Patient Severity Levels Increase Among Non-COVID-19 Hospitalized Patients

Hospitals treat a wide range of patient illnesses. However, the severity of patients' disorders was directly and indirectly aggravated by the COVID-19 pandemic. COVID-19 infections had detrimental effects for many residents, especially those with underlying chronic conditions. Stay-at-home orders and fears of contracting the virus also led to delays in healthcare, potentially causing some conditions to worsen without earlier forms of intervention[1-4].

As a result, the healthcare industry treated – and potentially continues to treat – patients presenting with more severe health conditions compared with prior years. NJHA's Center for Health Analytics, Research and Transformation (CHART) examined the extent to which the severity of patients' illnesses during the pandemic years changed and whether there is any indication that it may return to pre-pandemic levels. This report compliments CHART's continuing effort in examining the pandemic's impact on New Jersey's population (https://www.njha.com/chart).

Data and Methodology

Hospitalized patients are assigned an All-Patient Refined Diagnosis Related Group (APR-DRG) which includes a severity level related to their illness – either 1 (mild severity), 2 (moderate severity), 3 (major severity), or 4 (extreme severity)[5]. Hospital Discharge data for 2022 was also preliminary at the time of this paper.

Severity of Illness Among Inpatient Discharges

COVID-19 vaccinations and boosters – along with improvements in treatments – have greatly helped to improve outcomes of those infected with COVID-19 and subsequent variants[6-8]. While the severity of illness among COVID-19-positive patients may be reversing to pre-pandemic levels, the majority of the hospitalized patient population (i.e., non-COVID-19 patients) are presenting to acute-care hospitals with potentially more critical illnesses.

> In 2019, approximately 34.6 percent of non-COVID inpatients had illnesses that were classified as either major or extreme. In 2022, this proportion increased to 41.7 (a 21 percent increase compared with 2019).

Compared with the early months of the pandemic, New Jersey Hospital Discharge data suggest that the proportion of hospitalized non-COVID-19 inpatients classified with a major or extreme severity increased, among all major racial/ethnic groups. In 2019, approximately 34.6 percent of non-COVID inpatients had illnesses that were classified as either major or extreme. In 2022, this proportion increased to 41.7 (a 21 percent increase compared with 2019) (Figure 1). The percentage of non-COVID-19 hospitalized patients whose illness was classified as a minor or moderate severity declined from 65.3 percent in 2019 to 58.3 percent in 2022 (Figure 1).

The reverse trends were seen among COVID-19-positive inpatients. Approximately 17.9 percent of COVID-19-positive inpatients had a minor or moderate severity of illness in 2020 (Figure 2). However, this percentage increased to 55.2 in 2022. In 2020, 82.1 percent of COVID-19-positive inpatients had a major or extreme severity, decreasing by approximately 45 percent to 44.8 percent in 2022 (Figure 2).

The data also showed that the average ages of non-COVID-19 inpatients in nearly all severity groups – with the exception of minor severity group – have been decreasing, which may suggest that patients are potentially having medical issues at earlier ages. For example, among moderate severity non-COVID-19 inpatients, the average age was 54 years in 2019; 52 years in 2020 and 2021; and 50 years in 2022.

Compared with Black and White inpatients, those in other racial/ethnic groups were generally hospitalized with less severe illnesses. In 2022, however, this was no longer the case as those other racial/ethnic groups saw an increase in the proportion of non-COVID-19 inpatients with either major or extreme illnesses (Figure 3 & 4). For example, approximately 19.5 percent of Hispanic non-COVID-19 inpatients had a major illness in 2019 compared with 28.0 percent in 2022 (a 44 percent increase); while the corresponding percentages for White inpatients were 28.3 and 30.2 (a 7 percent increase). All racial/ethnic groups saw an increase in the percentage of non-COVID-19 inpatients with an extreme illness in 2022 compared with prior years. These increases, however, were higher for non-Black and non-White patients. (Figure 4).
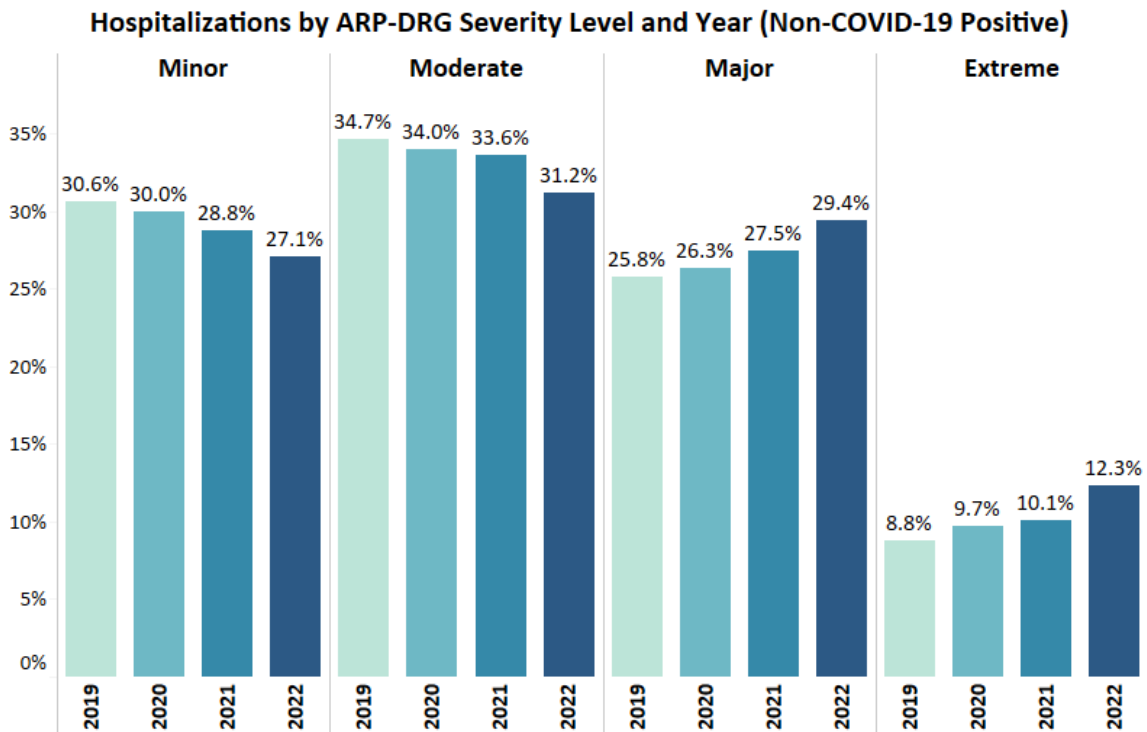
Figure 1

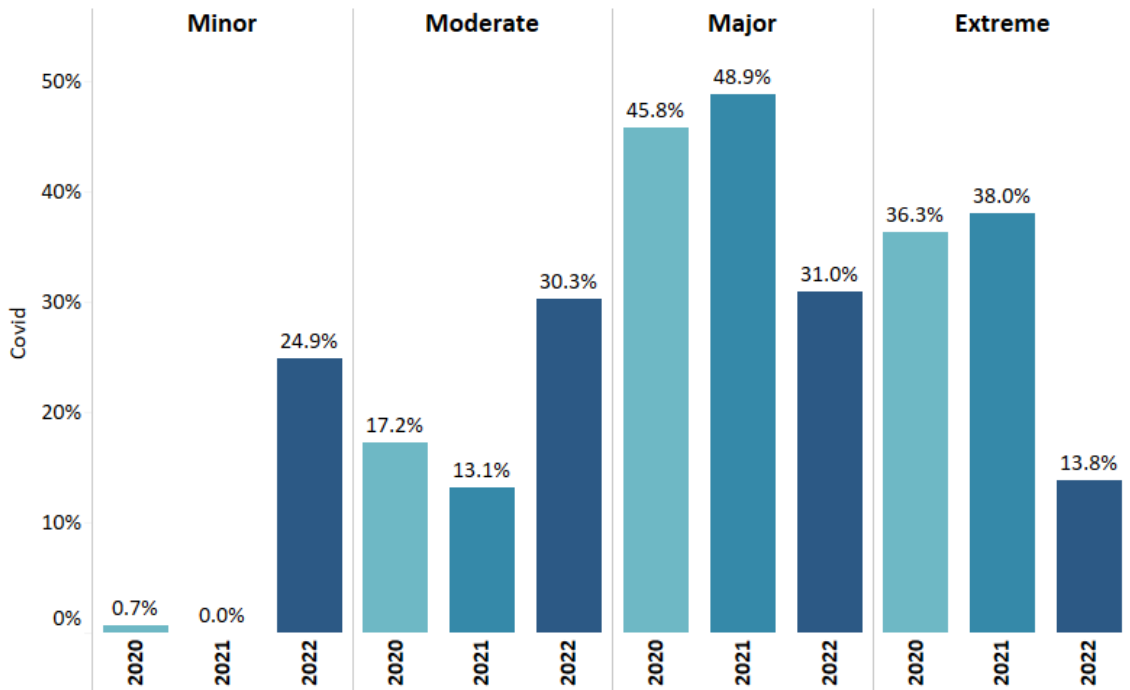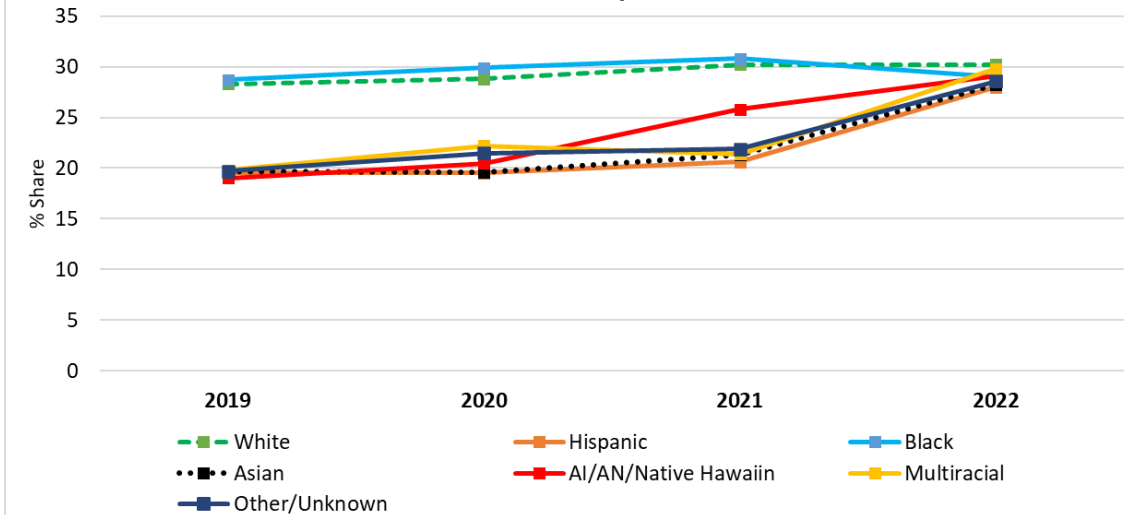**Hospitalizations by ARP-DRG Severity Level and Year (Non-COVID-19 Positive)**

Figure 2

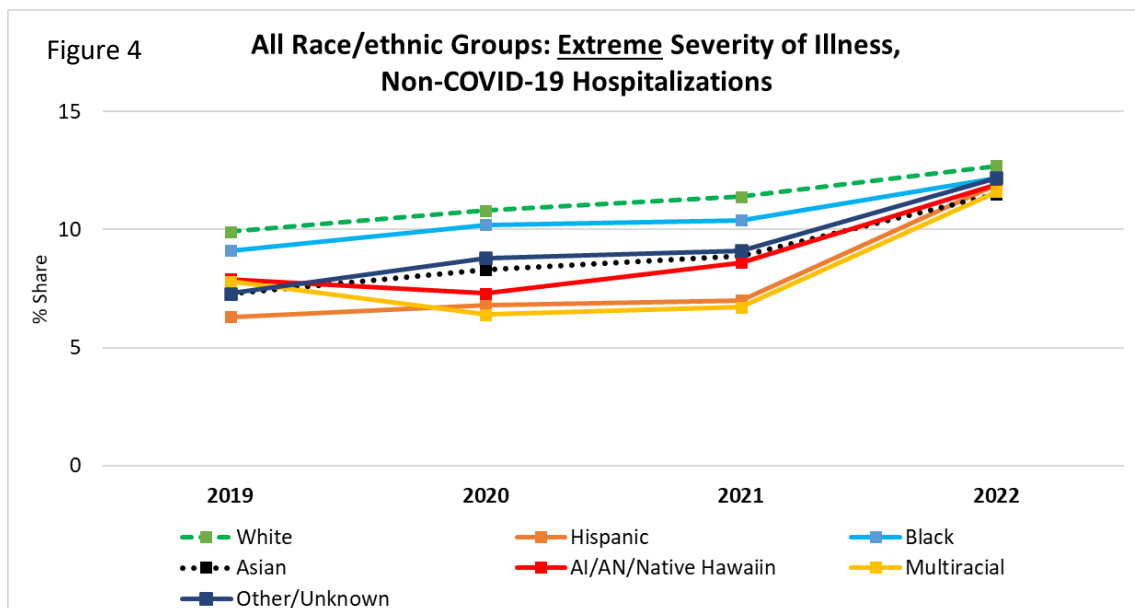**Hospitalizations by ARP-DRG Severity Level and Year (COVID-19 Positive)**

Figure 3

All Race/ethnic Groups: <u>Major</u> Severity of Illness, Non-COVID-19 Hospitalizations

Figure 4

All Race/ethnic Groups: <u>Extreme</u> Severity of Illness, Non-COVID-19 Hospitalizations

Legend: White, Hispanic, Black, Asian, AI/AN/Native Hawaiin, Multiracial, Other/Unknown

Discussion

As expected, a larger share of COVID-19-positive inpatients had a major or extreme severity during the early pandemic years (2020-2021), after which these proportions declined and more closely aligned with those of non-COVID-19 patients. While such improvements may be largely attributed to widespread vaccination efforts, New Jersey hospitals led the way in implementing early forms of treatment, safety, and regulatory protocols around COVID-19 that helped to improve patient outcomes[9]. However, in 2022, the proportion of non-COVID-19 inpatients with a major or extreme severity had slightly surpassed that of COVID-19-positive inpatients (42.7 versus 42.1 percent, respectively). Based on these findings, New Jersey's acute-care hospitals may continue to treat a more severely ill patient population, overall.

The indirect impacts of COVID-19 – particularly delays in or avoidance of medical care – may have contributed to more critical or advanced disorders among the hospitalized population in New Jersey. For example, a prior report from CHART found that there were substantial declines in inpatient volumes for potentially life-threatening conditions such as heart attacks, stokes, and heart failure in 2020 after the start of the pandemic[10].

This paper also highlights differences in severity of illness by race/ethnic groups. While Black and White inpatients were more likely to be hospitalized with either major or extreme illnesses prior to 2022, other racial/ethnic groups are now seeing similar shares of inpatients with more severe illnesses. Furthermore, with the exception of those in the minor severity category, the average age of patients has generally decreased among non-COVID-19 inpatients. This is concerning as a younger inpatient population may mean that individuals are potentially acquiring morbidities earlier (i.e., they have fewer healthy years of life and spend a lesser amount of time in full health).

These trends in severity levels – overall and by age and race/ethnicity – among non-COVID-19 patients suggest that the pandemic may have a lasting effect on New Jersey's patient population case mix in future years. The emergence of COVID-19 has impacted hospitalized patient care in many ways. Assuming the coronavirus will continue to exist in an endemic phase for years to come, hospitals will need to adjust to a non-COVID-19 population that is more complex – with potentially more severe illnesses – than pre-COVID-19 years.

Patients with greater severity and higher acuity tend to have longer lengths of stay and consume additional resources. Payments from governmental and commercial insurers should be adjusted to account for the added expense burden this unanticipated increase in patient severity is creating.

Footnotes

1. [JAMA Health Forum – Health Policy, Health Care Reform, Health Affairs | JAMA Health Forum | JAMA Network](#)
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9254505/
3. https://www.cdc.gov/mmwr/volumes/69/wr/mm6936a4.htm
4. https://www.healthaffairs.org/doi/10.1377/hlthaff.2022.00509
5. 3M™ All Patient Refined Diagnosis Related Groups (APR DRG): Methodology Overview https://apps.3mhis.com/docs/Groupers/All_Patient_Refined_DRG/Methodology_overview_GRP041/grp041_aprdrg_meth_overview.pdf, Software version 40.0 October 2022
6. https://jamanetwork.com/journals/jama/fullarticle/2786039
7. https://www.cdc.gov/mmwr/volumes/71/wr/mm7137a4.htm
8. https://www.medrxiv.org/content/10.1101/2022.07.01.22277137v1.full
9. https://www.njha.com/chart/special/pandemic/
10. https://www.njha.com/media/673250/Death-at-Home-Bulletin-12-6-21.pdf

Visit www.njha.com/chart for additional resources.