COVID-19 Response Unites Perioperative Teams at a Recently Merged Health Care System

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ABSTRACT

Advocate Aurora Health, located in the north-central United States, is the result of a merger between two large health care organizations in April 2018. The health care system comprises 26 hospitals, offers more than 500 sites of care, and employs 75,000 team members. This article discusses the effects that coronavirus disease 2019 had on the perioperative services departments while directors and site leaders were still managing the complexities of the merger. Included are strategies used to address the challenges created by the pandemic, special considerations based on level-of-care capacity, the effect that the hold on elective surgeries had on staffing assignments, the reactivation process when elective surgery resumed, and the importance of keeping the perioperative team members informed and safe. It also illustrates how facing the challenges caused by the pandemic helped to solidify the merger of the two health care organizations.

Key words: *coronavirus disease 2019 (COVID-19), surgical services, pandemic response, health care system merger, perioperative leadership.*

Advocate Aurora Health is a 26-hospital health care system spanning two states in the north-central United States. The system was created during the April 2018 merger of two independent health care organizations: Aurora Health Care in Wisconsin and Advocate Health Care in Illinois. The organization comprises four Level I trauma centers (all teaching hospitals), seven Level II trauma centers, and more than 75,000 team members. Both organizations had a shared purpose of helping people live well; common values of excellence, compassion, and respect; a passion for positive clinical outcomes and patient and team member engagement; and a similar service line structure.

After the merger was approved and consummated, the two legacy organizations began the process of becoming one system. This process included the merger of the two separate OR directors' councils. At this time, both organizations had well-organized OR directors' meetings that included participants with supply chain, patient safety, and clinical expertise (ie, clinical nurse specialists [CNSs], nurse educators) as well as electronic medical record (EMR) representatives; however, there were differences in agenda items and participation at the meetings. Further, different team members led the separate legacy organization meetings: the Aurora Health Care meeting was led by an OR director and the Advocate Health Care meeting was led by the vice president of surgical services.

The first time that the OR leaders came together on a project was during Advocate Health Care's adoption of Aurora Health Care's EMR system. Surgical services leaders from both organizations had strong feelings regarding the functionality of their existing EMRs, but it was decided that the newly merged organization would adopt the EMR that was used at Aurora Health Care because not all sites across Advocate Health Care used the same EMR. In the late summer and early fall of 2018, surgical services

leaders, CNSs, and EMR experts from the health system and the EMR company spent several days negotiating changes and promoting understanding for the creation of the new EMR. Although this process successfully laid the foundation for integrating the EMR across the new system, it did not promote partnerships among the OR leaders. Everyone thought their version was best and there was tension among the sites.

Other changes in the system (eg, consolidation of leadership roles, reporting structures, and human resources) led to both leaders and frontline team members at each legacy organization viewing the merger as a takeover by the other legacy organization. It was not uncommon to hear that processes were changing to the "Advocate way" or "Aurora way" instead of a new middle ground that supported the best from both organizations. One solution to this concern was the system's shared governance practice council's chartering of subspecialty practice advisory workgroups in August 2019. The surgical services workgroup had a designated cochair from both legacy organizations, CNSs, and nurse educators representing all areas of the system, as well as a director or manager from each legacy organization for support. This council workgroup was responsible for vetting surgical services policies and education before sending them to the directors' council for final approval. It was the responsibility of the CNSs and leader members from the legacy organizations to distribute drafts of any new policies and educational proposals in advance of the directors' meetings and address any questions before final approval.

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By November 2019, the lead director for the Aurora Health Care OR directors' meeting was having difficulty garnering the other OR directors' participation in the monthly meetings. I (C.M.) and the Aurora Health care lead determined that this disengagement was negatively affecting policy approvals; further, other support services (eg, environmental services, purchasing, EMR, information technology) had to be on duplicate calls for both legacy organizations and individual site updates. Both OR leads also noted that the Aurora Health Care directors' meeting structure differed from the Advocate Health Care directors' meeting structure—at Aurora, system supervisors, educators, and other clinical leads (eg, sterile processing, EMR) were attending the directors' meeting via phone; at Advocate, the meeting was attended by OR directors and business managers. The Aurora Health Care director proposed merging the two meetings into one monthly system-wide hourly call that would be attended by all system OR directors and managers, along with the CNSs, and holding quarterly virtual meetings that would last several hours and include some of the supporting department personnel such as purchasing personnel, EMR leaders, industry vendors, and supply chain personnel. Also, representatives from other sites that needed to bring new projects or processes to the attention of this larger group could attend select meetings. With the support of the vice president of surgical services at Advocate Health Care, the lead Aurora Health Care OR director also suggested that the CNS group from Aurora Health Care be included in the meetings because they were coordinating most of the policy work and education across the new system.

Unfortunately, attendance from the Aurora sites declined, indicating that there was still no buy-in to participating as a single system. In December 2019, the lead OR director and the vice president of surgical services reached out to the system chief nursing officer (CNO) for assistance. The CNO sent an e-mail to all OR directors across the new system encouraging them to participate so that their sites' needs and programs could be supported at the system level. By March 2020, there was improved participation in the combined system-wide meetings; however, by that time, there also was a need for a response to the coronavirus disease 2019 (COVID-19) pandemic that necessitated all OR leaders coming together.

INCEPTION OF A PANDEMIC: COVID-19

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first identified in Wuhan, Hubei Province, China. Of the initial cases, 55% were attributed to the Huanan Seafood Wholesale Market in Wuhan. Throughout December

2019, the number of novel coronavirus–infected pneumonia cases continued to increase. By January 1, 2020, the Chinese government had closed the Wuhan seafood market.[1]

The World Health Organization (WHO) was first notified of the viral outbreak in China on December 31, 2019. Following virus naming conventions, the WHO designated the virus responsible for the outbreak as SARS-CoV-2 and the resulting disease as COVID-19.[2] From December 2019 through mid-January 2020, outbreaks were thought to be contained to the city of Wuhan.[2] However, on January 30, 2020, the WHO declared a global emergency and the US government began to restrict travel to and from China.[3] Also on this date, the Centers for Disease Control and Prevention (CDC) reported the first known instance of person-to-person spread in the United States—this transmission was to the spouse of the second confirmed US case.[3]

Additional responses from the US government included gathering data for test kit availability and the formation of a presidential task force of physicians led by Vice President Pence. According to the WHO Director-General, "This outbreak could still go in any direction;"[4] however, the United States was preparing for a large and lengthy public health response.[5] By February 25, the CDC warned that it believed COVID-19 was spreading and that "[d]isruption to everyday life might be severe."[6]

SYSTEM RESPONSE TO THE PANDEMIC

On Tuesday, March 3, 2020, Advocate Aurora Health formed a system incident command composed of senior executives in nursing, medicine, operations, human resources, infection prevention, and logistics. The incident command was linked to the CNOs and chief medical officers at each hospital location. The next week, each hospital created a site incident command that mirrored the system incident command structure. The system incident command began to prepare for a potential surge in patients with COVID-19—the same was occurring overseas, particularly in China. One of the significant products of the system incident command was the implementation of a COVID-19 information intranet web page. The intent of this web page was to consolidate all the COVID-19 related information and make it accessible for all team members. Personnel were to consider the information on this web page as the "source of truth" on all things COVID-19. Topics included personal protective equipment (PPE) guidance, human resources (eg, furlough pay), employee

health (eg, how to report an exposure, testing process), and team member resources (eg, employee assistance) and well-being (eg, self-care tips, counseling, stress relief). The intranet web page provided patient care–specific information (eg, planning for high volumes of patients, isolation guidance, emergency department [ED] workflows and infection control signage, COVID-19 testing, nursing resources, specialty area resources).

The number of patients hospitalized with COVID-19 varied between Wisconsin and Illinois. The Illinois sites experienced a significant amount of hospitalized COVID-19 patients in the south Chicagoland area. In contrast, the largest hospital in the Aurora System only experienced a quarter of the number of patients as the largest Illinois hospital. As of June 30, 2020, Advocate Aurora Health had discharged 5,241 patients that were hospitalized because of COVID-19—4,382 in Illinois and 859 in Wisconsin. This discrepancy in numbers raised our awareness of cultural disparities, which aligned with our priorities of promoting diversity and inclusion.

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On March 17, system incident command halted all elective surgeries in our system and directed educators to develop plans for training and redeployment of perioperative team members. The nurse educators were responsible for the educating and precepting of their team members to support staffing in the ED, intensive care unit, and medical and surgical inpatient units. The CRNAs trained perioperative team members to support staffing in the intensive care unit. Nurse educators and employee health nurses trained nonnursing team members to perform building entrance screenings and other support roles (eg, disinfection of high-touch spots, transporting patients). Any perioperative team members who could not be used on any given day were furloughed home with full pay. System-wide, hospital incident command encouraged ancillary department personnel (eg, information technology staff members, clinical informatics educators, medical librarians, administrative assistants, outpatient department staff members) to

work from home to decrease the number of people in the facilities. This reduction would decrease potential exposure to COVID-19, as well as conserve PPE.

This virus was forecasted to have a much more serious effect on surgical services than previous outbreaks of influenza or coronavirus. The last time ORs were severely affected as a result of a virus was in 1981 with HIV.[7-9] During the early days and months of the HIV outbreak, the mechanism of transmission was unknown. Perioperative staff members were observed making changes in their assessment of all patients undergoing procedures. Orthopedic surgeons started using cut-resistant glove liners to protect themselves from puncture or stab wounds from bone or sharps. The status of communicable diseases present in any patient became part of the hand-over report, and perioperative staff members would even post this status on their assignment boards and outside entryways into the OR suite if a patient's HIV status was positive. This last practice was discontinued because it was a breach in patient privacy.

Leading surgical services on a good day is not an easy task; to lead during a global pandemic has been one of my (C.M.) biggest career challenges. The system incident command focused their efforts on the ED and inpatient units and did not give priority to surgical services because of the postponement of elective procedures; however, essential surgery continued, and perioperative team members needed to know that the leadership team was focused on keeping them as safe as possible from exposure to the COVID-19 virus. Additionally, surgical patients needed to know that isolation standards were in place to keep them safe in the hospital. The system executive leadership team used collaboration, transparency, and timely communication to lead the team during this crisis. I (C.M.) instituted weekly meetings to share information on PPE supply, changes in COVID-19 testing results, as well as aerosol-generating procedure (AGP) recommendations. I (C.M.) also served on the system incident command team to share perioperative concerns and facilitate the flow of information to the OR and anesthesia leaders via weekly meetings as well as in real-time when major changes or updates were shared.

System incident command in collaboration with system anesthesia professionals identified that defining urgent and emergent surgical needs was critical to standardize the delivery of surgical services care to patients who could not or should not wait for surgery. They decided that any

urgent or emergent procedure could be performed if it met the following criteria:

- a delay would cause permanent harm to the patient or result in death, or
- the patient's condition would worsen and could affect quality of life or allow a diagnosis to progress to irreversible (eg, cancer).

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These criteria are consistent with recent recommendations from a scoping review of the long- and short-term effects of COVID-19 on surgical services in Norway.[10] According to the researchers,

> Surgical care that is not essential or time-critical can be delayed and deferred to a later date when the pandemic subsides. However, even in the midst of a pandemic certain procedure types must be performed, including appropriate cancer treatment, emergency surgery and urgent transplantation, as these are considered life-saving procedures with curative potential. A complete neglect of certain surgical services would be considered unwanted collateral damage, and inadvertently increase the number of deaths and life-years lost owing to the COVID-19 pandemic.[10(p1254)]

The American College of Surgeons published the COVID-19: Elective Case Triage Guidelines for Surgical Care[11] on March 24, 2020. This publication provided a detailed guide categorized by surgical specialty so that teams could prepare appropriately for every patient procedure using best evidence.

The Advocate Aurora Health OR directors' group is diverse with talent. In response to the COVID-19 pandemic,

team leaders in supply chain focused on securing PPE; the OR directors focused on the Advocate Aurora Health mantra of "Calm over chaos, faith over fear;" and the system-wide perioperative CNSs were tasked with providing support at their hospitals and ensuring that AGPs for patients with COVID-19 could be performed safely. The CNSs and nurse educators along with system infection prevention personnel created, reviewed, and disseminated new educational materials and policies and procedures for surgical services to all perioperative sites.

The first system-wide OR directors' meeting after elective surgeries were put on hold was held on March 25, 2020. At this meeting, attendees were presented with an early global timeline of the pandemic from its inception through current status as of the meeting (Figure 1). I (B.G.L.) presented a PowerPoint that included the following information:

- an overview of the epidemiology of SARS-CoV-2 compared with other historical epidemics (Table 1);
- the status of COVID-19 according to the latest CDC information;
- the CDC guidelines for AGPs;
- an overview on using an anesthesia machine as a patient ventilator; and
- a template of OR safety protocols, including OR cleaning, that could be adapted to fit each site's architecture and ventilation systems (Supplementary Sidebar 1).

We relied heavily on the AORN COVID-19 Tool Kit[12] and the CDC web site on coronavirus[13] to provide the most up-to-date information and evidence-based interventions. By April 2020, information was changing at such a rapid rate on all web sites that keeping up with the latest recommendations would not have been possible without accessing the system COVID-19 tool kit, as well as the AORN COVID-19 Tool Kit and CDC web site daily.

The OR director leads from both legacy systems decided that the meeting frequency of the directors' council should be increased to weekly to allow all new information to be distributed to all system OR leaders in a timely fashion. It also allowed the directors to voice site-specific population concerns. During this time of weekly

Timeline of COVID-19 Pandemic
November 2019–April 2020[1]
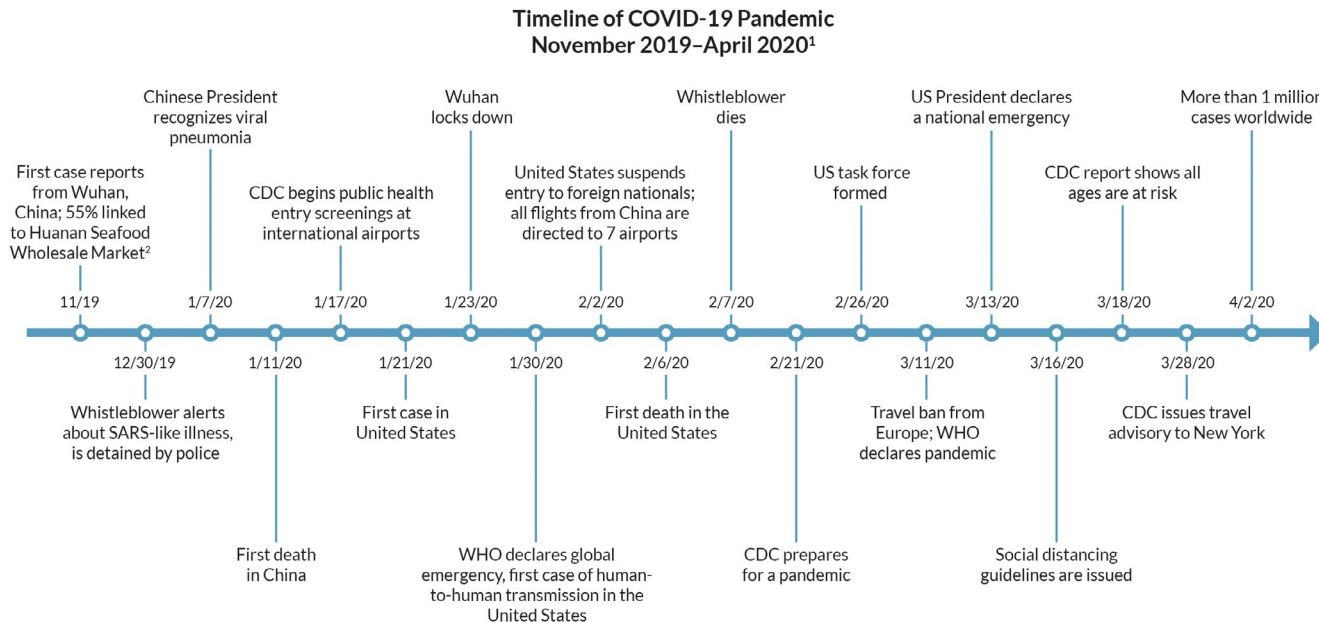
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Figure 1. Early global timeline of the pandemic presented on March 25, 2020, at the first OR directors' meeting after halt in elective surgery. COVID-19 = coronavirus disease 2019; SARS = severe acute respiratory syndrome; CDC = Centers for Disease Control and Prevention; WHO = World Health Organization.

Table 1. List of Historical Viral Outbreaks[1-3]

Disease (years active)	No. of Deaths Worldwide
Spanish flu, H1N1 (1918–1920)	50,000,000
West Nile virus (1937)	15,000
Asian flu, H2N2 (1957–1958)	100,000
Hong Kong flu, H3N2 (1968)	700,000
Ebola (1976)	>1,553
Russian flu, H1N1 (1977)	0
HIV/AIDS (1981–2017)	>30,000,000
Hendra virus (1994)	4
Avian flu, H5N1 (1997)	>371
Nipah virus (1997)	>250
H9N2 and H7N7 flus (1999–2002)	1
SARS coronavirus (2002–2003)	774
Swine flu, H1N1 (2009)	>15,000
MERS coronavirus (2012–2013)	54
West African Ebola virus (2014–2016)	11,325
Zika virus, Western Hemisphere (2015–2016)	0
SARS-CoV-2 (2020)	225,500[a]

[a]At the time this article was written.
MERS = Middle East respiratory syndrome; SARS = severe acute respiratory syndrome; CoV = coronavirus.

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meetings, attendance from OR leaders across the entire system became more consistent and participatory. Those who had been attending the meetings previously found their voice and those who did not attend before the pandemic realized the necessity of coming together as a group to keep all patients, providers, and team members as safe as possible. Supply chain participants were key to ensuring that the appropriate PPE was available and distributed in the amounts needed for the various sites based on daily and weekly patient population trends at each site. These weekly meetings lasted from late March to early May 2020, at which time the system began to reinstate elective surgeries.

Internal Coronavirus Tool Kit

The system incident command developed the internal coronavirus tool kit to disseminate critical pandemic-related information within the large organization. The tool kit was a resource for all team members in the organization to use when they had questions or needed guidance managing any issues related to COVID-19. Several items in the tool kit were in response to concerns that were raised to the system incident command team.

The system's internal coronavirus tool kit contained topic sections that provided direction for all areas of hospital care, including

- PPE guidance based on CDC guidelines;
- human resources and employee health (eg, furlough pay, family care resources);
- resources for resilience and well-being (eg, location of respite rooms, links to the employee assistance program and counselors);
- reactivation plans for resuming elective surgery;
- anesthesia services, techniques for protecting caregivers during AGPs, proper PPE for procedures, anesthesia machine protection devices;
- ED and hospital protocols for screening patients for COVID-19;
- ED and hospital surge planning;
- testing and de-isolation guidance;
- visitor and staff screening guidelines;
- managing supplies (eg, use and decontamination of N95 respirators); and
- managing medication shortages or substitutions related to treating patients with COVID-19.

Also included were links to important regulatory web sites for both Wisconsin and Illinois as well as the CDC web site for coronavirus information. Finally, there was a listing of all site incident command team members.

Infection Control Practices to Prevent Transmission

Navigating the coronavirus outbreak in surgical services and other procedure areas in a way that would protect both patients and team members was essential for the perioperative leadership team. After the CDC determined

the mode of transmission for COVID-19, our system infection prevention team produced two new door posters for personnel to use to indicate if the patient had droplet and contact isolation precautions or airborne and contact isolation needs. These posters assisted the CNSs with developing workflows to protect team members, including anesthesia professionals, from inadvertent exposure to COVID-19 and those who were designated as persons under investigation for COVID-19.
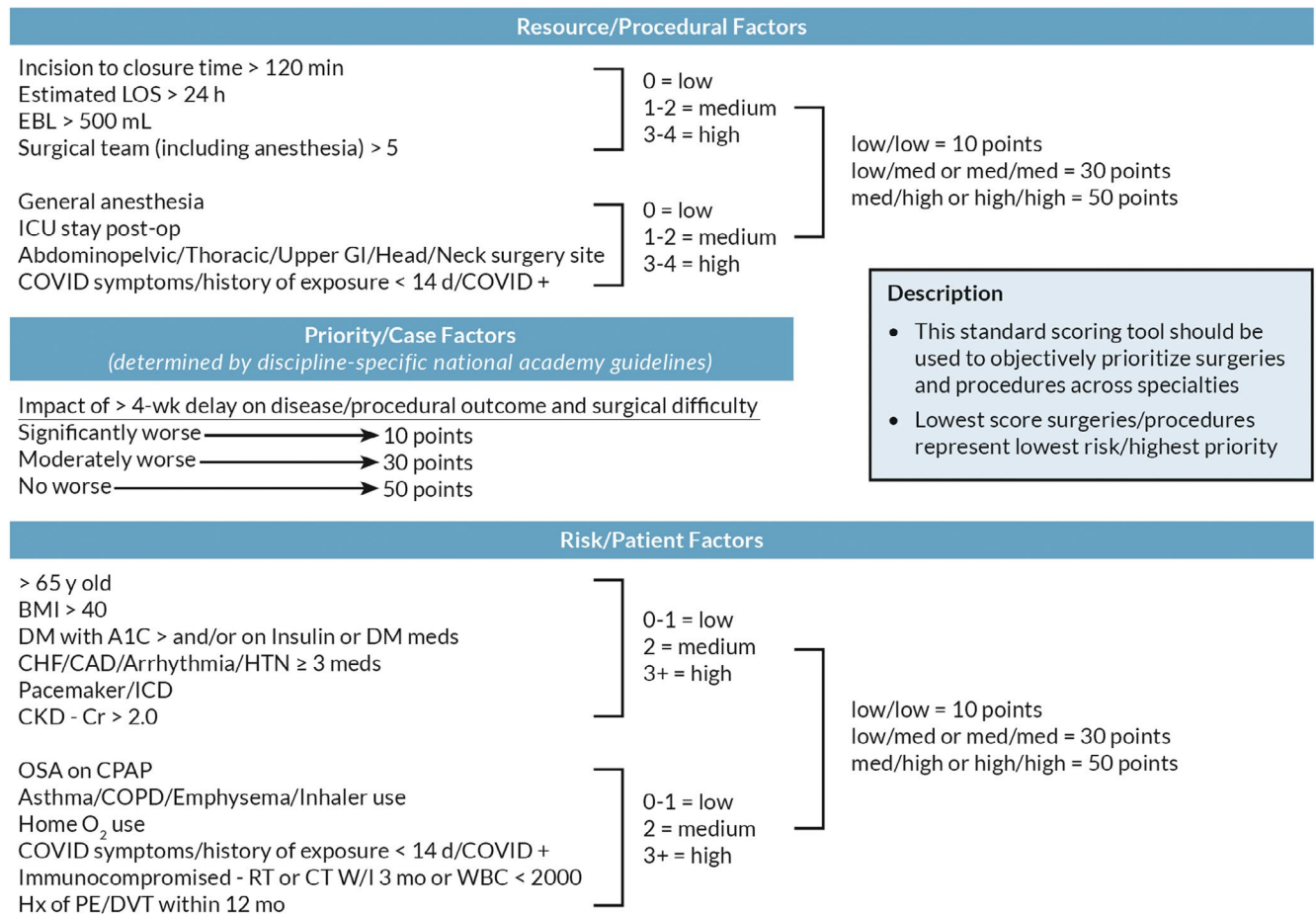
Of great importance was proper cleaning of the surgical suite after a procedure involving a patient confirmed to have COVID-19 or under investigation for COVID-19. Cleaning procedures for the OR suite were designed specifically to address the appropriate room air exchanges necessary to clear 99.9% of all air contaminants from the room before staff members could enter to perform end-of-procedure cleaning or end-of-day terminal cleaning.

RESUMING ELECTIVE PROCEDURES

When elective procedures resumed in June 2020, nursing leaders identified several positive outcomes from the pandemic (eg, rapid decision making, the use of

Surgical Wait Priority Scoring (SWAPS) System

Resource/Procedural Factors

Incision to closure time > 120 min
Estimated LOS > 24 h
EBL > 500 mL
Surgical team (including anesthesia) > 5

    0 = low
    1-2 = medium
    3-4 = high

General anesthesia
ICU stay post-op
Abdominopelvic/Thoracic/Upper GI/Head/Neck surgery site
COVID symptoms/history of exposure < 14 d/COVID +

    0 = low
    1-2 = medium
    3-4 = high

low/low = 10 points
low/med or med/med = 30 points
med/high or high/high = 50 points

Description
- This standard scoring tool should be used to objectively prioritize surgeries and procedures across specialties
- Lowest score surgeries/procedures represent lowest risk/highest priority

Priority/Case Factors
(determined by discipline-specific national academy guidelines)

Impact of > 4-wk delay on disease/procedural outcome and surgical difficulty
Significantly worse ⟶ 10 points
Moderately worse ⟶ 30 points
No worse ⟶ 50 points

Risk/Patient Factors

> 65 y old
BMI > 40
DM with A1C > and/or on Insulin or DM meds
CHF/CAD/Arrhythmia/HTN ≥ 3 meds
Pacemaker/ICD
CKD - Cr > 2.0

    0-1 = low
    2 = medium
    3+ = high

OSA on CPAP
Asthma/COPD/Emphysema/Inhaler use
Home O_2 use
COVID symptoms/history of exposure < 14 d/COVID +
Immunocompromised - RT or CT W/I 3 mo or WBC < 2000
Hx of PE/DVT within 12 mo

    0-1 = low
    2 = medium
    3+ = high

low/low = 10 points
low/med or med/med = 30 points
med/high or high/high = 50 points

Figure 2. The Surgical Wait Priority Scoring (SWAPS) system is a standardized scoring tool to prioritize surgeries objectively across specialties. LOS = length of stay; EBL = estimated blood loss; ICU = intensive care unit; GI = gastrointestinal; COVID = coronavirus disease; BMI = body mass index; DM = diabetes mellitus; CHF = congestive heart failure; CAD = coronary artery disease; HTN = hypertension; ICD = implanted cardioverter-defibrillator; CKD = chronic kidney disease; Cr = creatinine; OSA = obstructive sleep apnea; CPAP = continuous positive air pressure; COPD = chronic obstructive pulmonary disease; O_2 = oxygen; RT = radiologic technology; CT = computed tomography; W/I = within; WBC = white blood cell; Hx = history; PE/DVT = pulmonary embolism/deep vein thrombosis. *Adapted with permission from Advocate Aurora Health, Milwaukee, WI.*

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Key Takeaways

- The April 2018 merger of two independent health care organizations in the north-central United States created a health care system comprising 26 hospitals and 75,000 staff members. However, merging aspects such as OR directors' meetings and electronic medical record systems created barriers to fostering a sense of partnership among personnel at the two legacy organizations.

- In response to the global coronavirus disease 2019 (COVID-19) pandemic, a system incident command team was formed in March 2020 to prepare for the potential surge of patients. One of the significant products of the system incident command team was the implementation of a COVID-19 intranet web page for team members that included information on personal protective equipment and employee health and well-being.

- To continue their efforts, surgical services leaders instituted weekly meetings to disseminate information on the personal protective equipment supply, COVID-19 testing, and recommendations for aerosol-generating procedures. Additional resources developed during this time included an internal coronavirus tool kit and a surgical wait scoring system.

- In this time of crisis, personnel at the merged health care system worked together to address safety precautions for team members and patients, leading the way to improved collaboration between the medical staff members and perioperative teams. This teamwork accelerated the process of uniting personnel as one health care system instead of two legacy systems that functioned independently.

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virtual patient visits, improved interaction among surgical services leaders, flexible workforce structure). Perioperative leaders knew we had to have a plan in place for patients who were COVID-19 positive, patients who had an unknown COVID-19 status, or patients under investigation for COVID-19 to relaunch health care services successfully at all levels. Advocate Aurora Health Care developed a "Safe Care Promise" for patients and visitors that included a virtual check in, COVID-19 symptom screening, universal masking, social distancing, and enhanced cleaning. We needed to get "back to business" and had to reassure the consumers that we would keep them safe. We also began to design perioperative float pools that could work within multiple hospitals. The float pools were designed to reassign furloughed team members to the perioperative areas that needed extra help.

The system incident command provided guidelines for scheduling surgeries based upon whether the patient was an inpatient or outpatient; this reactivation tool kit was essential to planning and executing the safe return to "normal" surgical services operations. Incident command initiated this reactivation at a system level, taking into consideration the availability of beds, PPE, COVID-19 test kits, and team members as well as

patient status (inpatient or outpatient) and state regulations. For example, the criteria for bed and ventilator capacity and testing capabilities within 72 hours of a scheduled procedure were stricter in Illinois than in Wisconsin.

The system incident command developed a surgical ranking tool that was used to prioritize the backlog of procedures. The Surgical Wait Priority Scoring (SWAPS) system (Figure 2) is a scoring system that addresses the consequences that may result if a procedure is delayed—for instance, whether it will affect the patient's outcome or increase the acuity of the surgical procedure, potentially resulting in lengthier procedure times.

COVID-19 Testing Protocol

As part of the protocol for the reactivation and rescheduling of elective surgeries, patients were required to undergo testing for COVID-19 before surgery. The presurgical testing department is responsible for scheduling the test 72 hours before surgery, managing the test results, and communicating the results to the scheduling surgeon. If a patient tests positive for COVID-19, then the surgeon discusses the results and risks with the patient and assigns a SWAPS score. Presurgical testing personnel

share the information with the chair of each site's surgery committee. Operating room and anesthesia leaders were then able to make an informed decision regarding whether the elective surgery will be scheduled.

PPE Guidelines for Surgical Services

As elective procedures resumed, system infection prevention personnel, along with the perioperative CNSs, released guidelines for surgical services team members outlining safety measures regarding surgery for patients who would not be tested for COVID-19 preoperatively because of the emergent nature of the surgery or a shortage of testing supplies. These guidelines were specific to the unique requirements of the surgical environment, including appropriate PPE use during AGPs and the postprocedural cleaning processes in the OR suites. The system vice president of infection prevention, the system vice president of surgical services, and a perioperative CNS worked together to create guidelines based on AORN's recommendations for AGPs.

CONCLUSION

The COVID-19 pandemic has greatly affected many aspects of everyday life in the United States. What we consider "normal" now may have been unimaginable before the pandemic. In this time of crisis, personnel in our health care system were able to work together to address safety precautions for our team members and patients, leading the way to improved collaboration between the perioperative leaders and perioperative CNSs across the system. This teamwork accelerated the process of uniting personnel as one health care system instead of two legacy systems that functioned independently. By working together in this unique critical situation to find the best practices to address new clinical needs, a new collaborative culture transpired in which the members of OR nursing leadership now felt stronger together rather than separate and gave us the satisfaction of having a lasting influence on our system's surgical services. Because of the frequent meetings in the early stages of the pandemic and the provision of trustworthy, evidence-based interventions from reliable sources that could be used at every site across the system, the OR leaders began seeing themselves as a team. The lessons we learned during this crisis will serve as a solid platform if there are future surges in COVID-19 or any other severe health crisis affecting perioperative services.

Editor's note: PowerPoint is a registered trademark of Microsoft Corporation, Redmond, WA.

SUPPORTING INFORMATION

Additional information may be found online in the supporting information tab for this article.

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