MAY 2021

The State of Surgery: An Analysis of Surgical Trends During the COVID-19 Pandemic

caresyntax®

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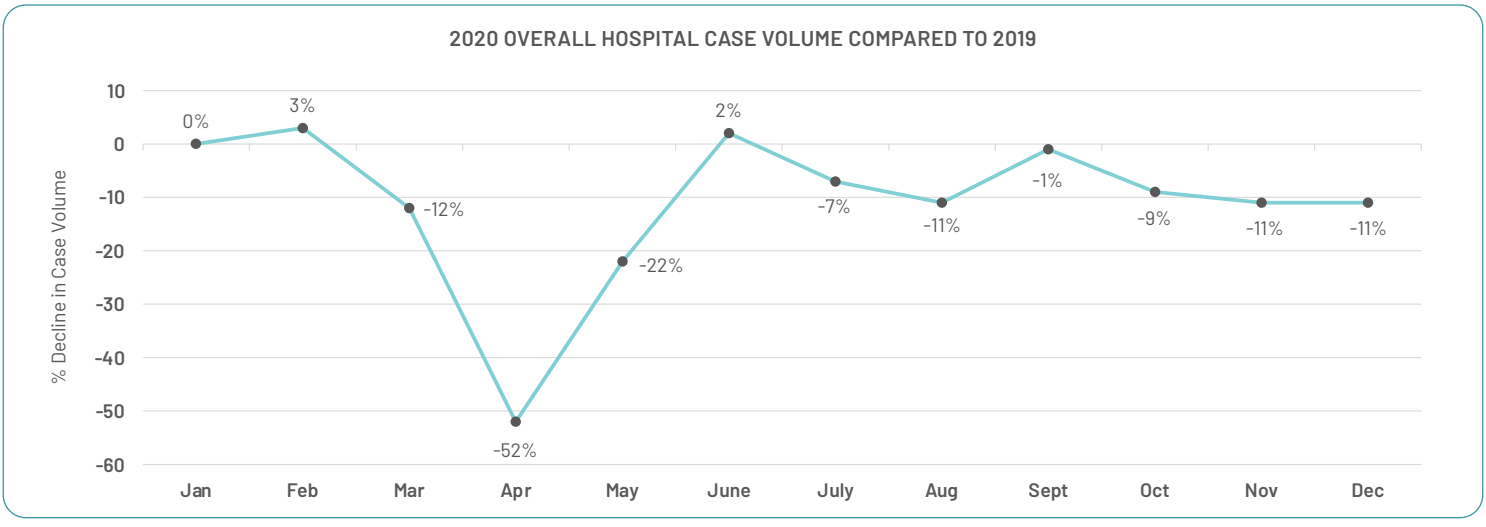
INTRODUCTION

In 2020, U.S. hospitals stepped up to meet the challenges of the COVID-19 pandemic in ways never seen before. Managing theincreasing demands for testing and treating patients with the coronavirus, acquiring necessary medical equipment, and keeping beds available, all while mitigating personal exposure to the contagious virus, hospital administrators, providers, and staff showed true heroism. But as a result, hospitals experienced severe financial challenges. They had to treat more and more COVID-19 patients while dealing with their own staffing shortages as a result of infection from the virus. In the midst of addressing these hurdles, surgical caseloads tumbled. Surgery accounts for more than half of all hospital revenue, so where hospitals were required to cancel or postpone non-emergency procedures, they saw income dry up while expenses rose.

The trends in surgical volumes in 2020 compared to 2019 (Figure 1) are in some ways a reverse reflection of the familiar COVID-19 case volume trends in 2020. There was a big dip in surgeries right as cases rose, then a return to near normality during the summer, followed by another dip in surgeries in the fall and into winter as COVID-19 surged again. **It's estimated that it could take up to two years for hospitals to work through the surgical backlog, even operating above historical volume.**

The first step to hospital recovery is the collection and analysis of data. Organizations that effectively leverage data to optimize surgery can see rapid, quantifiable, and sustained improvements in metrics that directly link to operational efficiency and associated financial benefits. In order to effectively leverage data and best emerge from this crisis, it will be essential for hospitals and policymakers to better understand exactly how surgical trends played out during 2020. This report evaluated more than 2.5 million surgical cases, comparing volumes from 2018 through 2020 across a range of dimensions such as procedure schedule type, specialty, complexity, hospital ownership, and setting to further explain the changing dynamics.



Overall surgical case volume in 2020 often reflected COVID-19 case trends. After a peak decline in April, surgery cases rebounded in the summer months before falling again during winter surges in virus infections.

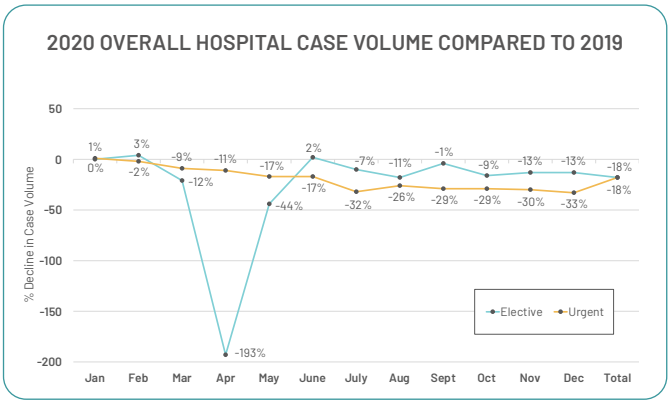
SCHEDULES

Elective Cases Stabilize as Urgent Cases Trend Down

Elective surgeries account for 60 percent of a hospital's total revenue on average. **After CMS recommended postponing non-emergent surgeries in early April 2020, there was a dramatic overall decrease in elective surgical case volume that month compared to April 2019 – 193 percent.** In comparison, urgent surgeries only dropped 11 percent that month.

In June, as reported COVID-19 cases dipped and many restrictions were lifted, hospitals made progress in managing the backlog, and elective surgeries were slightly higher than levels from the year prior, while urgent cases continued to see a decline. By the end of the year, urgent cases were back down by 33 percent, while elective cases were down only 13 percent.

There are a few possible explanations why. Some studies suggest a meaningful drop in cases due to patient fear of infection and delayed diagnoses due to deferred care. It's also possible that the initial cancellation of elective surgeries allowed surgeons to work through any existing backlog of urgent cases.



After an initial 193 percent drop in caseload in April, elective surgery stabilized around 10 percent below 2019's numbers, while urgent cases steadily declined.

Case Study: **Appendectomies**

One interesting example of how surgical urgency shifted over 2020 is the appendectomy, a common surgery to remove the appendix.

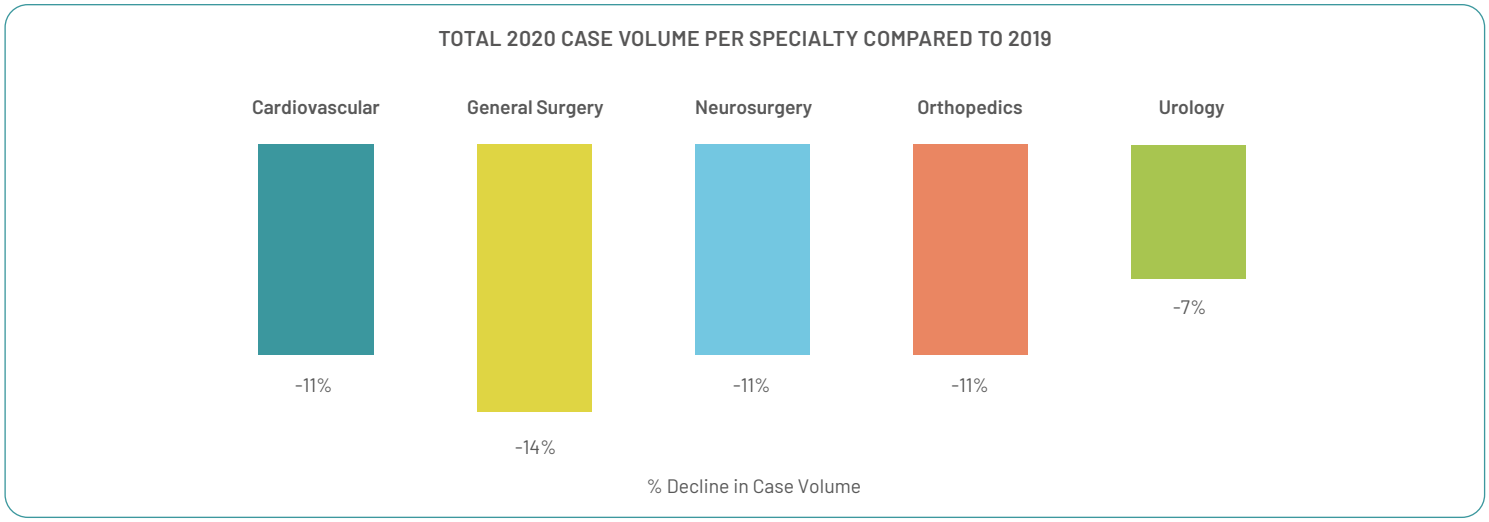
In December 2019, 26 percent of appendectomies performed were considered elective, while 74 percent were categorized as urgent. But by December 2020, elective cases had declined to 20 percent, while urgent cases increased to 80 percent.

This may be because patients and providers were more likely to delay care until it was absolutely essential to operate, whereas they would have previously taken a more preventive approach.

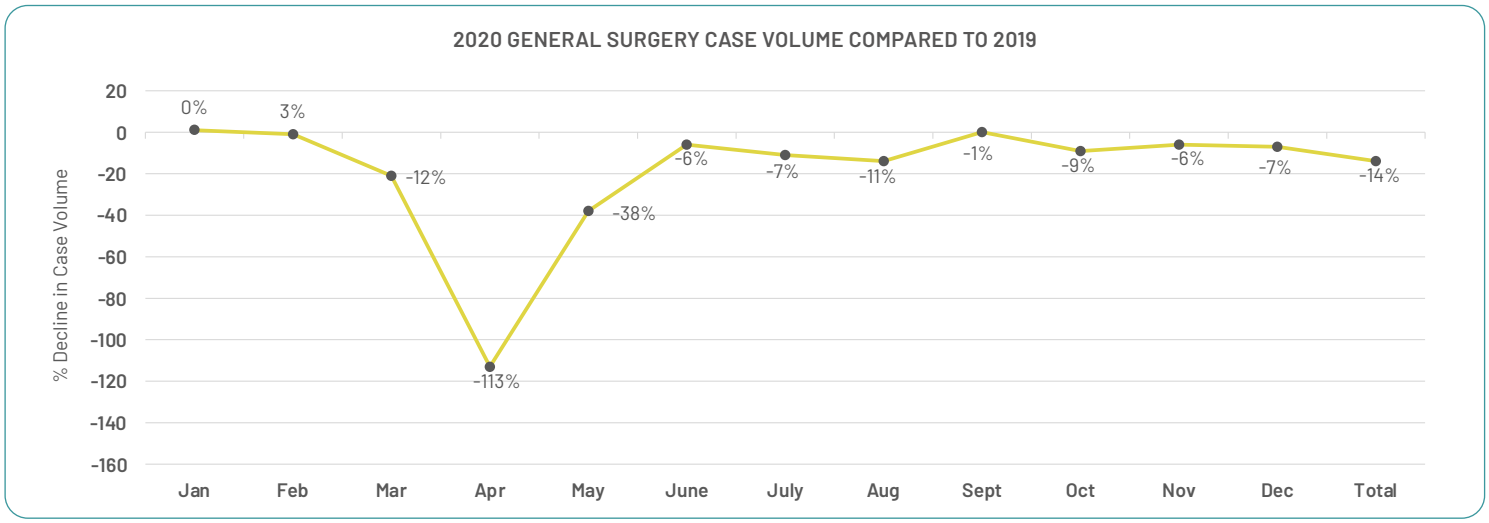
General Surgery Sees Greatest Drop in Cases Compared to Other Specialties

When looking at surgical volume data from 2019-2020, there were a variety of patterns, as certain specialties struggled more than others. Specialties vary in the amount of revenue they bring in for hospitals, with cardiovascular, neurology, and orthopedics generally bringing in greater returns than general surgery.

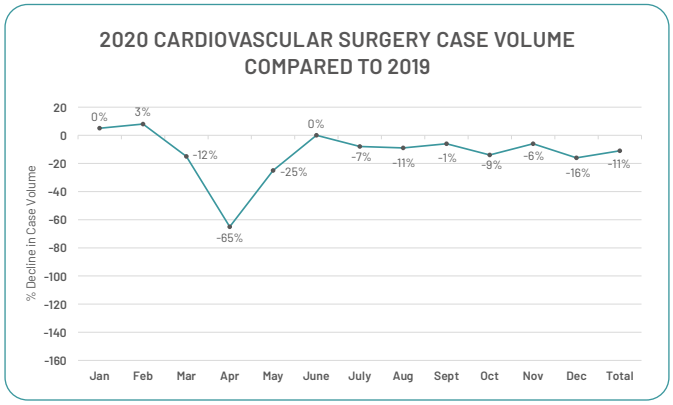
Over the entire year, general surgery saw the most significant drop in cases, at 14 percent fewer than in 2019.



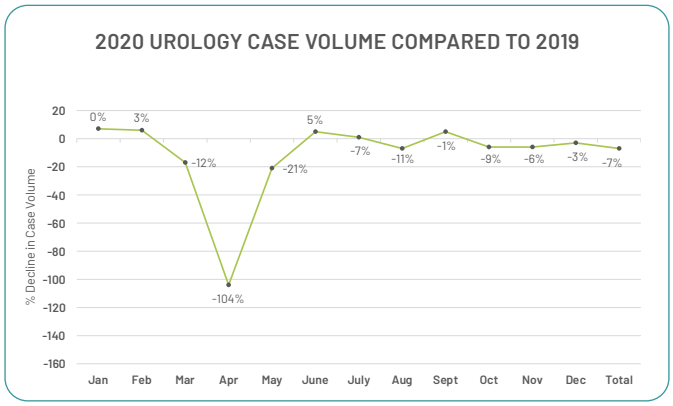
General surgery saw the greatest decline in surgical volume in 2020 compared to 2019, while Urology cases performed the best among the specialties we examined.



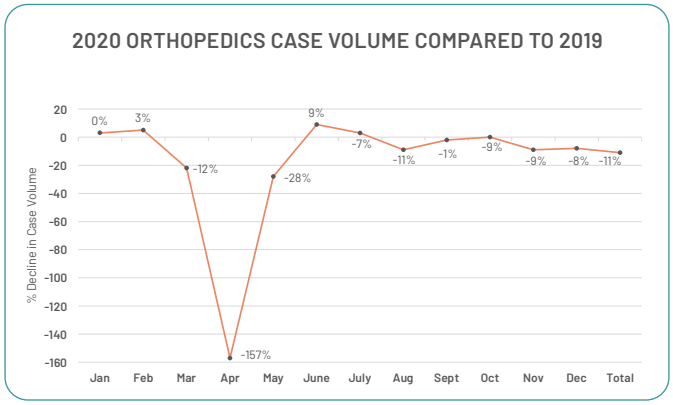
SPECIALTY



Cardiovascular surgeries took the smallest hit in April, but struggled more than others to rebound as the year progressed.



Urology had the least dramatic declines of the group, with only a 7 percent drop overall in 2020.



Orthopedic surgeries took the biggest hit in April, presumably due to the CMS guidelines encouraging hospitals to pause elective surgeries. However, they had the strongest rebound, as these cases can often be completed in outpatient settings.

Case Study:
Heart Attacks

A May 2020 ***New York Times* column** described an early trend: the sudden downward surge in cardiovascular events like heart attacks and strokes. Experts considered a variety of reasons why, including some may be delaying care until conditions worsened or some may be staying healthier while at home.

We looked at procedures done in catheterization laboratories (nonsurgical interventions used to visualize heart arteries and chambers) to try to account for the decline, but those non-invasive procedures actually did not increase during this time.

It is also possible that an overall delay in preventive care contributed to delays in cardiovascular surgeries, and in the future, we may see more patients come to hospitals in worse condition.

CASE MIX INDEX

Higher Complexity Surgeries Experience Less Severe Drop in Cases

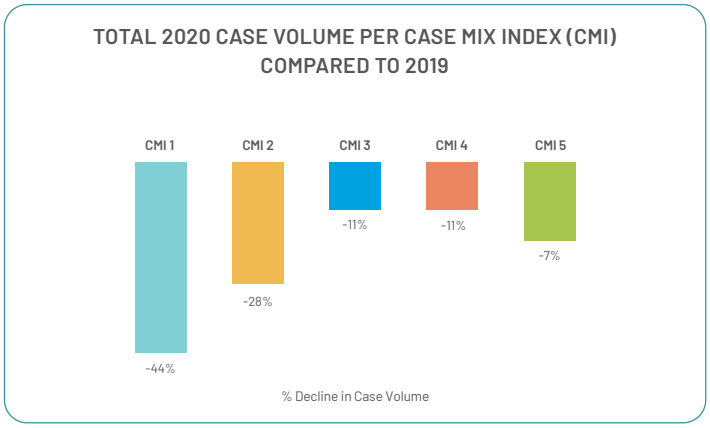
2020 Case Volume Per Case Mix Index (CMI) Compared to 2019

Category	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1 (Lowest Complexity)	-15%	-5%	-29%	-584%	-72%	17%	-46%	-67%	-26%	-51%	-67%	-51%	-44%
2	-1%	3%	-12%	-120%	-21%	3%	-49%	-54%	-32%	-44%	-45%	-38%	-28%
3	1%	3%	-17%	-145%	-38%	3%	-2%	-7%	2%	-7%	-6%	-5%	-11%
4	1%	5%	-17%	-115%	-31%	4%	-2%	-12%	1%	-10%	-6%	-3%	-11%
5 (Highest Complexity)	0%	0%	-17%	-110%	-41%	-1%	-14%	-18%	-10%	-18%	-14%	-21%	-18%

Surgery cases with a CMI of 1 fell 44 percent in 2020, the greatest drop of all cases by 16 percent.

Case mix index (CMI) refers to the average Diagnosis Related Group (DRG) weight of a hospital's discharges, reflecting the diversity, complexity, and resources needed for every patient. The scale ranges from 1-5, with 1 categorizing hospitals with the lowest complexity and 5 the highest. **In April 2020, low-complexity hospitals had severe drops in case volume while hospitals with higher complexity surgeries had a less severe drop.** These differences were likely associated with the urgency of cases, as hospitals were cancelling less critical cases (often less complex) to focus on life-saving procedures (often more complex). Meanwhile, hospitals with medium complexity consistently outperformed the others.

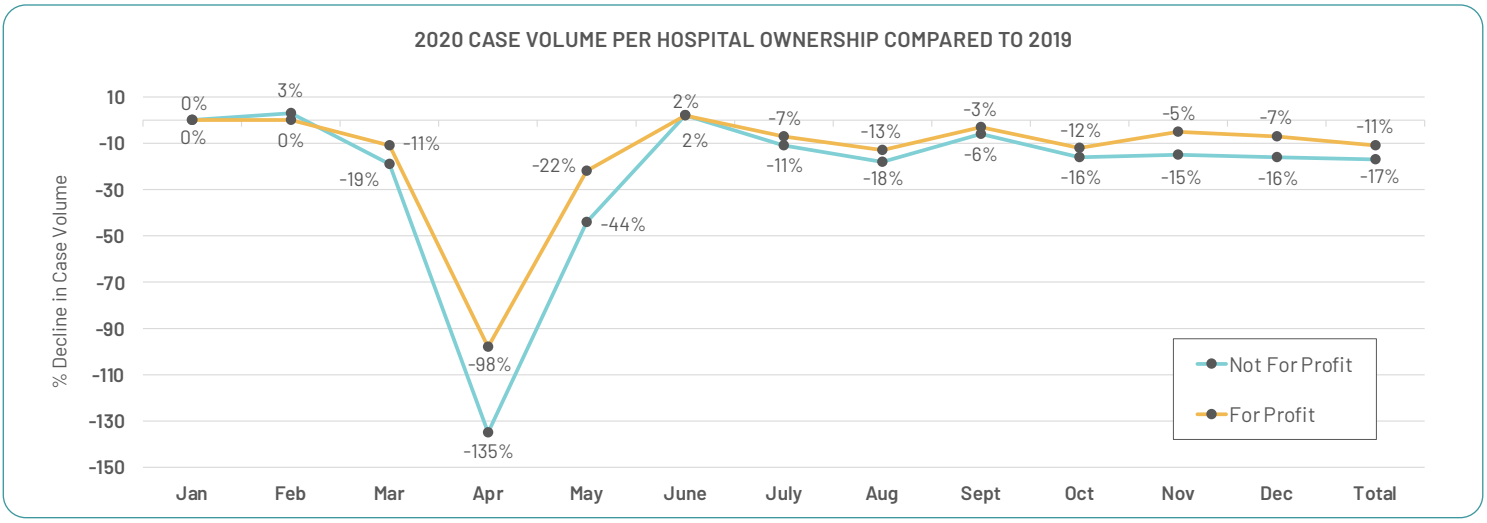
Notably, hospitals tend to net greater value from performing lower-complexity cases, as they are more likely to be outpatient and don't consume as many resources as higher-complexity cases. The ability for hospitals to return to normal volumes of these procedures will be an important part of supporting their financial resiliency.



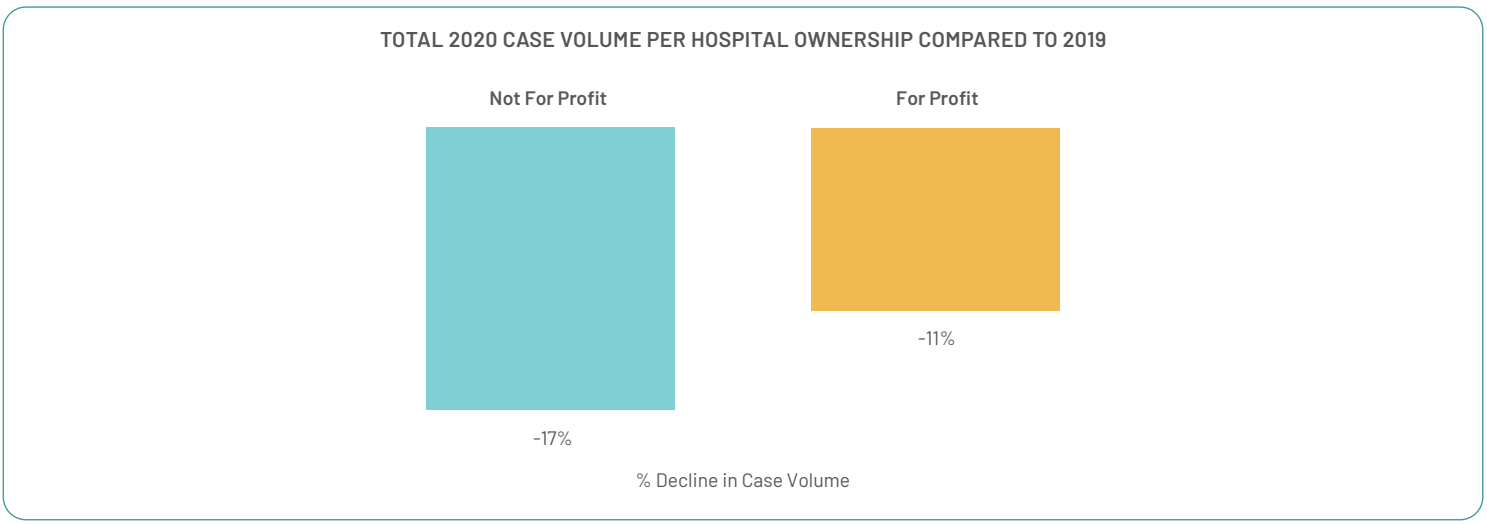
Hospitals with the capacity to perform medium and high complexity surgeries (those with a higher CMI) had a less severe drop in surgical volume than those with a low CMI.

Not-For-Profit Hospitals Suffer Larger Case Decline than For-Profit Hospitals

Throughout the entire year, for-profit hospitals routinely outperformed not-for-profit hospitals. This is consistent with the known approach of for-profit hospitals being less likely to cancel or more likely to reschedule procedures during COVID-19. After CMS guidelines were lifted, not-for-profit hospitals struggled to rebound; for-profit hospitals saw double the case volume growth in May 2020 compared to not-for-profit hospitals.



Throughout 2020, for-profit hospitals routinely outperformed not-for-profit hospitals, completing 37 percent more cases during the peak decline in April.

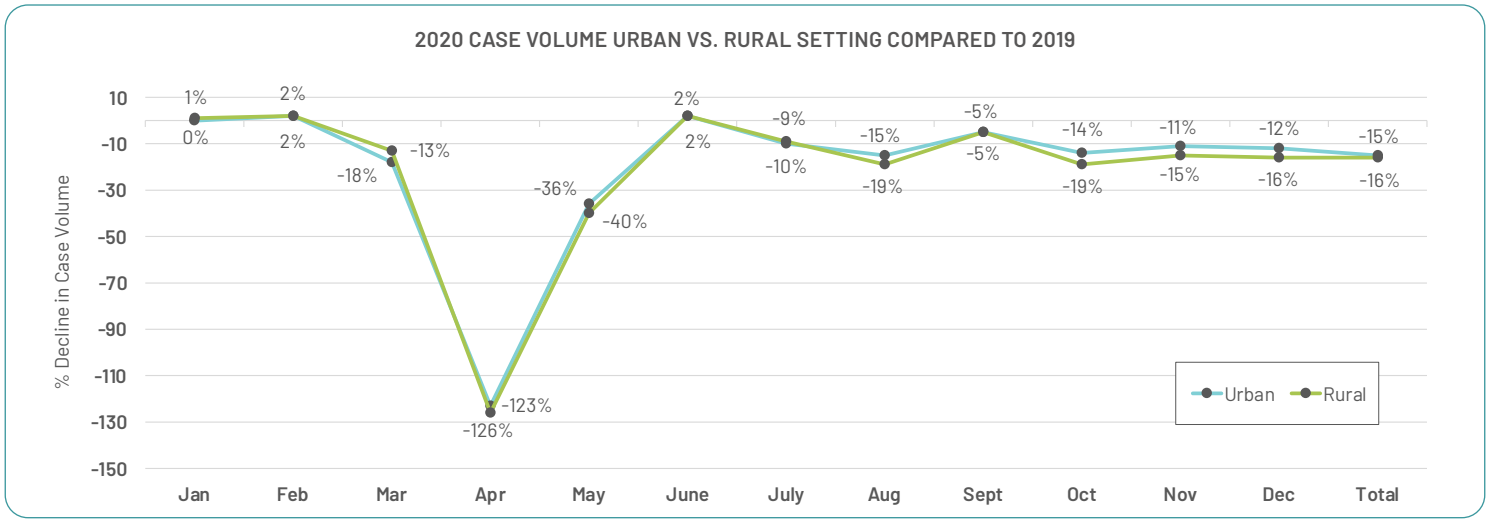


In total, for-profit hospitals completed 6 percent more cases in 2020 when compared to 2019.

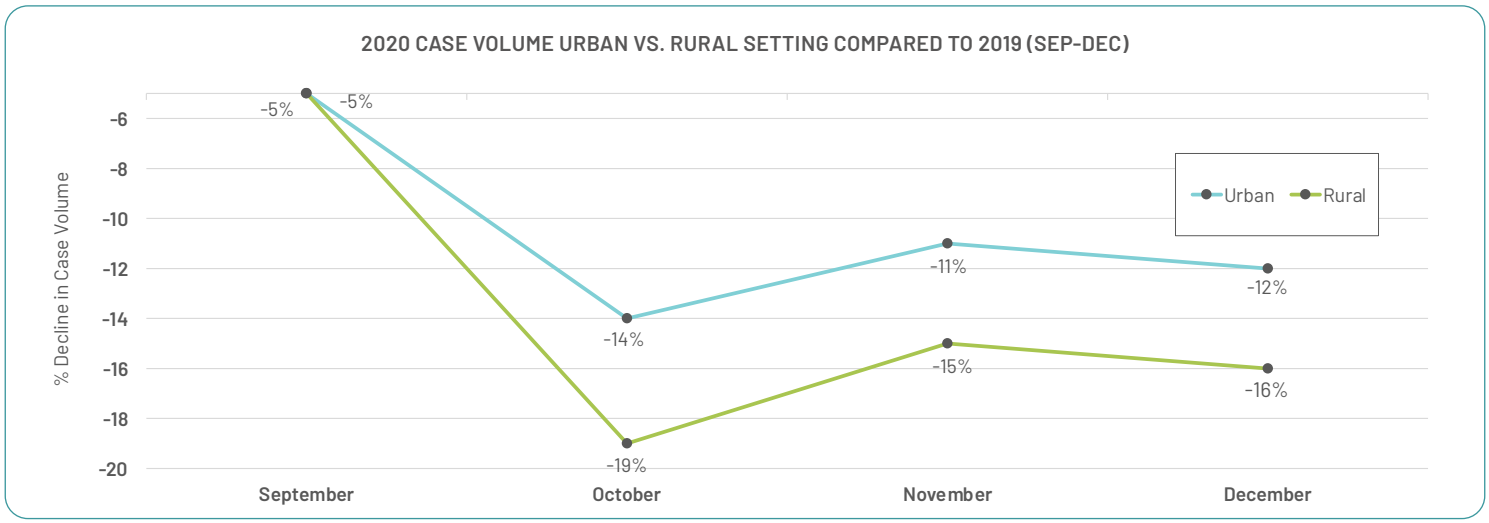
URBAN VS. RURAL SETTING

Rural Facilities Struggle During COVID-19 Winter Surge

Through the first half of the year, rural and urban areas experienced similar trends with declines in case levels around April, and then operating slightly over capacity in June 2020 – when CMS lifted guidelines discouraging surgeries. But then the volume in urban hospitals began bouncing back much quicker than rural hospitals, and **by the end of 2020, rural facilities continued to be further behind their urban counterparts.**



For much of the year, urban and rural hospitals experience similar declines in surgical caseload, including during their peak declines in April.



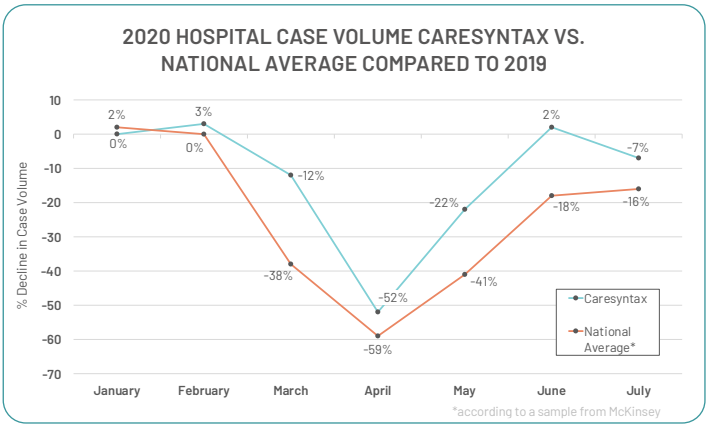
By October, when COVID-19 cases began surge, rural hospitals suffered a more severe drop in caseload compared to urban facilities.

CONCLUSION

Hospitals That Leverage Data Perform Better

COVID-19 had a significant impact on the state of surgery at hospitals across the country in 2020. In total, the U.S. saw a 35 percent reduction in surgical volume just from March to July 2020, contributing to over $200 billion lost.

Importantly, however, our analysis reveals that not all hospitals were equally affected. **Those that embraced innovation in the operating room (OR) through a partnership with Caresyntax retained 16 percent more of their surgical caseload through July 2020 compared to the nationwide average.** With the adoption of Caresyntax's digital surgery platform, these hospitals had the capability to monitor and measure surgical operations, all while collecting valuable, real-world data. By harnessing advanced analytics, Caresyntax's platform generates valuable insights and facilitates work improvement over time through benchmark comparison.



Our technology has allowed hospitals to make critical adjustments throughout the course of the pandemic. With the added technical capabilities of the digital platform, OR personnel were better equipped to track their caseload and make informed operational decisions based on the analytics.

While many hospitals were halting elective surgeries, Caresyntax customers used our digital surgery platform to analyze and alter their traditional workflow, dynamically adjusting caseload and staffing to safely maintain higher surgical volumes and associated revenue — all without having to manually enter data from multiple systems in a spreadsheet. Administrators harnessed this system to identify hidden operational opportunities, such as reducing setup and turnover times, leading to more rapid establishment of pre-COVID surgical case volumes.

While the pandemic has exacerbated many of the problems affecting the industry – limited bed availability, staffing shortages, suboptimal block utilization, employee burnout, and more – it certainly did not create them. But just as these problems existed before the pandemic, they will persist long after the coronavirus threat wanes.

In order to survive health care's rapid post-COVID evolution, key stakeholders must rapidly adapt by adopting proven innovations in the OR. Hospital leaders should embrace new technology, such as Caresyntax, to evaluate and improve surgical outcomes and increase efficiency of OR processes.

METHODOLOGY

Caresyntax's Digital Surgery Platform partners with hospitals, device vendors, and insurers to make surgery safer and smarter. The CX-INSIGHT application provides surgical intelligence using video and big data to hospitals around the world. As part of the new customer implementation and the subsequent customer success cycle, data from the customer is uploaded nightly into CX-INSIGHT for end-user access. The same data, fully identified as per the requirements in our mutual Business Associate Agreement (BAA) and Master Service Agreement (MSA), was used to generate this report.

Aggregated clinical case data collected from Electronic Health Record (EHR), Supply Inventory Management, Surgical Scheduling, and other surgical data collection systems was transmitted from health care facility to Caresyntax by daily, direct, and secure transfer. All data ingested into Caresyntax underwent daily validation to remove errors and address outliers.

Sample size includes 2.5 million distinct, completed surgical procedures collected from January 1, 2018 through December 31, 2020.

Data transmitted includes characteristics about said surgical procedures including date of procedure, procedure type, surgeon specialty, procedure schedule type, and many more dimensions required to implement the CX-INSIGHT application and subsequently this document. Also, non-transmitted data compiled by CX-INSIGHT was used in this analysis such as, but not limited to, urban setting, geographic region, and organization type. Distinct procedural data was aggregated across health care facilities to produce the comparisons, analysis, and conclusions in this document. Health care facilities who did not provide continuous, nightly data for the entire 36-month period were excluded from this document.

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