CENTER FOR SURVEILLANCE, EPIDEMIOLOGY, AND LABORATORY SERVICES

Change in Incidence of Multisystem Inflammatory Syndrome in Children Across the COVID-19 Pandemic in Chicago — March 2020–July 2022

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BACKGROUND

- Multisystem inflammatory syndrome in children (MIS-C) is a severe complication of SARS-CoV-2 infection in children.
- Waves of MIS-C follow peaks in COVID-19 incidence by 2-5 weeks. Fewer cases of MIS-C occurred after the Delta-predominant period compared to early waves of the pandemic.
- Objective: to analyze the ratio of MIS-C to pediatric COVID-19 hospitalizations by period of variant predominance from March 2020 – July 2022 to evaluate differences by variant.

METHODS

- MIS-C in Chicago residents was reported using the standard CDC MIS-C case report form; pediatric COVID-19 hospitalizations were reported through required disease surveillance.
- Four periods of COVID-19 infection and MIS-C onset were defined by associated variant predominance (Variant predominance defined by variant with ≥50% on first date of surveillance week; date ranges for MIS-C were defined as starting 21 days after the COVID-19 period began)
  - Original lineage: March 5, 2020–April 3, 2021
  - Alpha: April 4, 2021–July 16, 2021
  - Delta: July 17, 2021–December 14, 2021
  - Omicron: December 15, 2021–July 10, 2022
- Ratios of MIS-C cases/100 corresponding pediatric COVID-19 hospitalizations (<21 years) for each variant period were calculated. Hospitalizations were selected rather than case counts, which are more subject to biases inherent in disease testing. (Figure 1)
- Proportions of key clinical outcomes as markers of MIS-C disease severity were calculated for each period. (Figure 2)

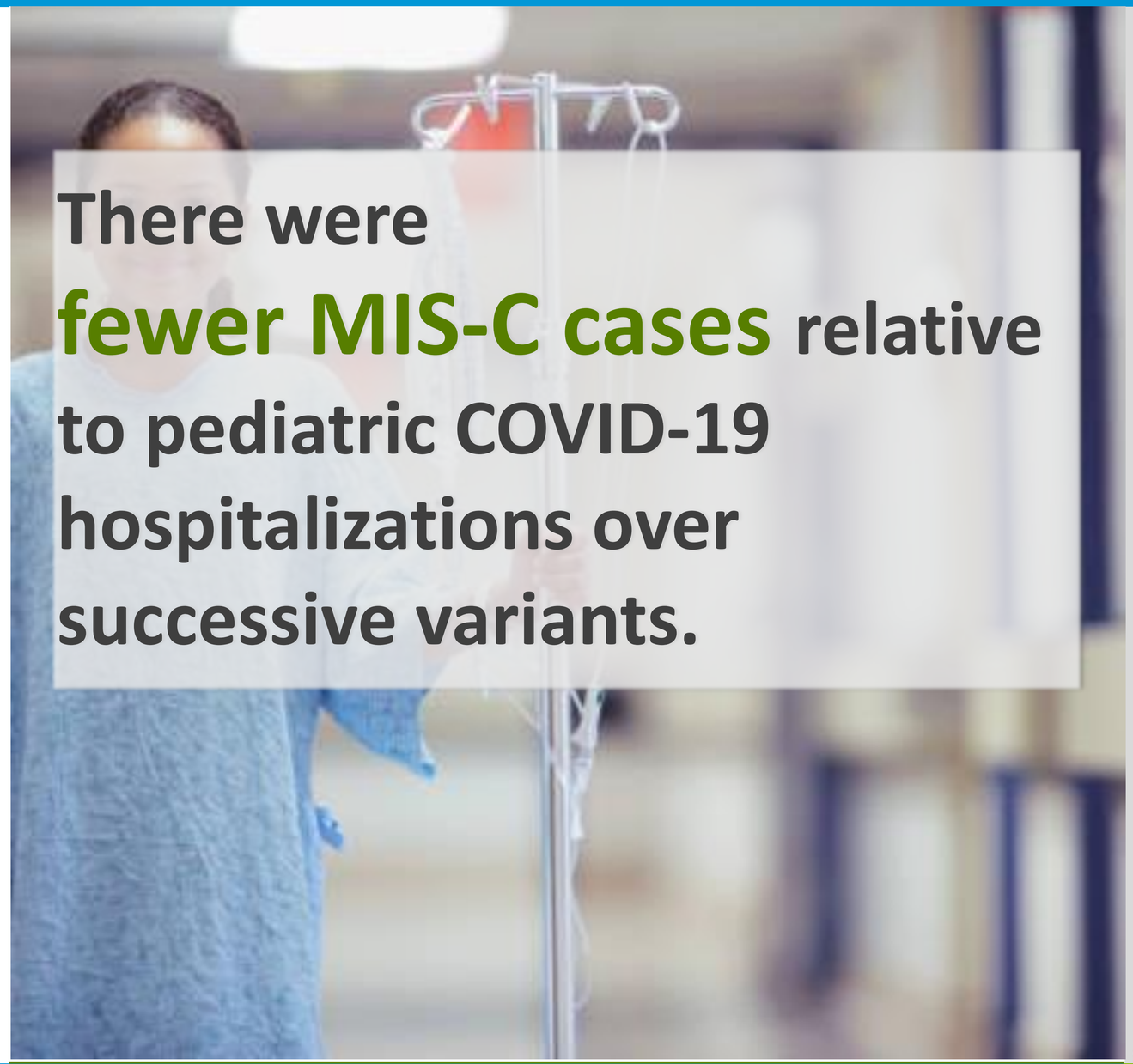
FINDINGS

- A decrease was observed in the ratio of MIS-C cases to pediatric hospitalizations across time and periods of variant predominance. Demographics and features of clinical severity were similar across periods.

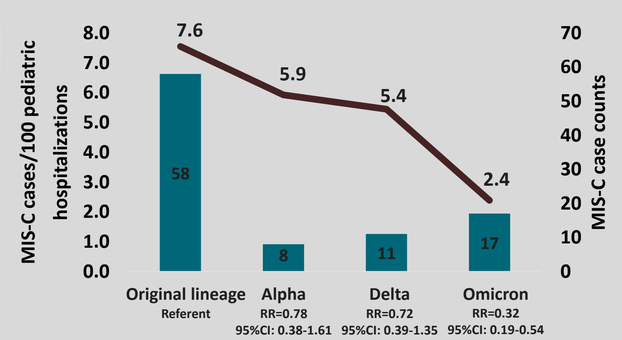
Table: MIS-C case demographics by predominant variant periods

	Original Lineage (N=58)	Alpha (N=8)	Delta (N=11)	Omicron (N=17)	Total (N=94)
Male[NS]	37 (64%)	5 (63%)	8 (73%)	11 (65%)	61 (65%)
Age, years (median, IQR) [NS]	9 (4-12)	12 (9-14)	10 (9-12)	11 (6-13)	10 (6-13)
Black, non-Hispanic[NS]	29 (50%)	5 (63%)	6 (55%)	10 (59%)	50 (53%)
Hispanic[NS]	21 (36%)	3 (38%)	3 (27%)	7 (41%)	34 (36%)
White, non-Hispanic[NS]	4 (7%)	0 (0%)	2 (18%)	0 (0%)	6 (6%)
Asian[NS]	1 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Race/ethnicity unknown[NS]	3 (5%)	0 (0%)	0 (0%)	0 (0%)	3 (3%)

NS = p-value not significant

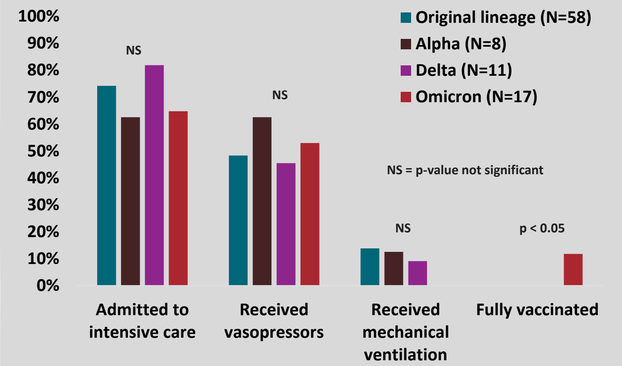


Fewer MIS-C cases relative to pediatric COVID-19 hospitalizations over successive variants observed. (Figure 1)



The risk ratio was lower in successive variants, however only significant in Omicron. Low case counts during Alpha and Delta may have limited our ability to detect significant differences during those periods; further analysis with multi-jurisdictional data is warranted.

No change in clinical severity in MIS-C by predominant variant. (Figure 2)



COVID-19 vaccination became available: May 2021 for 12–15-year-olds; October 2021 for 5–11-year-olds; and June 2022 for 6-month-4-year-olds. Two children with MIS-C were fully vaccinated against COVID-19, both in the Omicron period. Vaccination has been shown to be protective against MIS-C. [a] Future studies should evaluate the role of immunologic exposure (vaccination or previous infection) or whether the decrease is related to intrinsic variant differences.

[a] Zambrano, et al. Effectiveness of BNT162b2 (Pfizer-BioNTech) mRNA Vaccination Against Multisystem Inflammatory Syndrome in Children Among Persons Aged 12–18 Years — United States, July–December 2021. *MMWR*, January 14, 2022.

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