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The 2020 Pandemics: Lessons Learned in Academic Surgery and Beyond



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ABSTRACT

2020 was a significant year because of the occurrence of two simultaneous public health crises: the coronavirus pandemic and the public health crisis of racism brought into the spotlight by the murder of George Floyd. The coronavirus pandemic has affected all aspects of health care, particularly the delivery of surgical care, surgical education, and academic productivity. The concomitant public health crisis of racism and health inequality during the viral pandemic highlighted opportunities for action to address gaps in surgical care and the delivery of public health services. At the 2021 Academic Surgical Congress Hot Topics session on flexibility and leadership, we also explored how our military surgeon colleagues can provide guidance in leadership during times of crisis. The following is a summary of the issues discussed during the session and reflections on the important lessons learned in academic surgery over the past year.

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The coronavirus disease 2019 (COVID-19) pandemic that swept the world starting in early 2020 has had a devastating impact on the delivery of surgical care. Healthcare systems were upended and stretched beyond reasonable capacity. Academic medical centers and small hospitals alike had medical and surgical wards transformed into critical care units because of the significant overflow of seriously ill patients. Frontline workers cared for patients around the clock in the midst of worldwide shortages of personal protective equipment, and more than 650,000 infected individuals have died.¹ The world shut down and stay-at-home mandates were issued to combat the pandemic at the detriment of academic productivity and education of trainees.

As data poured in and epidemiologists developed predictive models to anticipate trends in infections, hospitalizations, and deaths, public health and medical care inequities became evident. Racial minorities were dying at higher rates than Whites, with the Center for Disease Control and Prevention estimating that Black, Latinx, and Native Americans were 2.8-3.5 times more likely to require hospitalization for COVID-19 infection complications and 2-2.5 times more likely to die from COVID-19 than White Americans, when adjusting for population age differences.² While the pandemic stretched healthcare systems to their limits, the untimely deaths of Breonna Taylor and George Floyd at the hands of US police officers sparked protests worldwide calling for racial equality and police reform. This series of events and the politicization of medical and public health systems motivated many surgical leaders to recognize that the status quo can no longer be upheld. Several surgical societies, including the leadership of the Association for Academic Surgery, released statements on racism as a public health problem, calling for education on antiracism, unconscious bias, and privilege while promoting research on healthcare disparities.³ Surgical leaders increasingly found a voice to address a variety of charged, but necessary issues, playing an important role in addressing problems calling for flexibility and agility. In doing so, they emulate the military experience, which offers useful perspectives on the development of leadership frameworks in times of crisis. Here, we aim to summarize the impact of the COVID-19 pandemic on the management of surgical disease, large-scale academic medical centers, surgical training, and academic surgeon productivity. We also describe how leadership informs advocacy and the importance of adapting leadership styles, particularly in times of crisis.

Academic medical centers and the pandemic: patient triage and resource shifting

The pandemic presented several unique challenges to large academic medical centers. Particularly, it led to redirection of health care resources, the introduction of flexible work schedules, as well as the need to reorganize workflow, adjust priorities, and dramatically change patient care/research/resident education. Making decisions as the crisis developed and evolved was difficult.⁴ Information changed daily, data were unreliable, and new assumptions were required as different scenarios emerged. Surgical leaders across various

health systems were forced to suspend and prioritize certain surgical procedures. General surgeons, in particular, were uniquely affected because of the wide variety of procedures they perform, many of which were elective and therefore most subject to being suspended. Interpreting the definition of “elective” and balancing this definition with the health of the patient was a challenge for even the most experienced surgeons. To clarify the ambiguity surrounding guidelines relative to elective surgery, professional societies put out guidelines, often providing disease-specific guidance.⁵ For instance, the American College of Surgeons provided subspecialty specific guidelines, ranging from oncologic surgery to neurosurgery and urology.^{6,7} At one major academic center, The Ohio State Wexner Medical Center (OSUWMC), patients were categorized into procedural categories based on adaptation of the MeNTS scoring system.⁸ Like many other large academic medical centers, OSUWMC experienced over a 70%-80% reduction in surgical volumes at peak times during the pandemic. The triaging, postponement, communication, as well as eventual rescheduling of this volume of surgical cases presented a major logistical challenge. In particular, the efforts of a broad array of teams, including hospital communications, information technology, logistics, as well as leadership from frontline surgeon/staff leadership, were required. In addition to changes related to the operating room, the pandemic drastically affected the clinic environment. Specifically, the number of telemedicine visits dramatically increased as in-person clinical encounters were restricted.⁹ In response to the COVID-19 pandemic, federal agencies promoted telehealth through regulatory relaxation, which encouraged the dramatic increase in telemedicine utilization.

In addition to the unprecedented challenges related to clinical operations, academic medical centers also had to adapt the education and research missions. To protect the health of the trainees and preserve the workforce, many institutions changed trainee workflow and rotation schedules. The demands on hospitals from COVID-19 also impacted the number of operative cases and, in turn, the ability of trainees to achieve the same number of cases.¹⁰ There was also less time to spend on didactics, as more time was needed to spend on COVID-19-related clinical care. Education conferences were moved to virtual formats and often suffered from less ability for trainees to interact in “real time” with faculty and visiting professors. The ability to conduct research was also hampered, particularly basic science and translational laboratory research.¹⁰ Personnel who normally worked in laboratories were forced to work from home to ensure physical distancing, with only essential personnel being allowed to perform essential research duties. In turn, researchers experienced significant scientific setbacks that slowed research progress, as well as interrupted faculty progress toward professional and scholarly achievement. In recognition of these challenges, some academic medical centers and colleges of medicine extended the probationary period of all tenure-track eligible faculty. The pandemic also adversely impacted research due to the significant financial pressures placed on academic medical centers. Decreased revenue streams limited the ability of some academic medical centers to invest in research, recruit new researchers, as well as use discretionary funds to support surgeon-scientists. While anecdotal

evidence supports the theory that students and trainees were detrimentally impacted on several levels (safety, quality of surgical curriculum, case loads), objective gender gap differences in academic productivity also became apparent.

“Other” casualties of the viral pandemic: surgical education, academic productivity, and the gender gap

The impact of the viral pandemic on surgical teaching was palpable for medical students on their surgical rotation, surgery residents, and even for the professors teaching them. The suspension of elective surgery in 2020 and the transition toward telehealth for clinic visits significantly limited the engagement of training residents and fellows and provided less opportunity for faculty to observe trainees practicing their skill. To this effect, the American Board of Surgery modified its training requirements for the graduating class of 2020, but how they will modify requirements moving forward is yet to be determined.¹¹ Exposure of medical students to the field of surgery decreased because of their early removal from clinical rotations during the height of the pandemic, potentially leading fewer students to pursue surgery. Whether this will lead to fewer medical students pursuing a career in surgery is unknown.

Clinical research was also significantly impacted during the pandemic as previously discussed. At the beginning of the pandemic, when the mandated shutdown of all nonessential medical services occurred, most clinical trials unrelated to COVID-19 were shut down or paused. Significant delays in the creation of remote work environments for researchers coupled with the need to convert in-person contact with subjects to virtual or telephone-based platforms resulted in decreased trial participant recruitment.¹² Basic and translational research performed in “wet labs” came to a standstill due to forced shutdowns of research buildings and suspension of animal research and core facilities. Reemergence was also slow, with a limited number of employees allowed in laboratories because of social distancing requirements. With the slowdown in active experiments, efforts shifted toward data analysis, article writing, and grant submissions. The overall impact of these slowdowns and shutdowns on research innovation is yet to be determined. Furthermore, it is unclear how the decreased research productivity will impact grant applications and renewals.

While basic science experiments were hampered by the pandemic, total biomedical research publications during the pandemic soared, with many journals reporting record numbers of submissions. There were 30% more papers posted to preprint servers than expected.¹³ Strikingly, a different observation was made regarding the increased numbers of publications. Specifically, a significant decrease in the proportion of female-authored manuscripts was noted, and this was observed with first authorship, senior authorship, and corresponding authorship positions. In biomedical preprint repositories, there was a 9% decrease in female first author publications across all disciplines.¹³ This was particularly pronounced for manuscripts-related to COVID-19 research with a decrease in female first authorship by 28%.¹³ The *Journal of the American Medical Association Surgery* saw a 4%-7% reduction in the percentage of women first authors, last

authors, and corresponding authors.¹⁴ The studies noted smaller differences in female last authorship manuscripts. Although we cannot be certain of the etiology, these findings suggests that early career female academicians are being disproportionately affected because of disparities in childcare and home responsibilities. Furthermore, early career academic surgeons are also likely disproportionately being affected by the shift toward virtual national meetings, resulting in fewer opportunities for in-person podium presentations, networking, and professional visibility, all of which widens the gender gap within academic medicine and stifles progress toward gender equity in the field.¹⁵ In summary, surgical education suffered and academic productivity seemingly improved, yet the gender gap in research during the pandemic widened and disparities in investigational work, though more subtle, mirrored health equity concerns among patients infected with the virus.

The other concomitant public health crisis: racism and health inequity

COVID-related hospitalizations and deaths disproportionately affected Black, non-Latinx, Americans. The city of Chicago, IL, serves as a case study of how racism translates to health inequity and illustrates that stark disparities are apparent. We refer the readers to two maps of the city of Chicago. The first is a map of shooting victims available through the Chicago Tribune,¹⁶ where red dots show the distribution of firearm victims in the city during 2021 and depict how the locations of these incidents are concentrated in majority Black communities (identified by ZIP codes). The second map is available through the Chicago Department of Public Health¹⁷ and shows the COVID-19 deaths among Chicago residents during the first surge in May 2020. The purple dots on this second map represent COVID-19-related deaths of Black Chicago residents confirmed by laboratory testing. The red and purple dots from the respective maps can virtually be superimposed over each other. These maps suggest that one’s ZIP code, a proxy for race and poverty, is associated with life expectancy in the context of two seemingly unrelated factors—gun violence and a viral pandemic. Although Black Americans comprise 30% of Chicago’s population, they constitute 75% of the firearm homicides and 70% of the COVID-19 deaths. Why would this be so?

These glaring divides are an enduring legacy of decades of isolating Black Americans seeking homeownership by marking mortgage lending maps with red lines. Today, more than 50 years since the passage of the Fair Housing Act, 91% of the communities identified as “Best” on the redlined maps remain middle- to upper-class, with 85% of these communities having majority White populations.¹⁸ Accordingly, three of four redlined neighborhoods remain impoverished, and 67% of redlined neighborhoods remain populated by racial minorities. Many were intentionally located in proximity to industrial areas, municipal landfills, and toxic waste sites—and the subsequent negative health impacts persist across generations.

The narrative that “eradicating barriers is the answer to reverse inequality” is also incorrect. Although that strategy is necessary, the authors believe it is not sufficient. Alternatively, we must first acknowledge the deadly public health

effects of systemic inequality rooted in the legalized racial segregation of Black American communities. Second, we must deconstruct de facto barriers intended to exclude Black Americans from mainstream society. Third, we must implement and enforce policies that are designed to include historically marginalized populations. Those of us in health care play an important role because many of the patients we treat live in a reality that we may not fully comprehend. Yet, we can still use our expertise to serve the greater good. To that effect, just as surgeon leaders navigated and managed the challenges of the viral pandemic, there is a moral obligation to similarly address racism as a public health problem and enact effective change to eradicate it.

The pandemic and the role of surgeons as leaders: lessons from the military in leadership in times of crisis

Finally, as we discussed the global viral pandemic and the simultaneous public health crisis of racism and health inequity, the panel discussion also reflected on leadership qualities and organizational skills on the part of surgeons during the crises. To do so, they looked to their military colleagues for guiding principles. The COVID-19 pandemic presented unique challenges both nationally and abroad, which military surgeons have faced with courage, innovation, and flexibility, providing example and insight for surgeon leaders in periods of crisis. Collectively, military and civilian surgeons have overcome pandemic challenges with an immense collaborative effort. One of our panelists shared his experience of leading a small surgical team on a new ship to an austere environment to present useful leadership principles for surgeons. A team with limited prior deployment experience was expected to care for critically injured patients with untested equipment and unknown blood product supply. Major obstacles to performing damage control resuscitation on multiple patients in this setting included operating with relatively junior providers and limited relevant clinical volume.¹⁹⁻²¹ In addition, the typical pre-deployment clinical trauma training was not available because of COVID-19 restrictions. The principles of flexible military leadership were critical components of preparing for missions during times of crises. Specifically, they were (1) defining the “inflexibles,” (2) comprehensive planning and execution, and (3) integrity.

Identification of the critical “inflexibles” for the mission was counseled by the example set forth by our panelist’s previous mentor, Col (ret.) Craig Shriver, whose “Surgical Ten Commandments,” displayed in Figure, provided guidance for our colleague. The two he focused on were “always do the right thing for the patient” and to prepare knowing that “hope is not a plan.” Establishing these “inflexibles” early in team development helped guide preparation for the mission.

The type of comprehensive planning and execution required to revamp the team’s deployment preparation had been previously well described by CAPT (ret.) Eric Elster with the roll out of the military-wide assessment of individual operational readiness, known as “Knowledge, Skills, and Abilities,”²² executed following the Harvard Business Review’s steps for transforming an organization.²³ Finally, the integrity and prioritization of patients and crew members demonstrated by the medical departments aboard the USS Carl Vinson during the 2010 earthquake in Haiti and the USS Theodore Roosevelt during the COVID-19 outbreak in 2020—reminded our colleague that above all the team must be ready to “always do the right thing for the patient.”²⁴ Developing a training program during the height of a viral pandemic to care for trauma patients in an austere environment was worth challenging the established paradigm and refuting the status quo despite resistance and challenges.

Remaining flexible and adapting to a new environment ultimately led to the development of a novel training curriculum that included surgical exposure with the new ASSET+ (Advanced Surgical Skills for Exposure in Trauma) course as well as shipboard-specific training to develop resuscitation areas with the support of a “Walking Blood Bank” with a supply of component blood products.²¹ Surgical teams have adopted this novel training pipeline, and it serves as the foundation for preparing these teams during the pandemic. Military personnel all over the globe applied similar strategies to overcome their own pandemic hurdles to care for international patients in Afghanistan, develop vaccine clinical trials at military treatment facilities, extend medical capabilities in New York, and repurpose field tents to diagnose and manage COVID-19 patients in California.²⁵ None of these solutions were perfect, and the issues surrounding readiness and retention of experienced providers continue to plague many military medical groups.²⁶ However, as military surgeons emerge from this pandemic with expertise in flexible

1. Good judgement is based on experience, and experience is based on bad judgement.
2. Hope is not a plan.
3. There is no swearing in surgery.
4. You are not the one taking the risk. The patient is.
5. Always do what’s right for the patient.
6. Asking for help is not a sign of weakness, it’s a sign of maturity.
7. A good surgeon known when to operate; a great one knows when not to.
8. The definition of a minor procedure is one that’s being done on someone else.
9. The two diagnoses you’ll never make are the ones you don’t know about, and the ones you didn’t think about.
10. A professional is someone who can do their best work when they don’t feel like it.

Fig. – Surgical Ten Commandments: Col (ret.) Craig Shriver’s guiding principles for military surgical trainees.

leadership, they will continue to strengthen partnerships with civilian institutions and provide novel perspectives in overcoming challenges.²⁷

Conclusion

In summary, the COVID-19 pandemic has had a profound impact on how we provide surgical care. Academic surgical departments have altered how they provide care to patients and how they train residents and students. They have also had to make difficult decisions to maintain revenue flows while ensuring that nonsurgical patients, including COVID-19 patients, could be cared for in the intensive care units, emergency departments, and general floors. The pandemic has also highlighted ongoing racial and socioeconomic disparities and exacerbated inequities in the provision and outcomes of medical care. Furthermore, the pandemic is not over. As of January of 2022, the United States continued to see high rates of hospitalizations and deaths related to COVID-19, with the overwhelming number of serious cases, hospitalizations, and deaths due to adults who are not vaccinated. While we continue to struggle to emerge from the pandemic and combat misinformation and disinformation, difficult decisions will need to be made regarding which aspects of our professional and personal lives revert to pre-pandemic patterns and which changes are here to stay. Solutions to address racial inequities in all facets of our lives, from finances to housing to the criminal justice and medical systems, must continue to be sought out and implemented. Bold leadership will be essential as we move forward, and there are innumerable examples from our military colleagues on how to lead with flexibility as circumstances change. We are confident that the surgical community can continue to lead by example, provide excellent care for our patients, and help society move beyond this devastating global pandemic.

Author Contributions

L.G., M.P.O., C.G.V., and L.F. conceived of the presented idea and co-chaired the original presentation of the session. All authors contributed to the final version of the manuscript.

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