

COVID-19 Hospitalizations Skew Younger Post-Vaccine and Post-Delta

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Abstract: Patients age 65+ make up a smaller proportion of COVID hospitalizations after the vaccine. The Delta variant surge has increased impact on children.

We studied how vaccine availability and the emergence of variants of COVID-19 have affected different age groups of patients hospitalized with COVID-19. The data show that the distribution of COVID hospitalizations among different age groups has remained relatively stable since the start of the pandemic. However, there are two noteworthy trends:

- After the vaccine became available, the proportion of patients in the 65+ age group decreased to make up a considerably smaller percentage of overall COVID-19 hospitalizations.
- During the Delta variant surge, the percentage of hospitalizations for children that were related to COVID-19 increased.

In Figure 1, we show that patients in the 65+ age group have always made up the highest percentage of COVID-19 hospitalizations. However, since the first Emergency Use Authorization (EUA) was issued for the vaccine on December 11, 2020, the proportion of COVID-19 hospitalizations made up by this age group decreased from 57% the week of December 20, 2020 to 31% the week of July 4, 2021 then rose to 42% the week of October 17, 2021. Figure 1 also shows how these proportions changed after the CDC classified the Delta variant as a Variant of Concern (VOC) on June 15, 2021.¹

Figure 1: Percentage of COVID-19 Hospitalizations by Age Group

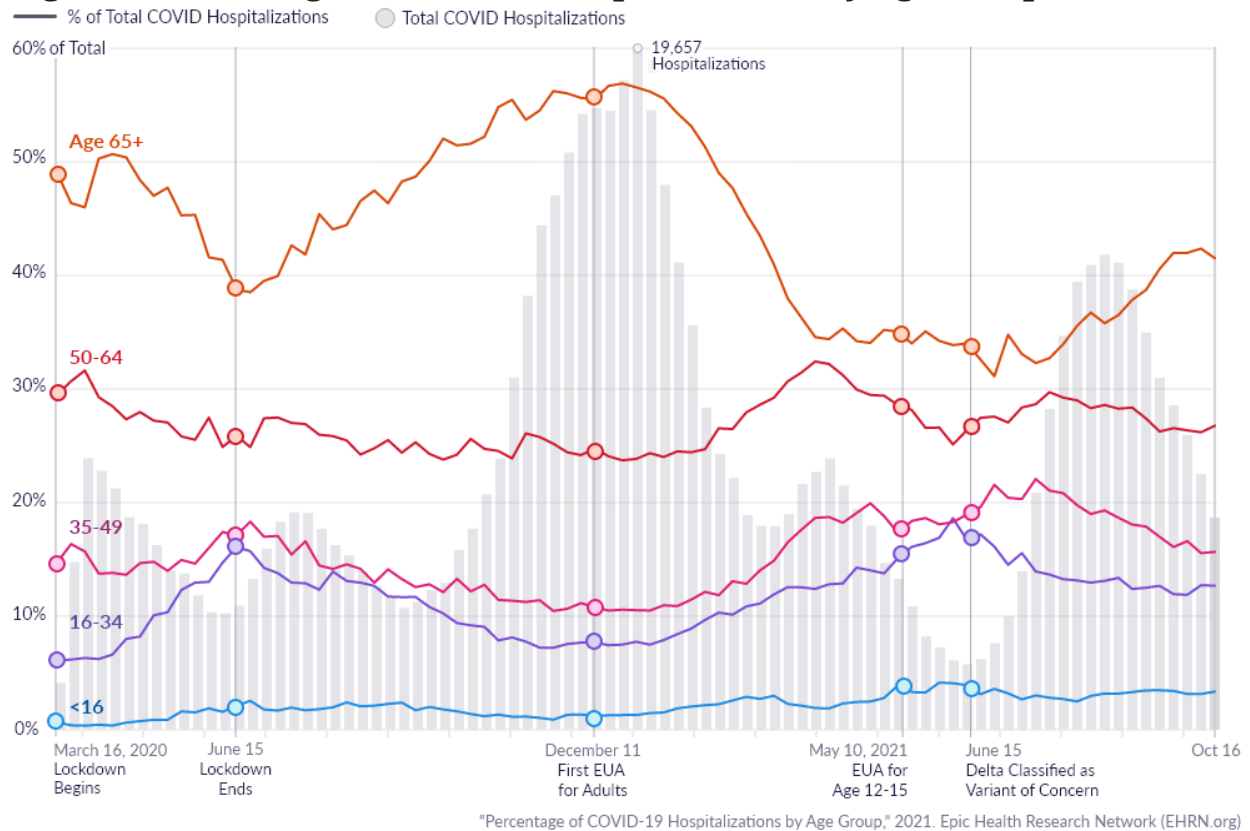


Figure 1: Distribution of COVID-19 hospitalizations by age group from March 2020 through October 2021. Each line represents a proportion of the weekly COVID hospitalizations. Weekly COVID hospitalizations for all age groups are represented by the gray shaded areas.

While pediatric patients represent a very small percentage of overall COVID-19 hospitalizations (just over 3% for September and October), we wanted to see whether the vaccine or Delta variant surge impacted these populations. Figure 2 shows the percentage of overall hospitalizations for each pediatric age group that were COVID-related.

Figure 2: Percentage of Hospitalizations Within Pediatric Age Groups That Are Related to COVID

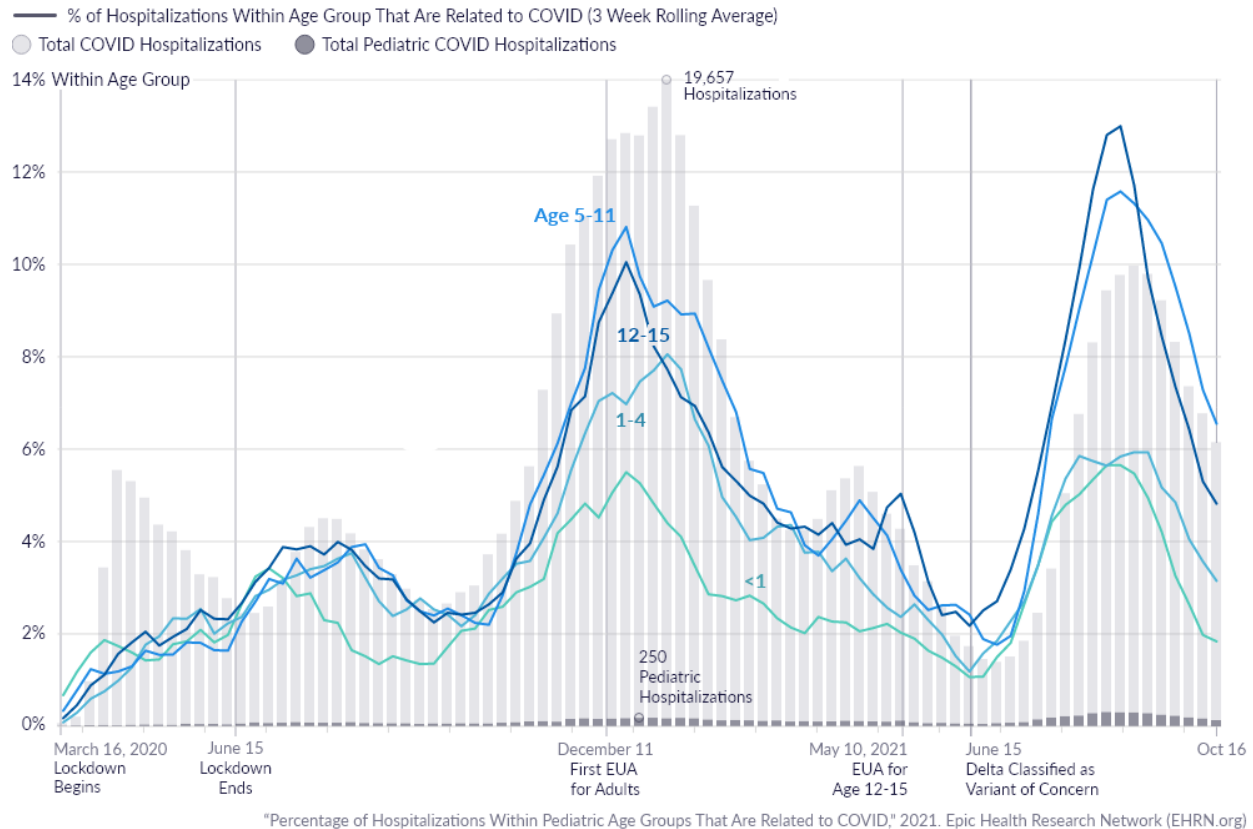


Figure 2: The percentage of weekly hospitalizations across different pediatric age groups that were COVID-related from March 2020 through October 2021. For the under 1 year age group, we excluded birth admissions from the denominator. Weekly COVID hospitalizations for adult and pediatric age groups are represented by the light gray shaded areas. Weekly numbers of COVID hospitalizations for only pediatric age groups are represented by the dark gray shaded areas.

The data show that a higher percentage of hospitalizations of school-age children (5-11 and 12-15 age ranges) were COVID-related during the Delta variant surge than during previous surges of the virus.

These data come from Cosmos, a HIPAA-Limited Data Set of more than 120 million patients from 136 Epic organizations including 705 hospitals and 12,172 clinics, serving patients in all 50 states. This study was completed by two teams, composed of clinicians and data scientists, that independently acquired and analyzed data. Both teams were involved in the interpretation of results and drafting of this brief. Overall, the two teams came to similar conclusions.

References

1. Centers for Disease Control and Prevention. (2021, April 12). [06/15/2021: Lab Advisory: CDC Classifies SARS-CoV-2 Variant B.1.617.2 \(Delta\) a Variant of Concern](#). Centers for Disease Control and Prevention. Retrieved October 13, 2021.

Data Definitions

Term	Definition
Weekly hospitalizations	The number of hospitalizations with an admission date during a given week.
COVID-19 hospitalization	A hospital admission is considered a COVID-19 hospitalization if the earlier of a positive lab result or COVID diagnosis is during the hospitalization or within 41 days before the admission date.
Birth admissions	Admissions that a clinical or billing diagnosis from the following list: Liveborn infants according to place of birth and type of delivery (ICD-10-CM: Z38.*), Twins, one liveborn and one stillborn (ICD-10-CM: Z37.3), Single liveborn infant, born in hospital (ICD-10-CM: Z38.0), Single liveborn infant, delivered vaginally(ICD-10-CM: Z38.00), Twin liveborn infant, born outside hospital (ICD-10-CM: Z38.4), Twin liveborn infant, delivered by cesarean (ICD-10-CM: Z38.31), Twin liveborn infant, delivered vaginally (ICD-10-CM: Z38.30), Quadruplet liveborn infant, delivered vaginally (ICD-10-CM: Z38.63), Quintuplet liveborn infant, delivered vaginally (ICD-10-CM: Z38.65), Single liveborn infant, born outside hospital (ICD-10-CM: Z38.1), Single liveborn infant, delivered by cesarean (ICD-10-CM: Z38.01), Triplet liveborn infant, delivered by cesarean (ICD-10-CM: Z38.62), Quintuplet liveborn infant, delivered by cesarean (ICD-10-CM: Z38.66), Quadruplet liveborn infant, delivered by cesarean (ICD-10-CM: Z38.64), Triplet liveborn infant, delivered vaginally (ICD-10-CM: Z38.61), Other multiple liveborn infant, born outside hospital (ICD-10-CM: Z38.7), Other multiple liveborn infant, delivered by cesarean (ICD-10-CM: Z38.69), Other multiple liveborn infant, delivered vaginally (ICD-10-CM: Z38.68), Twin liveborn infant, unspecified as to place of birth (ICD-10-CM: Z38.5), Twins, both liveborn (ICD-10-CM: Z37.2), Other multiple liveborn infant, unspecified as to place of birth (ICD-10-CM: Z38.8), Single liveborn infant, unspecified as to place of birth (ICD-10-CM: Z38.2), Triplets, all liveborn (ICD-10-CM: Z37.51), Triplets, some liveborn (ICD-10-CM: Z37.61), Quadruplets, all liveborn (ICD-10-CM: Z37.52), Quadruplets, some liveborn (ICD-10-CM: Z37.62), Quintuplets, all liveborn (ICD-10-CM: Z37.53), Other multiple births, all liveborn (ICD-10-CM: Z37.59), Other multiple births, some liveborn (ICD-10-CM: Z37.69), Multiple births, unspecified, all liveborn (ICD-10-CM: Z37.50), Multiple births, unspecified, some liveborn (ICD-10-CM: Z37.60)