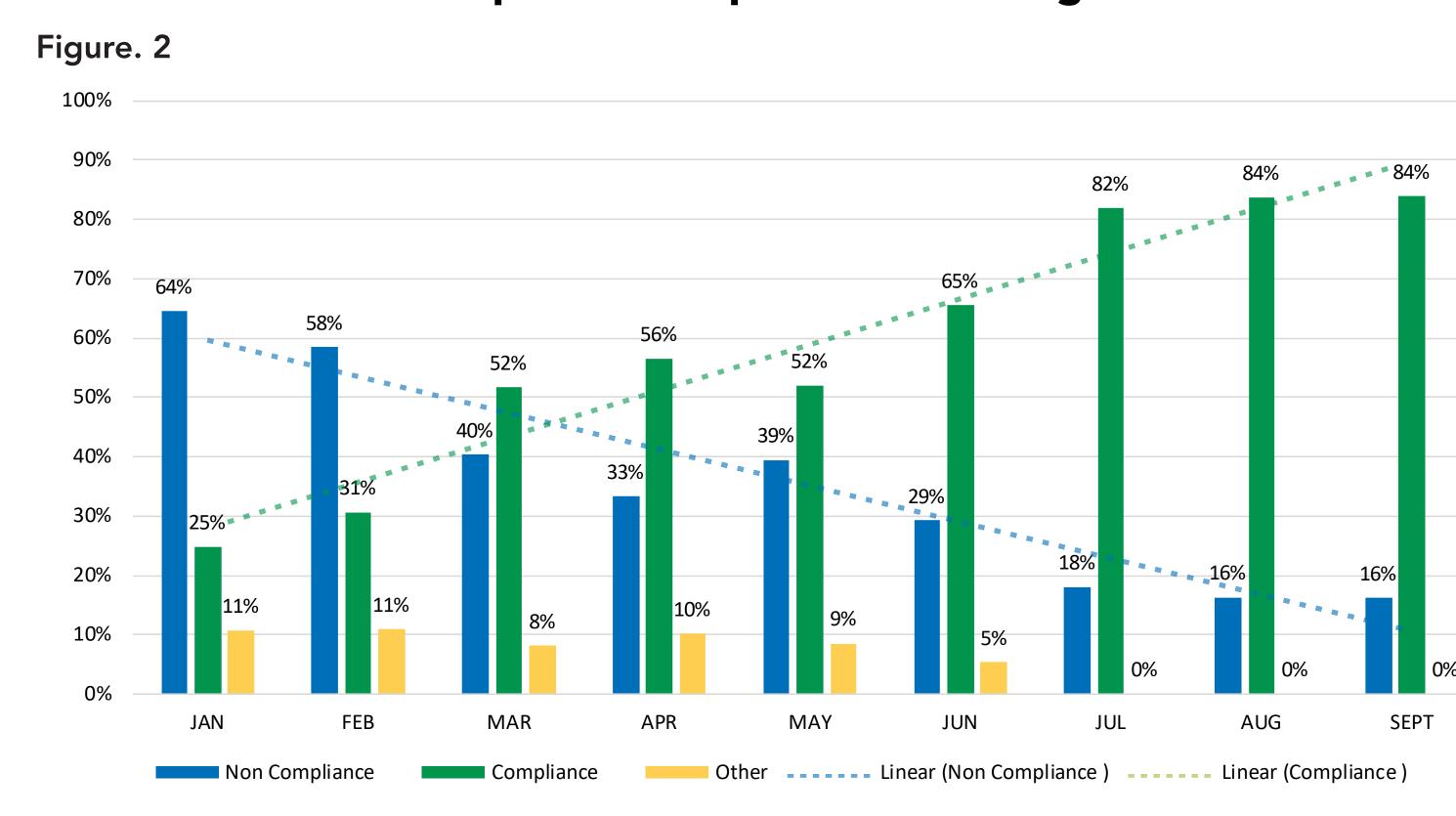
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### Emergency level and responding within the target timeframe:

Delays in access to operating rooms are multifactorial, and their measurement from existing electronic health databases can lack pertinent detail. On the supply side, the availability of surgeons, anesthetists, and other staff in surgical teams and the supply of the required medical equipment affect response activity rates.

Close monitoring of the scheduling process aims to identify the areas for improvement. Staff (Physicians and Nurses) awareness and orientation on the prioritization criteria for scheduling aim to increase the response compliance within each level's target time frame. Discussing the statistical finding in the Surgical and Procedural Committee (SPC) drive the attention on the non-compliance. There has been significant improvement in the response time frame associated with reducing level I and II percentage. Figure. 2.

### Level I & II Response Compliance with Target Time Frame



Benchmarking the performance of surgery scheduling between different hospitals is difficult, as case mixes differ between hospitals. A case-mix describes the volume and characterization of all surgery types. SSMC is the primary trauma facility in Abu Dhabi with unique specialties such as burns and thoracic; thus, any comparison or benchmark at the national or international level would not reflect an accurate measure.

Several initiatives have been introduced in OR, mainly targeting the supply side, including opening additional blocks, extending working hours for health personnel, and planned add-on blocks during weekends to reduce the level IV load during the first days of the week, on-call schedule. The need for an additional emergency room 24/7 has been reduced significantly but still under evaluation and review.

Overall, there has been a significant improvement in the patients' access to emergent and urgent services during the last months. These initiated efforts set to continue supporting access to the operating room for levels I and II. It has been agreed by the surgical and procedural committee to include access to the operating room in the monthly performance metrics with a focus on levels I and II.

### CONCLUSIONS

Access to the operating room within the priority target time frame significantly correlates to the scheduling and prioritization culture. Numerical results show that substantial gains can be realized by having a standardized policy and compliance with the scheduling protocols while clinical decisions influence resource optimization and access to care. I was not a capacity constraint driving the 75% non-compliance in responding to emergency cases on time. It was a subjective variability and preference among providers.

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On the one hand, peri-operative leadership playing an integral role in facilitating smooth operations when planning for capacity and demand, discussing the statistical finding in the Surgical and Procedural Committee to drive the attention to non-compliance. On the other hand, surgeons must appreciate the floor managers' logistical challenges when requesting their cases' surgical priorities.

Overall, It is acknowledged that different specialties have unique characteristics, caseloads, and resourcing considerations. An optimal methodology of care for one specialty may be less applicable or effective in another. During this improvement project, the efforts were directed towards emergency response within the target time frame for level I, II, and III. There is a belief that access to the operating room has been enhanced for level IV and elective cases due to the capacity and scheduling expansion. Elective waiting time is not included in this project, but it is worthy of exploration and review.

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### **ACKNOWLEDGMENT**

Improving access to care is a complex adaptive process and the most challenging topic for healthcare systems. Without leadership involvement and support, this would not reveal the positive impact on the patients and staff working in the operating room doing their best to attend to patients' needs on

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