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Operating room utilization – How the pandemic affected resulting case volume

To the Editor,

COVID-19 forced health care systems around the world to modify and adapt many aspects of their operations to preserve resources and inpatient bed capacity. Fueled by increased inpatient bed utilization by COVID patients, in conjunction with an overlapping nursing and staffing shortage,1 institutions struggled to maintain the capacity to provide vital services to patients.

Surgical operations were affected by these changing dynamics. This included modifications to scheduling, limiting non-emergent surgeries, and increased motivation to perform surgeries at facilities that were not sites for inpatient COVID care. In this correspondence, we discuss the effect these types of operational decisions had on the surgical workflow at a large, academic institution that was the first healthcare center in the U.S. to care for COVID patients.

Surgical procedures at Nebraska Medicine (NM) are performed at NM main campus (28 OR sites) – the primary NM facility for complex medical and surgical patients, as well as a large trauma, transplant and cardiovascular center for the region. Surgeries are also performed at Bellevue Medical Center (7 OR sites with limited inpatient capacity), Lauritzen Outpatient Surgical Center (7 OR sites with 23 hour overnight capability), and Village Pointe Outpatient Surgical Center (3 OR sites with 23 hour overnight capability).

Considerable efforts were made to maintain inpatient bed capacity at NM main campus throughout the COVID pandemic. This includes shifting cases to ambulatory sites when appropriate. Traditionally, surgeons were able to schedule cases at NM main campus regardless of procedure or patient acuity or complexity. During this time frame, all low-acuity, low complexity cases were only allowed to be performed at an ambulatory site. Patient criteria to qualify the case for ambulatory status was not changed during this time.

The combination of shifting ambulatory surgical cases away from NM main campus and limiting non-urgent surgical admits was successful in that case volumes increased at ambulatory sites, and surgical admissions at NM main campus decreased.

However, the effects of these modifications likely had a discernable effect on the resulting surgical case volume and case characteristics at NM main campus.

To describe this changing OR dynamic, NM OR utilization reports were evaluated from fiscal year 2020 (July 2019-June2020), fiscal 2021 (July 2020-June 2021) and the first 6 months of fiscal year 2022 (July 2021-Dec 2021). Utilization reports are generated monthly for NM OR sites to evaluate efficiency of care, staffing, and equipment needs. These reports include total OR cases, total minutes of OR time and delineate weekday and weekend cases. Similarly, enterprise data that evaluates NM case mix index (CMI) based on surgical diagnosis-related group (DRG) and mean length of stay (LOS) were evaluated for the same time periods.

1. Data

In evaluating the first 6 months of FY 22, it is apparent that efforts to transition cases to other campuses was effective. When compared to FY 21, NM performed nearly 4 fewer cases (7.4%) each weekday, and 9 fewer surgical procedures per day (16.6%) when compared with FY 20. This decrease in NM main campus case volume is in line with expectations, as during this time, any case suitable for a facility other than NM main campus was performed at the alternate facility.

However, from FY20 to FY22, the average case length for NM main campus increased nearly 46 min per case, representing a nearly 22% increase in average case length. This likely reflects the idea that the resulting case volume consisted of increasingly complex cases and patients (Fig. 1).

2. Case complexity

To further evaluate this changing surgical patient dynamic, Case Mix Index (CMI) and Length of Stay (LOS) data for the study periods was evaluated.

During the study period, the CMI for all NM main campus surgical cases increased from 3.5122 in FY 20, to 3.8785 in FY 22 (red line). Also, during this time frame, the NM main campus mean observed LOS increased from 7.54 days in FY 20 to 8.91 days in FY 22 (Fig. 2).

3. Discussion

Many factors contribute to these changes, including the aforementioned limitation of ambulatory cases at NM main campus, effectively eliminating the “easy cases” from this site. Additionally, this likely reflects patients with known disease who experienced delays in receiving care due to the various impacts of COVID 19.2,3 This phenomenon has been well documented and likely contributed to the decrease in overall health and increased disease progression of the resulting surgical population.

Inpatient census preservation has never been more important to healthcare organizations. In order to maintain inpatient hospital bed capacity as well as personnel and resource availability, institutions made difficult decisions about which cases could be safely performed at alternate sites or deferred to a later date. This likely resulted in a more complex surgical population at tertiary care centers. Our data supports this. Despite fewer cases per day in FY 22, we experienced a similar number of total and average OR min per weekday, but increased average case length. Similarly, our data reflects the increasingly complex surgical population that is being cared for, with a significant increase in CMI and mean LOS for our surgical population.

The implications of this data are widespread. Healthcare worker
fatigue and burnout are major issues in healthcare. Routinely, healthcare systems are experiencing high levels of personnel turnover, temporary staffing solutions, and changing workforce dynamics. Much effort has been made to preserve inpatient capacity, but our data illustrates that the immediate perioperative workforce at NM has not experienced a decrease in overall workload in terms of overall time in the OR. The ramifications of perioperative workforces caring for a consistently more complex patient population undergoing consistently more complex surgical procedures is yet to be determined. The consistent performance of high complexity surgeries on increasingly complex patients may be more emotionally and physically taxing on perioperative personnel. Continued vigilance is needed to understand the lasting impact of these changes on operating room dynamics, as well as the impact on perioperative personnel.

Declaration of Competing Interest

The authors have no Conflict of Interest with any medical device or company.

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