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Post COVID-19 Hospital Inpatient and Emergency Visit Utilization in the United States: An Update

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Abstract

The COVID-19 pandemic dramatically impacted utilization of healthcare services in the United States. This study incorporates updated data to provide a complete and more up-to-date picture of hospital utilization pre, during, and post COVID-19 and to assess the potential long-term implications of the COVID-19 pandemic on hospital care in the U.S. Our data, drawn from a unique real-time hospital registration platform covering over 900 hospitals in a cross section of states, show an initial steep reduction in both emergency department (ED) visits and total inpatient (IP) admissions during the first half of 2020 (compared to 2019 levels) with rebounding occurring in 2021, but through early 2023 both ED visits and inpatient admissions are still generally lagging behind pre-pandemic levels with only a one state, Washington, having both inpatient admissions and ED visits return to pre-COVID levels. However, the updated data regarding ED visit volumes show that despite a dramatic reduction in utilization of hospital-based inpatient care and ED visits, volume has continued to rebound, with emergency departments nearing, and in some cases, fully returning to pre-COVID levels, suggesting that, at least for the time being, hospital-based emergency services will continue to play a significant, frontline role in meeting the needs of patients with medical emergencies.

Keywords: COVID-19; Hospital Utilization; Emergency Services

Introduction

The COVID-19 pandemic dramatically impacted utilization of healthcare services in the United States. Previous research documented that early in the COVID-19 pandemic, many outpatient visits and elective hospitalizations were delayed, avoided, or canceled, leading to a sharp decline in hospital utilization [1,2]. However, there were expectations that this would create pent-up demand for missed care and that utilization will return to and exceed pre-COVID levels. Other research has suggested that post-COVID utilization would continue to lag citing that the COVID-19 pandemic accelerated the movement of care from high-cost acute and post-acute sites to lower-cost freestanding and non-acute sites, including increased demand for home-based services and virtual care [3].

Study Goals

This study incorporates updated data to provide a more complete picture of hospital utilization pre, during, and post COVID-19 and to assess the potential long -term implications of the COVID-19 pandemic on hospital care in the United States. Study data cover a large sample of hospitals across six states in the United States reporting their hospital inpatient admissions and ED visits covering the period from January 1, 2019, through mid-May, 2023.

Study design and Setting

We drew upon daily hospital registration data to measure total inpatient hospital (IP) admissions and hospital emergency department (ED) visits from more than 900 hospitals. The data covers between 40% to 100% of hospitals in each of the six states (California, Washington, Oregon, Virginia, Massachusetts, Alaska) for the period of January 1, 2019, through May 14, 2023. The study sample includes only hospitals reporting for the entire study period.

Methods

We conducted a descriptive trend analysis using a pre-post design. Data from 2019 serve as the pre-COVID baseline. Total inpatient hospital admissions and ED visits across all study hospitals within each state are calculated for each quarter between January 2019 through December 2022 and monthly in 2023 for each month from January through May 14, 2023. Totals for each quarter from 2020 to 2022 and each month in 2023 are compared to the same month in 2019 with the percentage difference from 2019 calculated. For example, within a given state, total ED visits in the first quarter of 2019 are compared with the total ED visits in the first quarter of 2020 and the percentage difference between 2019 and 2020 is calculated. A negative value indicates that utilization in the post period is below the 2019 baseline period. An overall average difference from pre-COVID levels

is estimated for inpatient admissions and ED visits for all states combined and for each state separately.

Results

For both ED visits and IP volumes (Exhibit 1), there was a steep decline in the first half of 2020, reaching a bottom value in Q2 (-33% and -18% respectively) compared to pre-pandemic levels. Both ED visits and IP volumes rebounded after Q2 of 2020, but with noticeable dips in Q1 of 2021 and 2022 that contributed to continuing reduced ED visits and IP volumes compared to 2019.

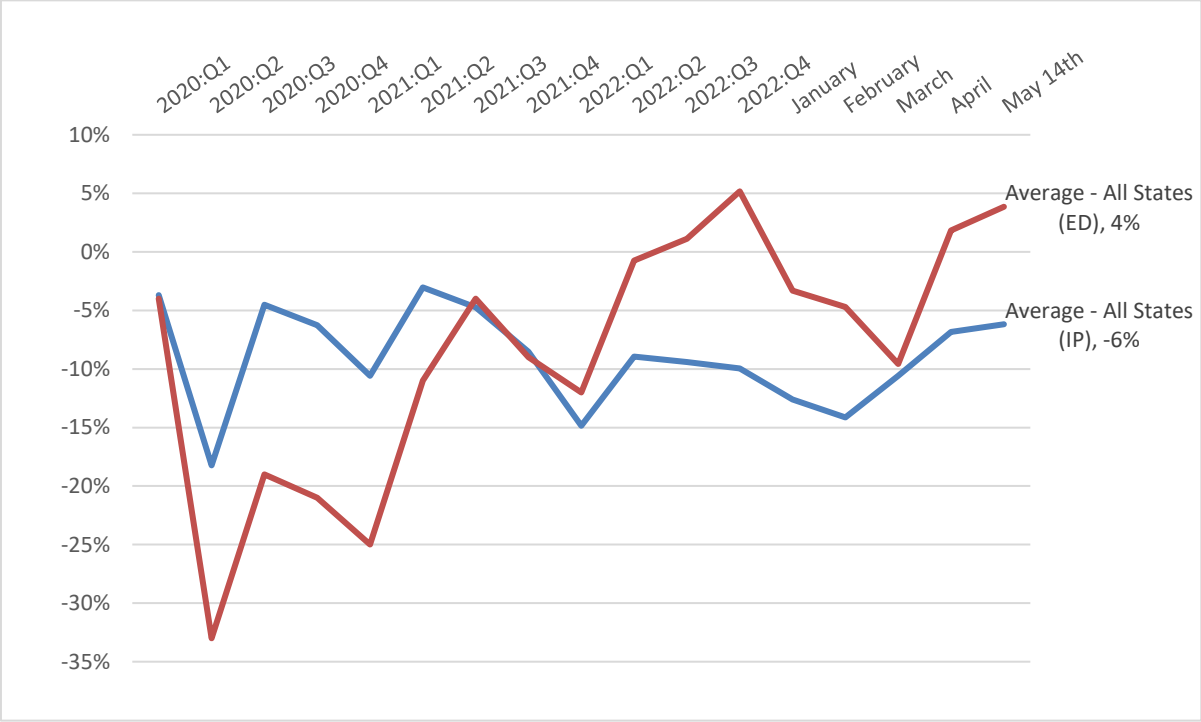

Exhibit 1: Comparison of Inpatient Admission (IP) Volumes and Emergency Department (ED) Visits — % Difference from 2019 Levels, by Quarter 2020-2023.

While the rebound trend has continued, on average, across all states, IP admission volumes (Exhibit 1) have still not returned to pre-COVID 2019 levels – remaining 6% below pre-COVID levels as of May 14th 2023. In contrast, while ED visits also declined substantially relative to 2019 from the start of 2020 to the end of 2021, there is now a more noticeable positive trend in ED visits compared to 2019 levels. This is highlighted by Q3 of 2022 where ED visits exceeded pre-pandemic levels, with a difference of 4% as of May 14, 2023. The data shows that there has been a greater recovery in ED hospital utilization since the start of the COVID-19 pandemic compared to IP volumes.

Exhibit 2 presents data on IP admission volume trends for each state in our sample. For all states, there was an initial steep decline in IP volumes for the first half of 2020, bottoming at an average of -18% compared to 2019 levels. While there was a rebound after Q2 of 2020, winter surges in 2021 and 2022 contributed to reduced IP volumes in all states, with the downturn in Q1 of 2022 nearly mirroring the steep decline in 2020 bottoming at an average of -17% compared to 2019 levels. Only Virginia (during the latter half of 2020) and Alaska (during Q2 of 2021) showed more IP volumes compared to pre-pandemic levels, with all other states showing reduced IP volumes from the start of 2020 to the end of 2022. Overall, IP volumes across all states have not recovered to 2019 levels, with the exception of two states, Washington and Alaska, showing a noticeable recovery in IP volumes since the start of 2023 that have resulted in volumes exceeding pre-COVID levels.

Exhibit 3 presents data on ED visit volume trends for each state in our sample. For all states, there was an initial steep decline in ED visits for the first half of 2020, bottoming at an average of -33% compared to 2019 levels. While ED visits started to rebound after Q2 of 2020, winter surges in 2021 and 2022 contributed to reduced ED visits in all states compared to 2019. ED visits across all states remained below 2019 levels until Q4 of 2022, where hospitals in all of the study states finally reached or exceeded pre-COVID levels (with a 5% increase in ED visits volumes compared to pre-pandemic levels averaged across all states). However, while ED visits declined across most states at the start of 2023, ED visits rebounded again starting in March 2023, with half of the states in the sample now showing ED visit volumes above pre-COVID levels, with Washington and Oregon showing a significantly higher rebound in ED visits volumes in recent months.

Exhibit 4 summarizes and combines data covering the most recent period (2023) for IP and ED volumes compared to

pre-COVID levels. Of all studied states, only Washington has shown a return to pre-pandemic levels for both IP volumes and ED visits from January through May 14, 2023. Oregon has shown a recovery in ED visits relative to 2019 but remains below pre-COVID levels for IP admissions while Alaska shows the opposite trend, with a recovery in IP volumes but not ED visits. For the remaining states of Virginia, Massachusetts, and California; there has been no recovery in either IP volumes or ED visits for 2023. For most states, there remains a steeper reduction in IP volumes compared to ED visits relative to 2019, with the exceptions of California and Alaska. The data shows that there has generally been a greater recovery in ED hospital utilization in comparison to IP hospital admissions since the start of the COVID-19 pandemic.

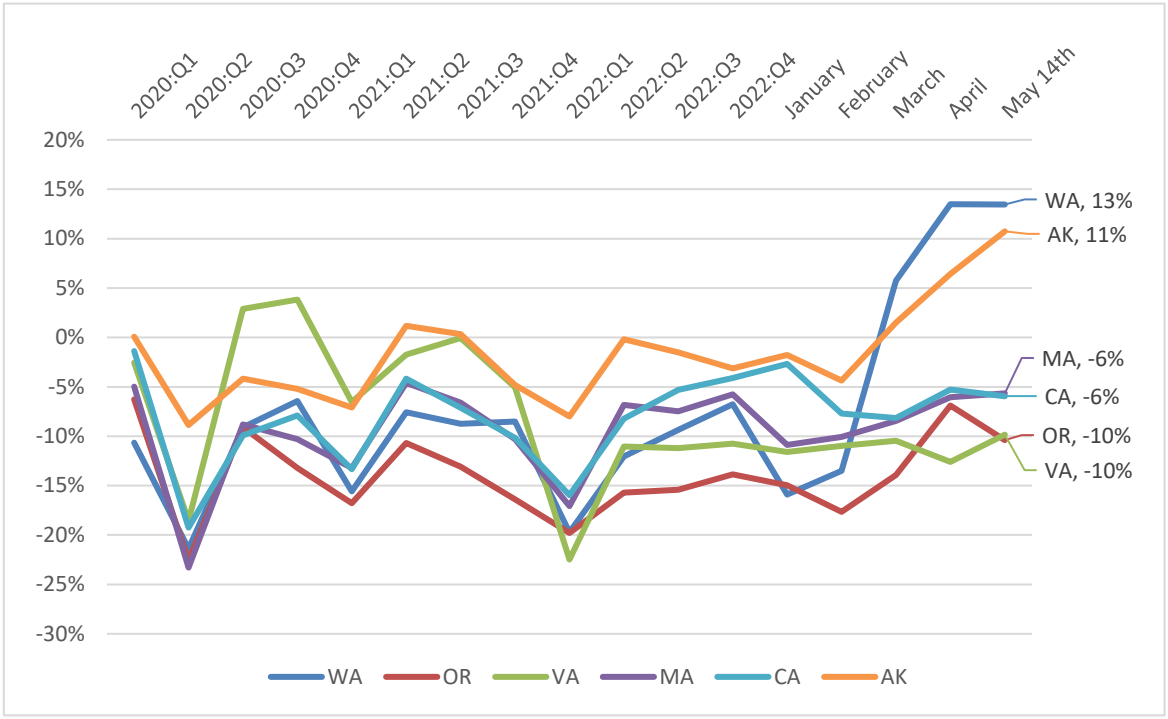

Exhibit 2: Inpatient Admission (IP) Volumes by State — % Difference from 2019 Levels, by Quarter, 2020-2023.

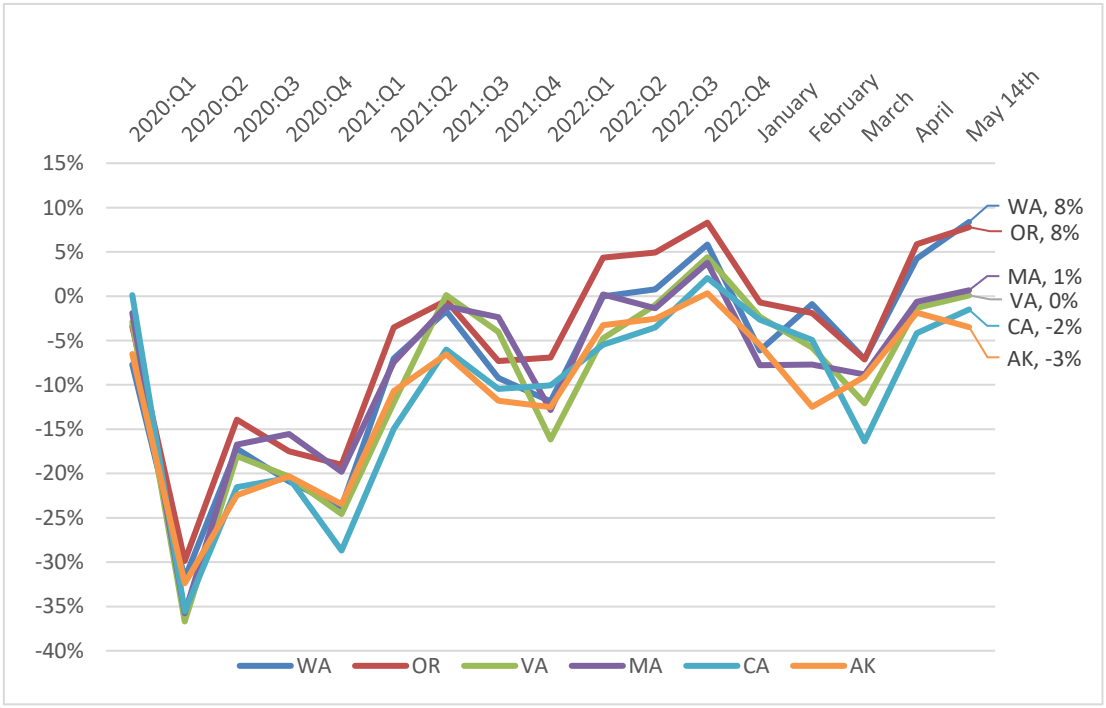

Exhibit 3: Emergency Department (ED) Visits by State — % Difference from 2019 Levels, by Quarter 2020-2023.

State	Inpatient Admission (IP) Volumes for 2023* Relative to Pre-COVID Levels	Emergency Department (ED) Visits for 2023* Relative to Pre-COVID Levels	Return to Pre-COVID Levels
WA	*-1%*	*0%*	*Both*
OR	*-13%*	*1%*	*ED Only*
VA	*-11%*	*-4%*	*Neither*
MA	*-8%*	*-5%*	*Neither*
CA	*-6%*	*-6%*	*Neither*
AK	*3%*	*-6%*	*IP Only*

Exhibit 4: Comparison between Inpatient Admission (IP) Volumes and Emergency Department (ED) Visits by State for 2023 — % Difference from 2019 Levels.

Limitations

It is important to note that, while the data used for this study is based on a large sample (900+ hospitals across six states), it is a convenience sample. However, it does represent a significant proportion of the hospitals and ED visits for these states, ranging from over 40% of hospitals in California to virtually 100% in the other states, and is broadly representative of hospitals nationally, across all states. On the other hand, with respect to data quality and validity, the data is drawn from hospitals that have been participating in the Collective Medical network well before the appearance of COVID-19, with the data systems and reporting used being tested and standardized to create a highly reliable dataset.

Discussion

This shows that there has been a greater recovery in ED hospital utilization since the start of the COVID-19 pandemic compared to IP volumes.

Our data, drawn from a unique real-time hospital registration platform covering 900+ hospitals in a cross section of states, show an initial steep reduction in both ED visits and total inpatient admissions during the first half of 2020 (compared to 2019 levels) with rebound beginning in 2021 and only very recently approaching pre-pandemic levels in five states, and only in the state of Washington, have both inpatient admissions and ED visits returned to pre-COVID levels. In three of our study states, both inpatient admissions and ED visits are still lagging below pre-pandemic levels. Additionally, inpatient admission volumes are lagging more than ED visit volumes in most study states.

With regard to inpatient admissions, a recent study of a large sample of hospitals from California reported that although total inpatient admissions had not yet fully recovered to pre-COVID levels by 2022, total inpatient days had recovered to pre-COVID levels due to an increase in the average length of stay of patients that were being admitted post-COVID [4]. The study suggested that the observed 12.5% longer length of stay post-COVID was due to a combination of a more complex hospital case mix for patients admitted as well as an increase in "administrative" days for patients who are medically ready to be discharged but cannot be discharged to rehabilitation facilities, nursing homes, and other sources of post-acute care due to lingering staff shortages following COVID. Our study is not able to measure changes in case mix and length of stay in other states but it is likely that many other hospitals are experiencing similar trends. It will be important to measure and monitor changes in hospital patient case mix over time to determine whether the effects of COVID have resulted in permanent changes in the utilization of acute care hospitals.

These observed trends have several potential short and long run implications for ED physicians, hospitals, health plans and consumers. It appears, despite the accelerated development of alternative sources of non-hospital-based care such as telehealth and other outpatient services, consumer demand for hospital-based emergency care and ED physician services has almost fully rebounded to pre-pandemic levels [5]. This suggests that these alternatives have not yet been developed as a meaningful substitute for hospital-based emergency outpatient (ED) visits and services.

The continuing lag in return to pre-COVID utilization levels poses several challenges and questions. One major challenge is the financial and economic impacts on providers and ultimately, on consumers as well. For example, it has been widely reported that input prices that providers must pay for human resources and supplies have grown substantially and are continuing to grow at annual rates above pre-COVID levels [6]. This trend will put pressure on providers to increase cost-efficiencies and increase prices. It remains to be seen how this mix of adaptations will play out in the coming months and years. One concern is that providers, especially those within large systems and those with local market power, will impose significant price increases on patients covered by commercial health insurance. Significant price increases would exacerbate the already significant problem of health care affordability in the US, resulting in increased calls for government oversight and regulation.

Conclusion

The most up-to-date data shows that despite a dramatic reduction in utilization of hospital-based inpatient care and ED visits, volume has continued to rebound and is nearing, and in some cases, fully returning to pre-COVID levels, suggesting that, at least for the time being, hospital-based emergency services will continue to play a significant, frontline role in meeting the needs of patients with medical emergencies. Overall, IP volumes across all states have not recovered to 2019 levels, with only Washington and Alaska showing a noticeable recovery in IP volumes since the start of 2023. Our data may provide insight into the role of hospital-based emergency services. Hospitals are highly dependent on the activity generated by their emergency departments to support the operation of the hospital. EDs have become the main driver of total hospital revenues – both on an outpatient basis (ED treat and release visits) and as inpatients, as the majority of inpatients are admitted to hospitals through their ED's. Our data shows that despite a COVID-19 induced dramatic reduction in utilization of hospital-based ED visits, the volume has now headed towards pre-COVID levels, suggesting that, at least for the time being, hospital-based emergency services will continue to play a key front-line role in meeting the needs of patients with medical emergencies.

Conflict of Interest

None. This research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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