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## Economic Recovery After the COVID-19 Pandemic: Resuming Elective Orthopedic Surgery and Total Joint Arthroplasty

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## ABSTRACT

**Background:** The economic effects of the COVID-19 crisis are not like anything the U.S. health care system has ever experienced.

**Methods:** As we begin to emerge from the peak of the COVID-19 pandemic, we need to plan the sustainable resumption of elective procedures. We must first ensure the safety of our patients and surgical staff. It must be a priority to monitor the availability of supplies for the continued care of patients suffering from COVID-19. As we resume elective orthopedic surgery and total joint arthroplasty, we must begin to reduce expenses by renegotiating vendor contracts, use ambulatory surgery centers and hospital outpatient departments in a safe and effective manner, adhere to strict evidence-based and COVID-19-adjusted practices, and incorporate telemedicine and other technology platforms when feasible for health care systems and orthopedic groups to survive economically.

**Results:** The return to normalcy will be slow and may be different than what we are accustomed to, but we must work together to plan a transition to a more sustainable health care reality which accommodates a COVID-19 world.

**Conclusion:** Our goal should be using these lessons to achieve a healthy and successful 2021 fiscal year.

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The coronavirus (COVID-19) pandemic has created health care and economic crises at large metropolitan areas throughout the United States, and it is predicted to drive unemployment to a level not seen since the Great Depression. In the United States, fears of the COVID-19 outbreak began as we watched Italy's health care system grapple with a massive influx of patients. As a result, the U.S. stock market recorded its largest point drop in history on Monday, March 9, 2020 [1]. The World Health Organization designated the COVID-19 outbreak a pandemic on March 11 [2]. From February 19 to March 19, the Dow Jones Industrial Average lost over 35% of its value [3]. California then ordered the first statewide stay-at-home orders for its residents on March 19, 2020 [4]. Similar stay-at-

home orders and the closure of all nonessential businesses would follow over the next few weeks in 42 states including New York and Massachusetts [5]. The prompt closure of businesses deemed nonessential has forced >16 million Americans to file for unemployment, fueling speculation that the unemployment rate will reach 20% in the second quarter and may reach as high as 30% by the summer of 2020 [6,7]. For comparison, the Great Recession of 2008 reached a peak unemployment rate of 10% [8]. The COVID-19 crisis has created substantial stock market shifts, raised unemployment to a record high, created travel restrictions, and has overwhelmed health care systems throughout the world. The economic implications from the COVID-19 crisis are not like anything we have ever experienced.

The impact of the COVID-19 crisis on the U.S. health care system is also unprecedented. Health care organizations, which are already operating at near capacity are struggling to meet the need for ventilators, personal protective equipment, and intensive care beds. Other health care institutions are not under the same volume pressure, but have financial issues due to the moratorium on elective surgical procedures. In an attempt to conserve resources

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and slow the spread of disease, the Centers for Medicare and Medicaid Services [9], the Surgeon General, and the American College of Surgeons [10] recommended against elective surgeries. As the allocation of resources became more difficult, 35 states placed moratoriums on elective procedures [11]. The moratorium on elective procedures jeopardizes the financial integrity of health care systems that are disproportionately reliant on elective procedures as a revenue source. In response, the U.S. Congress passed the Coronavirus Aid, Relief, and Economic Security Act (CARES), a \$2.2 trillion bill with \$100 billion designated to hospitals and \$350 billion designated to small businesses including private orthopedic practices [12–14]. Although these relief programs may alleviate some of the economic burden, the legislation is not comprehensive, and it will not resolve all financial losses accrued by health care systems and orthopedic practices. Without the revenue from elective procedures, many orthopedic practices have had to furlough employees and withhold surgeon salaries [15,16]. Mayo Clinic has announced a projected \$900 million shortfall, with employee pay adjustments and furloughs [17].

New York City has dealt with one-third of the COVID-19 cases in the United States and has become the epicenter of the U.S. COVID-19 outbreak. However, the number of new hospitalizations in New York has begun to decrease, giving hope that the peak of the pandemic is near. As we reach this critical point, it is crucial that we begin to plan for a return to a more normal health care reality. Health care and orthopedic surgery will be an important component of the economic recovery. The health care sector in America represents 18% of the U.S. gross domestic product [18]. As orthopedic surgeons, we should help develop sustainable institutional protocols allowing for the safe return of elective surgery and economic profitability to health care institutions and orthopedic practices. Total joint arthroplasty (TJA) represents a large portion of orthopedic revenue production due to high volume and high margins. As we begin to make this transition, we need to understand that it will not be realistic to conduct the same case volume as we were before the COVID-19 outbreak. We should assess patient demand for elective TJA operations after the pandemic. Economic recovery will require a safe and comprehensive approach for the sustainable resumption of elective orthopedic practice. We must also critically assess the economic impact of the COVID-19 crisis so that we may adjust institutional protocols in a manner enabling an efficient response to future pandemics.

### **The COVID-19 Crisis of 2020 and The Great Recession of 2008**

The immediate economic effects and fallout as a result of the COVID-19 crisis resemble that of the Great Recession of 2008. A 2009 American Association of Hip and Knee Surgeons—sponsored survey with 953 respondents evaluated the effects of the recession on surgical and patient volume, practice type, hospital relationships, cost control mechanisms, Medicare reimbursement, attitudes toward health care reform and retirement. The report found that surgeons lost almost 30% of their retirement savings during the economic downturn of 2008, surgeons planned to retire at an older age, and surgical and patient volume decreased by 30.4% and 29.3%, respectively [19]. It is certain that in the short term, the COVID-19 crisis will have a similar outcome as the Great Recession of 2008, temporarily slowing the demand for TJA.

The Great Recession further changed practice patterns as independent orthopedic surgeons were absorbed by large group-based practices or health care systems. The economic effects of COVID-19 may burden surgeons with debt caused by high overhead costs not offset by clinical revenue, causing surgeons to seek more financially stable positions within large health care organizations. Health care systems will further be impacted as the rate of patients with

commercial insurance coverage will decrease as the rate of unemployment increases. After the Great Recession, from 2009 to 2011, the decrease in inpatient admissions from patients with commercial insurance resulted in an average loss of \$3.7 million for a 300-bed hospital [20]. At the end of the COVID-19 crisis, unemployment is projected to be up to three times that of the Great Recession. The loss of revenue due to the lack of commercial insurance after the COVID-19 crisis will far exceed that felt during the Great Recession. A rapid reversal in the economy is possible; however, much of this depends on how long state and federal restrictions are enforced, and how soon effective testing is implemented [6]. Many financially troubled hospitals and health care systems may need to be absorbed by financially healthier systems further decreasing patient, payor, and surgeon choice and thus narrowing the health care market further and continuing the consolidation which began in 2008.

### **Resuming Elective Orthopedic Practice: An Evolving Strategy From Surge to Sustainability**

During the COVID-19 crisis, TJA has been deemed a nonessential procedure to help conserve resources for COVID-19 patients. Loss of revenue from elective procedures for several months of the fiscal year will guarantee that statements of operations for 2020 will record unfavorable losses. Resuming TJA will be essential for economic recovery in health care. Lower extremity TJA is one of the most effective, quality of life—improving procedures available to patients [21]. Resuming TJA will also be essential to improve the well-being of our patients; however, it must be carried out in a safe and sustainable manner. Here we present Six Pillars required for the sustainable resumption of elective TJA (Fig. 1). If properly implemented, we anticipate a return to a new normal level of elective TJA by fiscal year 2021.

#### *Determine Patient Demand for Elective Orthopedic Surgery After the Pandemic*

To plan the orthopedic economic recovery from the COVID-19 pandemic, it will be necessary to understand patient demand for elective TJA operations. After the Great Recession of 2008, demand for elective surgery was decreased because patients had to work, they could not afford time to schedule hip and knee procedures, and many patients lost health insurance. After the COVID-19 crisis, patients will have the same economic, employment, and insurance concerns, but patients may also be concerned about the risk of entering a health care facility. It is likely that the demand surge we anticipate may be lower than expected. Older patients may be reluctant to undergo procedures while the pandemic simmers and their risk of infection is high. Younger patients may not be able to delay work for long periods to recover or may have insurance issues.

It may be prudent for orthopedic practices to assess patient demand by asking patients who were canceled for elective TJA operations if they want to reschedule immediately, cancel, or wait 3 to 6 months. When orthopedic practices understand demand for elective TJA services, they can plan for efficient utilization of surgical facilities, which will be critical to economic recovery and sustainability.

#### *Medical Optimization in a COVID-19 World With Evidence-Based Practices*

As we begin to resume elective orthopedic surgery cases, surgeons may be anxious to return to the operating theater. It will be imperative that orthopedic surgeons adhere to evidence-based

## 6 Economic Pillars: Sustainable Elective Orthopaedics

I. Patient Demand for Elective Surgery	II. Evidence-Based Practices	III. Early Discharge and Outpatient Surgery	IV. Technology and Innovation	V. Contracts and Vendors	VI. Government Program
<ul style="list-style-type: none"> <li>▪ Assess post-crisis demand by asking patients who were cancelled if they want to reschedule</li> <li>▪ Younger patients may not be able to take time off from work or may have insurance issues as a result of unemployment</li> <li>▪ Older patients may be reluctant to undergo surgery due to concerns about COVID-19</li> <li>▪ Project TJA demand 3-6 months in advance with the aim of efficient utilization of staff and resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pre-operative optimization in a multidisciplinary approach to ensure high-quality outcomes</li> <li>▪ Follow local and federal recommendations regarding testing elective TJA for COVID-19 exposure and immunity</li> <li>▪ Identify any TJA candidates with significant non-modifiable risk factors and consider delaying surgery</li> <li>▪ Goal of reducing postoperative complications that lead to inpatient admission</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure strict patient selection and screening criteria prior to surgery</li> <li>▪ Thorough preapproval process to identify any non-covered or early discharge penalties</li> <li>▪ Extend ASC, HOPD or rapid recovery TJA programs to meet increased need</li> <li>▪ CMS should be asked to consider eliminating the hospital-based reimbursement penalties</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use telemedicine and virtual visits to optimize time efficacy in the office</li> <li>▪ Invest in HIPAA compliant technology options that allow the use of virtual visits</li> <li>▪ Consolidating staff may mean instituting new training protocols to help distribute the workload</li> </ul>	<ul style="list-style-type: none"> <li>▪ Renegotiate contracts with possible vendors to drive implant costs down</li> <li>▪ Increase levying power by establishing a specialized hospital physician negotiating committee</li> <li>▪ Consider refinancing or negotiating new terms on office space or imaging equipment (e.g. MRI, CT)</li> <li>▪ Reconsider the use of value-added technologies such as robotics, navigation, custom implants, radiofrequency sealant devices and other non-essential costs</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reach out to local and national governing bodies about US-SBA programs</li> <li>▪ Apply for eligible programs, \$10 million maximum</li> <li>▪ Orthopaedic practices and healthcare systems need to avoid accumulating unsustainable debt</li> </ul>

**Fig. 1.** 6 economic pillars required for the successful implementation of sustainable elective orthopedics. ASC, Ambulatory surgical center; HIPAA, Health Insurance Portability and Accountability Act; TJA, total joint arthroplasty; US-SBA, United States Small Business Administration.

medical optimization practices, which include local and federal recommendations regarding testing elective TJA patients for COVID-19 exposure or immunity. TJA candidates with substantial risk factors before surgery need to be optimized to ensure high-quality outcomes while reducing resource expenditures [22]. In addition, elective TJA candidates with nonmodifiable risk factors who may need ICU beds or blood transfusions should be delayed if that community has increased COVID-19 demand. Postoperative complications that lead to in hospital readmission for TJA patients can lead to excessive resource utilization adversely impacting the care of COVID-19 patients. Furthermore, the use and availability of medical supplies must not be overlooked as we continue to care for COVID-19 patients.

Surgeons may be anxious to return to operating and will want block availability as soon as possible. It is our recommendation that operating room availability be designated by division instead of by surgeon, with urgent procedures prioritized. Hospital systems may want to consider shifting elective orthopedic surgery procedures to non-COVID or COVID-light facilities for patient comfort, safety, and peace of mind. Operating room staff will also need to be tested and protected to provide a safe environment for the patients.

#### Early Discharge and Outpatient Total Joint Arthroplasty

As orthopedic surgeons restart their elective practices, we anticipate an increase in early discharge and outpatient TJA. The psychological barriers (eg, pain and ambulation) preventing eligible TJA candidates from considering early discharge and outpatient TJA will likely be less relevant as patients attempt to distance themselves from exposure to COVID-19. It will be the orthopedic surgeon's responsibility to ensure that strict patient selection and screening be performed before surgery at hospital outpatient departments (HOPDs) and ambulatory surgery centers (ASCs). Patients not meeting the selection criteria for early discharge can instead be enrolled in rapid recovery programs at a regional hospital with minimal COVID-19 exposure. Adherence to strict patient selection protocols will allow high-quality clinical outcomes, while limiting complications and unnecessary expenditures and exposures.

Communication from orthopedic practices to patients pertaining to any noncovered costs must be complete, as patients may not have the financial capacity to cover these additional costs. For Medicare patients, it will be necessary to identify any early discharge penalties that could create an unneeded financial burden for the patient or practice [23]. Eliminating the increased out-of-pocket expenditures for Medicare patients would be a helpful measure to assist in expediting the safe care of our elderly, high-risk patients. Extending HOPD and ASC hours of operation and potentially operating on weekends presents another opportunity for orthopedic practices to meet the increased need for outpatient and early discharge TJA. Large private orthopedic groups or health care systems invested in HOPDs and ASCs will profit from the increased case load, whereas those who do not have access to ASC, HOPD, or rapid recovery TJA programs may see a decrease in patient volume.

The Centers for Medicare and Medicaid Services should be asked to consider eliminating the hospital-based reimbursement penalties associated with the Two Midnight Rule. Hospitals should discharge patients as quickly as possible to avoid inpatient stays and should not face reimbursement penalties for efficiently caring for the Medicare beneficiaries. Surgeons should be allowed to choose the appropriate setting for their patients based on comorbidity burden to ensure that patients are cared for in the right setting. Reimbursement should not be a consideration that slows down the discharge process. It is time to evolve to a one 90-day payment each for diagnosis-related groups 469 and 470 to allow for the safest and most cost-effective care of TJA recipients.

#### Technology and Innovation Investment

Perhaps one of the biggest benefits of the COVID-19 crisis has been the robust implementation of telemedicine and virtual visits. Surgeon concerns about reimbursement, privacy, and billing have been partially resolved as a result of the pandemic. Orthopedic surgeon practices in Massachusetts have already begun evaluating the safety and effectiveness of virtual visits during the 90-day global period [24]. During the COVID-19 crisis, it is not a requirement for practices to use HIPAA compliant technology options; however, it is likely that in the future when telemedicine is used for

**Table 1**  
The Microeconomic Effect on an Orthopedic Surgery Practice Associated With Unanticipated Reduction in Projected Revenue in the Setting of Fixed and Adjusted Overhead Costs.

Assumptions	Event	Actual Revenue	Fixed Overhead	Gross Profit	$\Delta$
1) \$1 million estimated revenue per physician/year	No crisis	\$1,000,000	\$456,000	\$544,000	N/A
2) Fixed overhead is \$38,000 per month [28] <sup>a</sup>	Crisis	\$716,665	\$456,000	\$260,665	-52.1%
3) Crisis reduces actual revenue 90% for first 2 mo, then increases by 20% every month after	Crisis + response	\$716,665	\$361,000	\$355,665	-34.6%
4) Response: 6 economic pillars implemented reducing fixed overhead by 25% starting month 3					

Revenue values are arbitrary and chosen to illustrate the economic impact.

<sup>a</sup> Adjusted for inflation.

routine postoperative visits, the use of HIPAA compliant technology will be necessary. The planning and implementation of telemedicine platforms will be expensive and depends on a number of factors such as education and training, number of providers and patients, compatible devices and security costs and concerns. Traditional capital expenditure purchase models for telemedicine platforms start at about \$42,000; however, newer more affordable options include per physician fees that start at around \$799 per month [25]. It is evident that the days of routine postoperative visits are fading and will be replaced with telemedicine. Virtual visits provide the orthopedic surgeon with an opportunity to increase office efficacy and cost-effectiveness in an era of decreasing reimbursements and increasing time constraints. New patient screening and long-term post-operative surveillance of TJA patients are also good applications for telemedicine and virtual visits.

Orthopedic groups and health care systems should look to technology and innovation during this transitional period to help sustain high-quality care in a cost-effective manner. It may also be a time when consolidating staff means that surgeons, physician extenders, technicians, and nurses learn more skills to help each other distribute the workload as we return to the operating room and ambulatory clinic.

#### Renegotiate Contracts With Vendors

As elective procedures are reinstated, we must become more cost conscious and re-examine the major cost drivers. It is well-documented that implant cost is the main driver of inpatient costs for TJA [26]. The renegotiation of contracts with vendors to decrease implant costs may help reduce the expenses for TJA. The use of specialized hospital physician negotiating committees may increase bargaining power and drive down costs [27]. Orthopedic practices and health care systems should also assess the

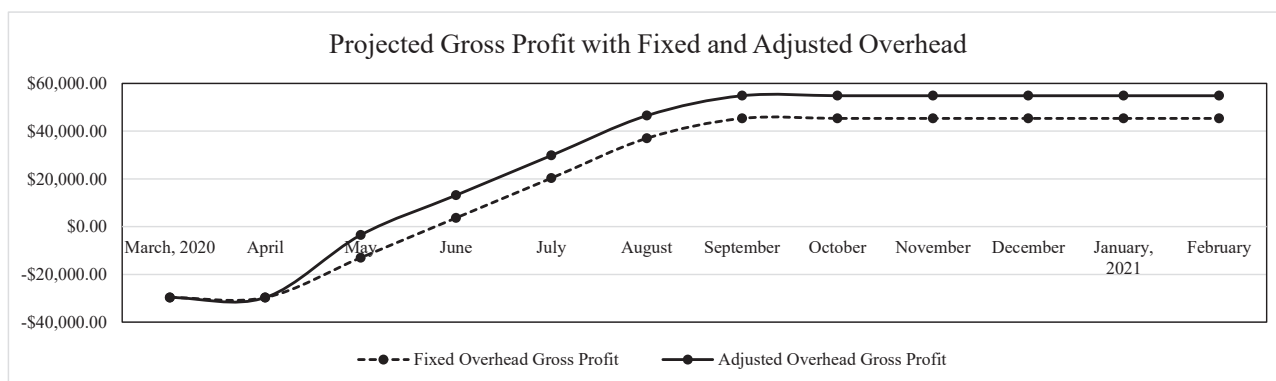
possibility of renegotiating terms on office space and imaging equipment (e.g. MRI, CT) with the aim of reducing overhead expenditures. Landlords and bankers may be willing to write-off short-term losses in the hope of retaining a long-term client. Value-added technologies which drive up TJA costs need to be reconsidered or renegotiated. Robotics, navigation systems, custom implants, radiofrequency sealant devices, and other nonessential parts of arthroplasty care can be eliminated in this time of economic hardship to minimize hospital cost. Reducing the fixed costs associated with TJA will improve financial performance and mitigate the losses associated with the COVID-19 crisis as demonstrated in Table 1 and Figure 2.

#### Government Programs

Private orthopedic practices are eligible for several funding programs through the U.S. Small Business Administration established by the CARES Act [14]. These programs were created to help small businesses with less than 500 employees navigate during the COVID-19 crisis. The loans, which can be as large as \$10 million are guaranteed by the U.S. Small Business Administration and may be eligible for forgiveness if used for payroll and employee retention. It is essential that orthopedic groups understand their financial options, enabling them to control overhead costs while participating in government-sponsored programs aimed at curbing the deleterious effects of this crisis. Orthopedic groups must continue to manage expenses and overhead to ensure that they do not accumulate unsustainable debt.

#### Concluding Remarks

The economic effects of the COVID-19 crisis are not like anything the U.S. health care system has ever experienced. As we begin to



**Fig. 2.** Projected gross profit with adjusted and fixed overhead costs using assumptions presented in Table 1. The projected 25% reduction in overhead costs can be achieved with the implementation of pillar V, via the renegotiation for essential disposables (eg, implants), office space, and imaging equipment, while temporarily eliminating nonessentials (eg, robotics, navigation systems, custom implants, radiofrequency sealant devices).

emerge from the peak of the COVID-19 pandemic, we need to plan the sustainable resumption of elective procedures. We must first ensure the safety of our patients and surgical staff. It must be a priority to monitor the availability of supplies for the continued care of patients suffering from COVID-19. As we resume elective orthopedic surgery and TJA, we must begin to reduce expenses by renegotiating vendor contracts, use ASCs and HOPDs in a safe and effective manner, adhere to strict evidence-based and COVID-19-adjusted practices, and incorporate telemedicine and other technology platforms when feasible for health care systems and orthopedic groups to survive economically. The return to normalcy will be slow and may be different than what we are accustomed to, but we must work together to plan a transition to a more sustainable health care reality which accommodates a COVID-19 world. Our goal should be using these lessons to achieve a healthy and successful 2021 fiscal year.

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