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

Kathleen M. Andersen, PhD, MSc; Thomas M. Porter, MPH; Maya Reimbaeva, MS; Maria D. McColgan, MD; Santiago M.C. Lopez, MD

INTRODUCTION

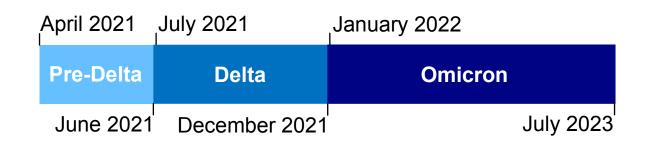
- COVID-19 disease severity has fluctuated with emergence of variants.
- Although Omicron led to surges in infection and hospitalization, some studies suggest lesser disease severity in adults infected with Omicron vs. Delta and pre-Delta variants.
- Less is known about COVID-19 clinical disease severity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



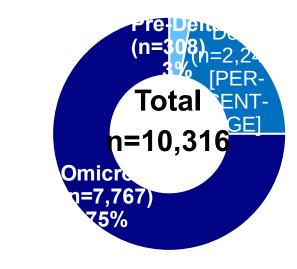
- Continuous variables are presented as medians.
- P-values for 3-way comparisons were estimated using χ2 tests for proportions and the Kruskal-Wallis method for medians (IQR).

*PINC AI: Premier Inc. Artificial Intelligence

RESULTS

Omicron

Pediatric COVID-19 Hospitalizations by Variant Period



Female

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

Demographics

Ethnicity

Hispanic

	/ 0	, ,	/ 0			, , ,					
Male	59%	54 %	58%	Non-Hispa	nic 62	2%	66%	61%			
				Unknown	11	1%	9%	11%			
	Race Distribution										
							AsianBlack				
							Other				
							Unkn	own			
							■ White	:			
Pre-Delta		Delta		Omicron		_					
COVID-19	9 Hospi	italiza	itions (%)), By Age	Group an	nd Va	riant Pe	riod			
■4 years	6% 11%		7% 8%		7% 8%						
■3 years	12%		119		10%	 For each variar 		variant			
2 years	24%		18 ⁰	%	19%		period, n	nost			
■1 year	24 /0						COVID-19 hospitalizations				
< 1 year							were in c	children			
	46%		56°	%	56%		≤1 year o	ot age.			
	Pre-De	lta	Del	ta	Omicron						

- Across all variant predominance periods, the majority of children < 5 years of age hospitalized for COVID-19 had no underlying medical conditions.
- Other than for inflammatory conditions, the prevalence of pre-existing health conditions was generally similar across each variant wave.

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							

- For each inpatient outcome of interest, there were no significant differences across the variants.
- In-hospital death rate was higher during the Delta era than pre-Delta or Omicron eras, however, statistical significance could not be estimated due to the low numbers.

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 disproportionally 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.

Contact

Kathleen (Kayte) Andersen
Global Scientific Affairs Director
COVID-19 and Influenza
kathleen.andersen@pfizer.com

