

Comparison of COVID-19 Inpatient Burden in Hospitalized Children Age < 5 Years, by SARS-CoV-2 Variant

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INTRODUCTION

- COVID-19 disease severity has fluctuated with emergence of variants.
- Although Omicron led to surges in infection and hospitalization, some studies suggest lesser disease severity in adults infected with Omicron vs. Delta and pre-Delta variants.
- Less is known about COVID-19 clinical disease severity in children by SARS-CoV-2 variant.

OBJECTIVE

To evaluate clinical disease severity in children < 5 years of age hospitalized for COVID-19 during different periods of SARS-CoV-2 variant predominance in the United States.

METHODS

- We used PINC AI Healthcare Data, a hospital-based real world data source that includes 25% of annual US hospitalizations, primarily from geographically diverse non-profit, non-governmental, community, teaching hospitals and health systems from rural and urban areas.
 - Children < 5 years of age hospitalized for COVID-19 (ICD-10-CM code U07.1).
 - Stratified by period of variant predominance:

April 2021

July 2021

January 2022

Pre-Delta

Delta

Omicron

June 2021

December 2021

July 2023
 - Continuous variables are presented as medians.
 - P-values for 3-way comparisons were estimated using χ^2 tests for proportions and the Kruskal-Wallis method for medians (IQR).
- *PINC AI: Premier Inc. Artificial Intelligence

RESULTS

Pediatric COVID-19 Hospitalizations by Variant Period

Total n=10,316

- In this cohort, there were 3 times as many hospitalizations during periods of Omicron predominance than pre-Delta and Delta combined.

Demographics

Sex	Pre-Delta	Delta	Omicron	Ethnicity	Pre-Delta	Delta	Omicron
Female	41%	46%	42%	Hispanic	27%	25%	28%
Male	59%	54%	58%	Non-Hispanic	62%	66%	61%
				Unknown	11%	9%	11%

Race Distribution

COVID-19 Hospitalizations (%), By Age Group and Variant Period

Age Group	Pre-Delta	Delta	Omicron
< 1 year	46%	56%	56%
1 year	24%	18%	19%
2 years	12%	11%	10%
3 years	11%	8%	8%
4 years	6%	7%	7%

- For each variant period, most COVID-19 hospitalizations were in children ≤1 year of age.

Comorbid Conditions*

	Pre-Delta	Delta	Omicron
No underlying conditions	59%	69%	68%
Asthma/reactive airway diseases	8%	7%	8%
Chronic kidney disease	4%	3%	3%
Neurological disease	7%	6%	7%
Primary immunodeficiency	4%	4%	4%
Rheumatologic/inflammatory	9%	4%	3%

* Top 5 co-morbidities across variant waves

Clinical Outcomes

	Pre-Delta	Delta	Omicron	p-value
Received supplemental O ₂	13%	16%	18%	0.06
Hospitalization length of stay	2 days	2 days	2 days	>0.99
Admitted to intensive care unit (ICU)	20%	21%	21%	0.77
ICU length of stay	1 day	2 days	1 day	0.37
Required invasive mechanical ventilation	6%	8%	7%	0.35
In-Hospital Death*	0.7%	0.9%	0.4%	--

* A p-value was not calculated for mortality given there were fewer than 5 events in one group

CONCLUSIONS

For each variant predominance period, COVID-19 had significant morbidity and mortality in children < 5 years of age. Most children had no-underlying medical conditions.

From April 2021 - July 2023, children < 5 years of age hospitalized for COVID-19 had similar demographics, underlying medical conditions and age distribution.

Children < 1 year of age were disproportionately affected with the highest risk of COVID-19 associated hospitalization across each variant period.

The majority (75%) of COVID-19 hospitalizations in children < 5 years of age occurred during the Omicron era. Similar disease severity was observed during pre-Delta, Delta and Omicron periods. In-hospital death rates were highest with Delta.

In the pre-Delta era, black children were hospitalized at a disproportion rate, compared with white, Asian and Hispanic children. However, for the Delta and Omicron eras, the racial and ethnic distribution was more consistent with racial and ethnic populations of the US.

POTENTIAL IMPLICATIONS

These results highlight the need for improved COVID-19 surveillance in the pediatric population and continued preventative measures to prevent SARS-CoV-2 infection in children, including routine immunization.

Disclosure: KMA, MR, MDM and SMCL are Pfizer Inc. employees and may hold stock and/or stock options. At the time of his involvement in this work, TMP was a Pfizer Inc. employee and may hold stock or stock options.

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