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5-2021

## Impact of COVID-19 on Inpatient Utilization and Outcomes for Children with Medical Complexity

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# Impact of COVID-19 on Inpatient Utilization and Outcomes for Children with Medical Complexity

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# PAS

## 2021 VIRTUAL

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School of Medicine

# Disclosure

## Dr. Markham

Has documented no financial relationships to disclose or Conflicts of Interest (COIs) to resolve.

## Dr. Markham

Has documented this presentation **will not** involve discussion of unapproved or off-label, experimental or investigational use.

# Background

- Coronavirus disease 2019 (COVID-19) has impacted patients and health systems around the world
- Children have experienced:
  - Declines in emergency department visits
  - Declines in hospitalizations
  - Delays in accessing care
- Limited investigation of children with medical complexity (CMC)

# Background

- CMC are at high risk for:
  - Hospital admissions
  - Readmissions
  - Prolonged lengths of stay
  - Increased healthcare costs
  - Health declines with service disruptions
- Understanding the impact of the pandemic on CMC may improve the future provision of healthcare

# Objectives

1. To describe the impact of the COVID-19 pandemic on hospitalizations for CMC
2. To describe the impact of the COVID-19 pandemic on hospital utilization metrics (e.g., length of stay) for CMC

# Methods

- **Study Design**

- Multicenter, cross-sectional study of data from 49 children's hospitals using the PHIS database

- **Study Population**

- Inclusion: Children 0-18 years of age with complex chronic conditions
- Exclusion: Transfers, left against medical advice, data quality concerns



# Methods

- **Exposures**
  - COVID vs. pre-COVID
- **Outcomes**
  - Total number of admissions
  - Clinical: length of stay, readmission rates, ICU use, mortality
  - Financial: standardized costs

# Methods

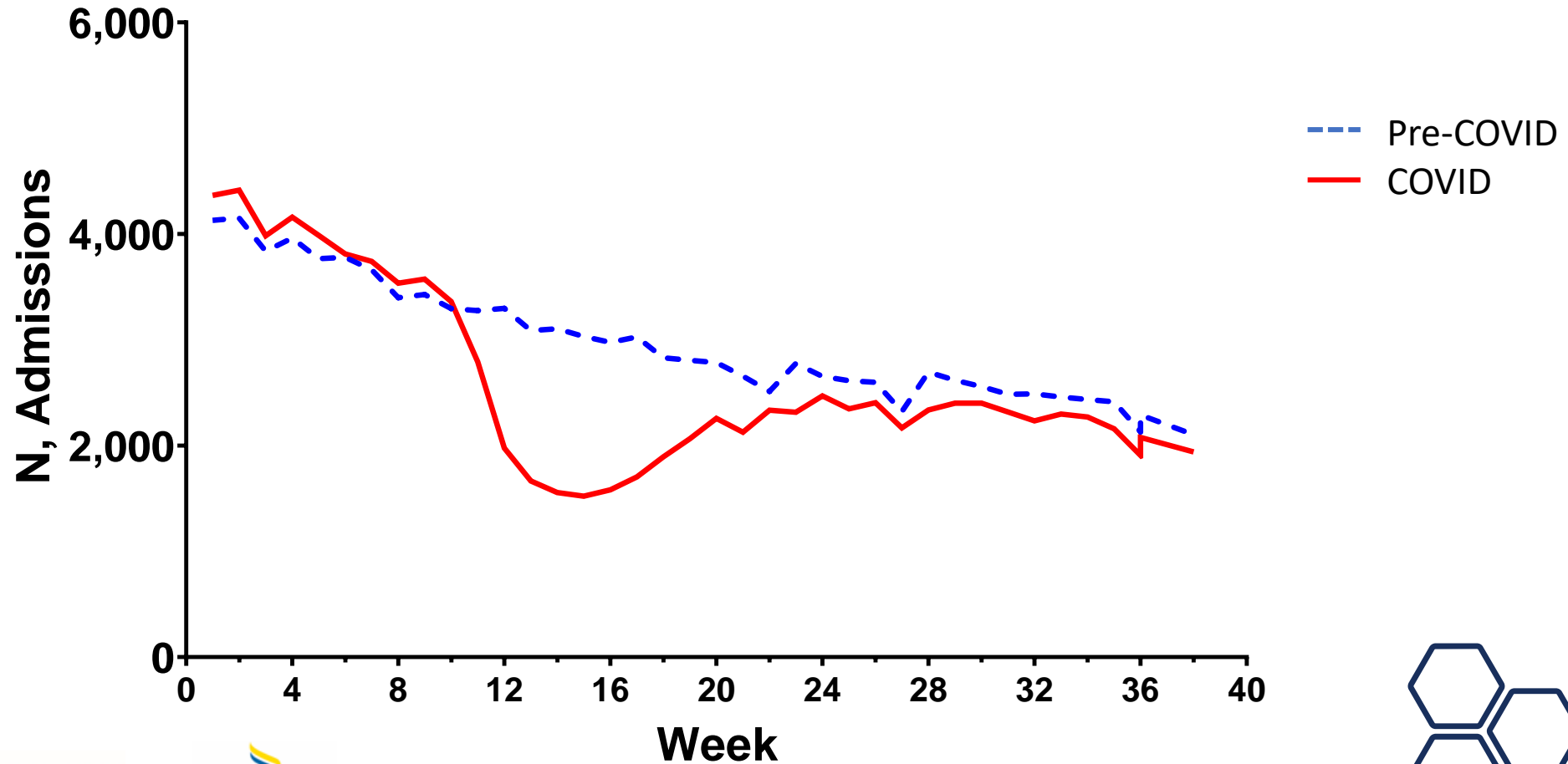
- **Analysis**
  - Descriptive statistics
  - Generalized linear mixed models (GLMM) with adjustments for important demographic and clinical characteristics
  - All GLMMs included a random hospital effect to account for clustering

# Results

		Overall	Pre-COVID	COVID
Index Admissions		283,097	225,038	58,059
Age, years	<1	67,950 (24.0)	52,668 (23.4)	15,282 (26.3)
	1-4	67,279 (23.8)	54,609 (24.3)	12,670 (21.8)
	5-9	50,848 (18.0)	41,292 (18.3)	9,556 (16.5)
	10-14	56,185 (19.8)	44,597 (19.8)	11,588 (20.0)
	15-18	40,835 (14.4)	31,872 (14.2)	8,963 (15.4)
Number of CCCs	1	158,129 (55.9)	126,063 (56.0)	32,066 (55.2)
	2	57,722 (20.4)	45,839 (20.4)	11,883 (20.5)
	3	35,970 (12.7)	28,541 (12.7)	7,429 (12.8)
	≥4	31,276 (11.0)	24,595 (10.9)	6,681 (11.5)

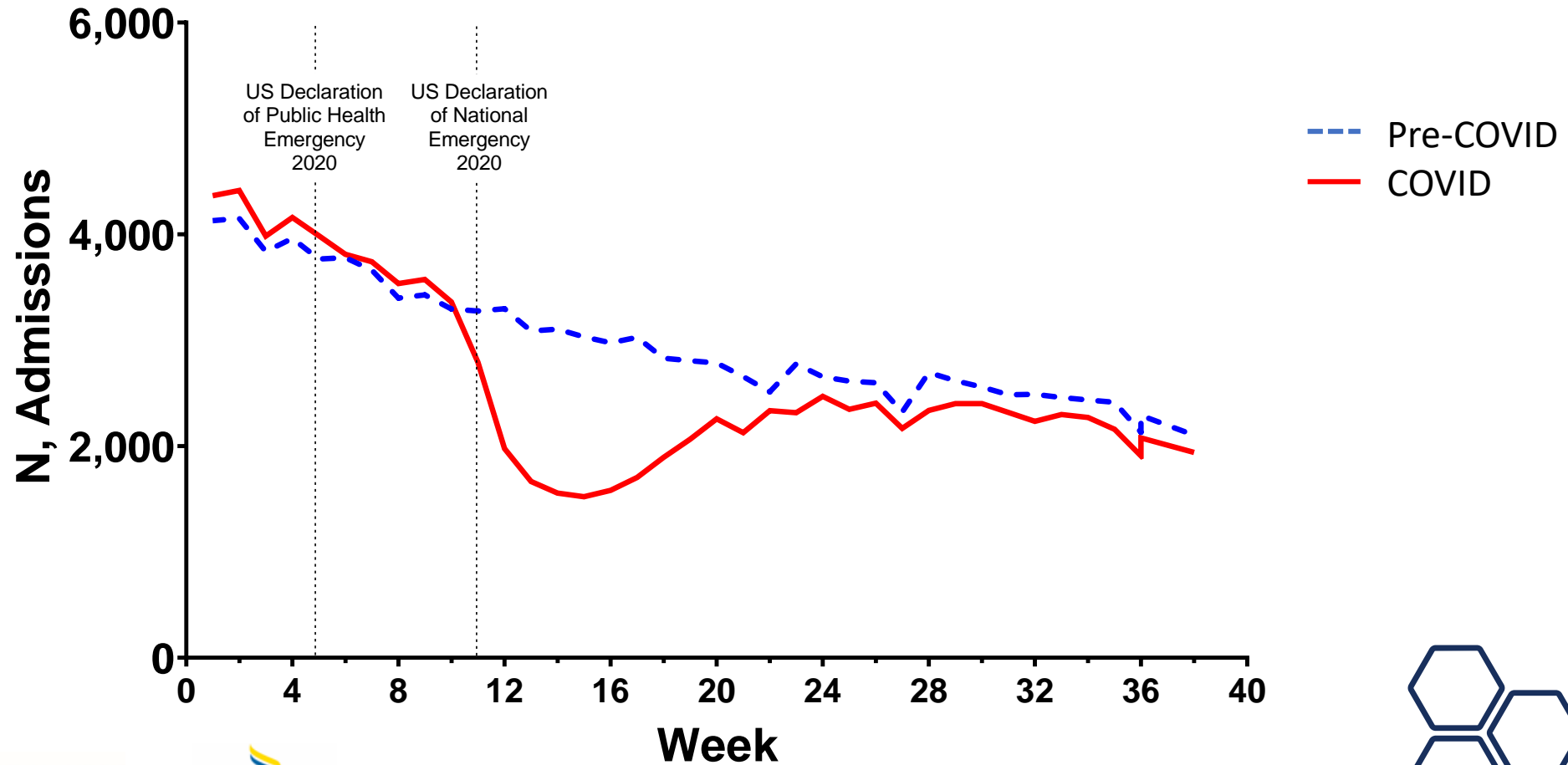
# Results

## Total Inpatient Admissions



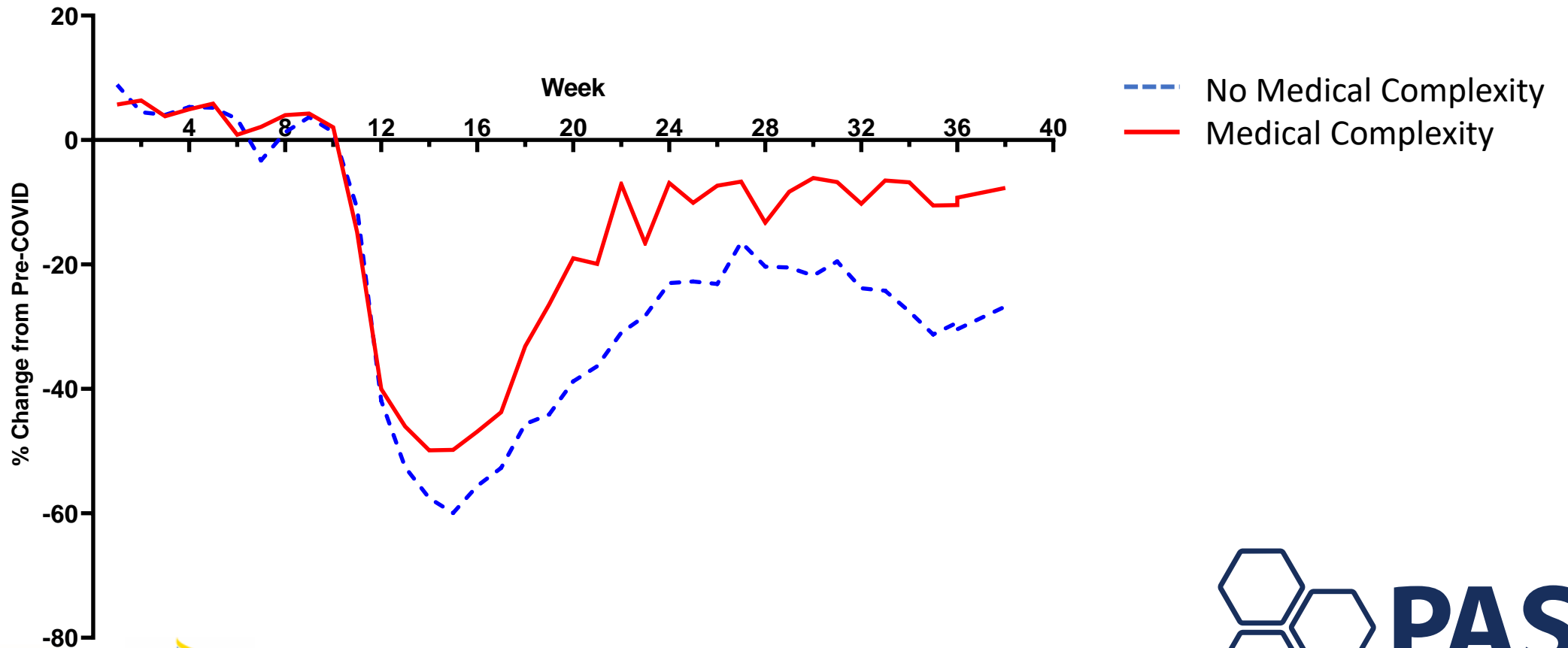
# Results

## Total Inpatient Admissions



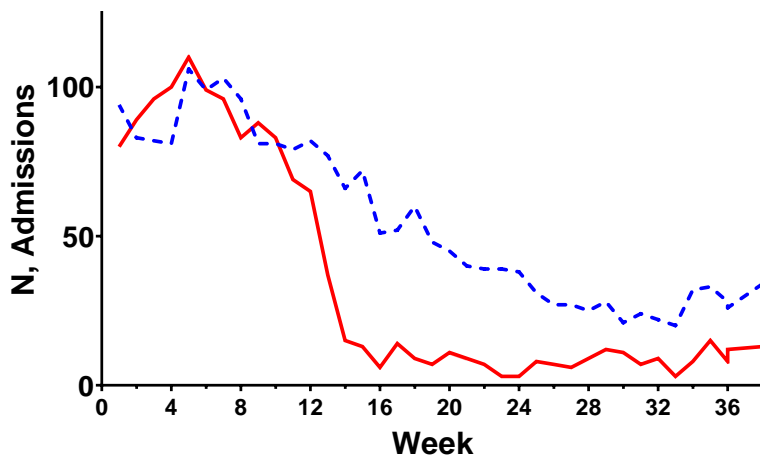
# Results

Percent Change in Hospital Admissions from Pre-COVID

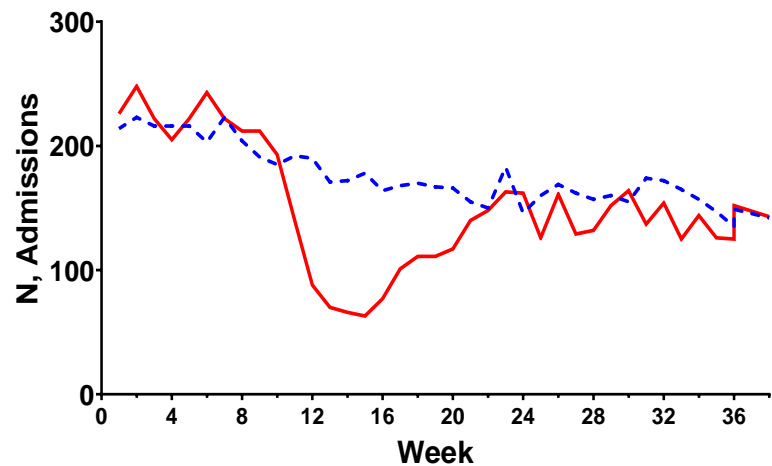


# Results

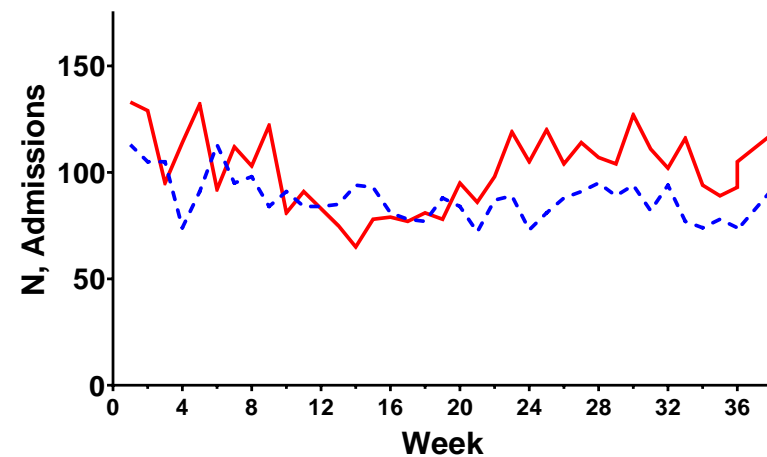
### Pneumonia



### Seizure



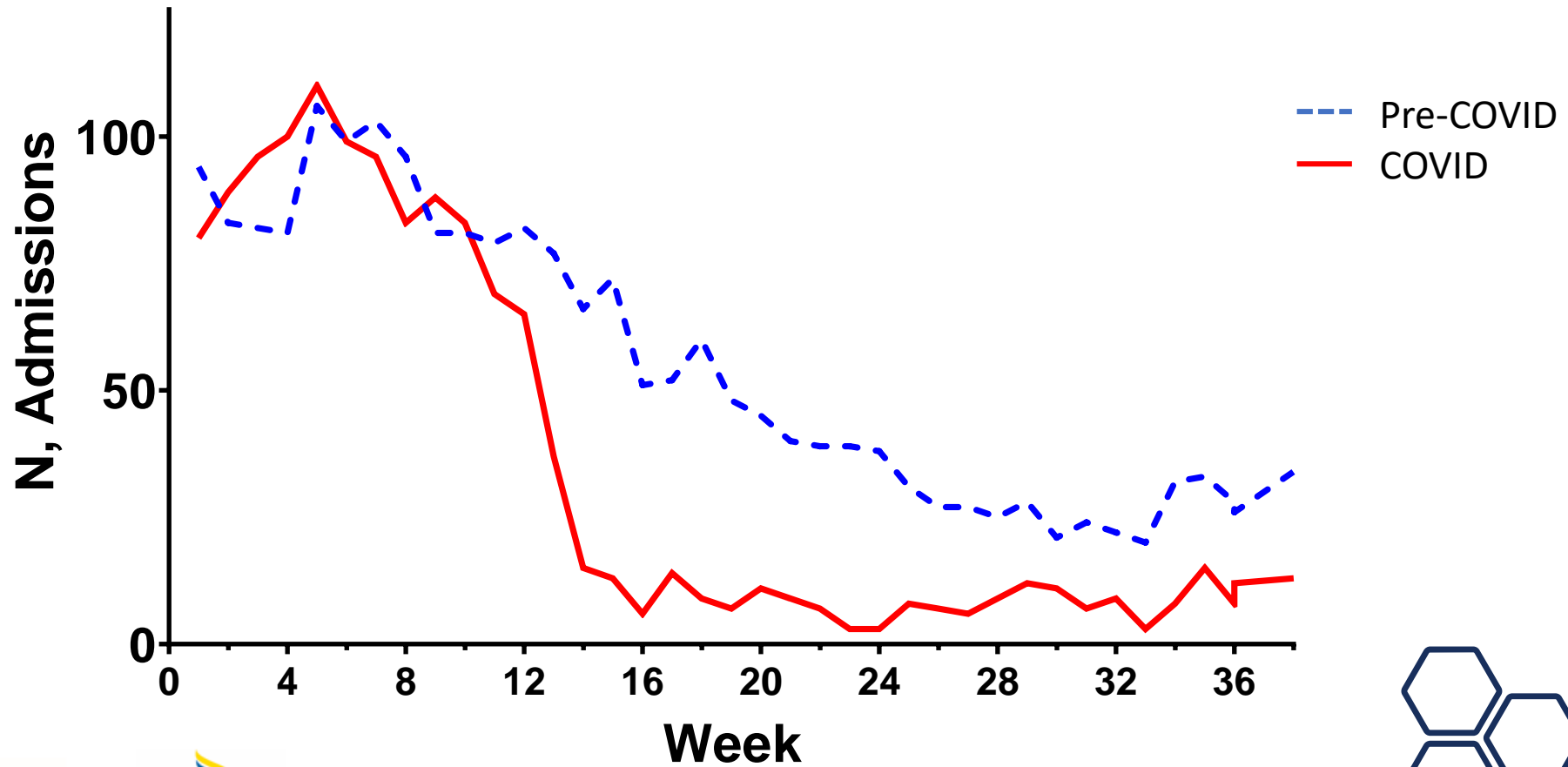
### Diabetes



--- Pre-COVID  
— COVID

# Results

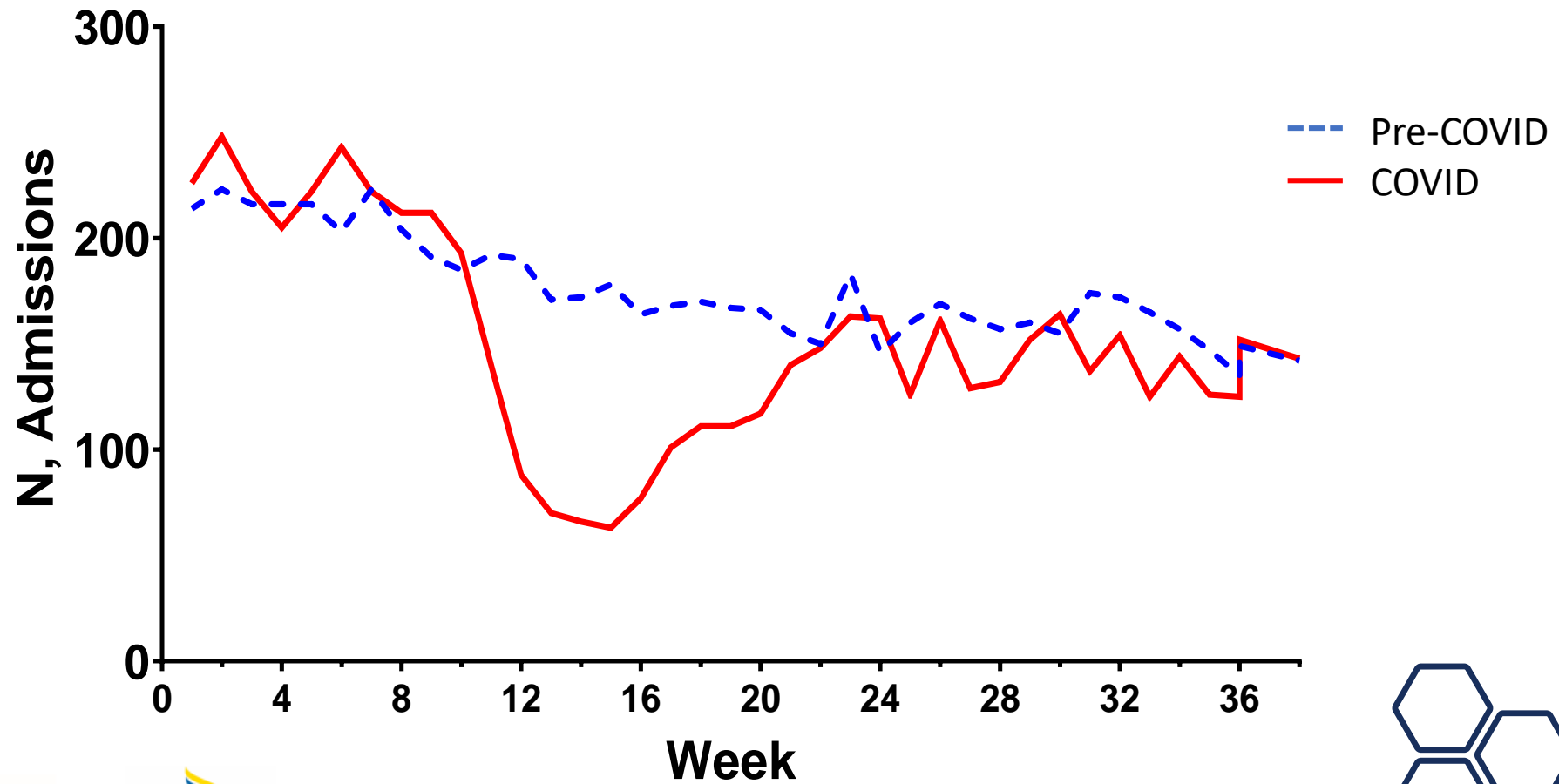
## Pneumonia





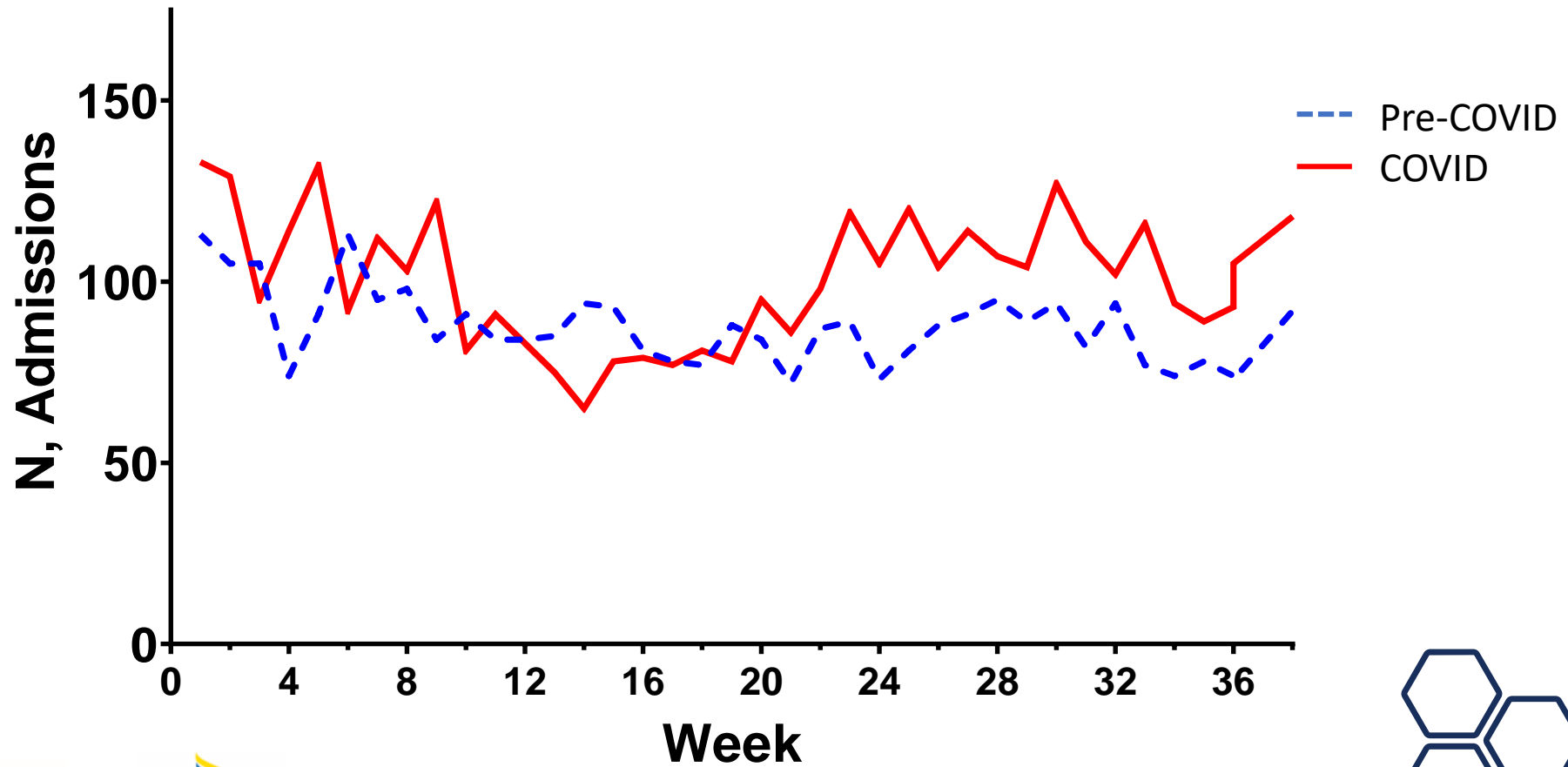
# Results

## Seizure



# Results

## Diabetes



# Results

	Pre-COVID	COVID	p-value
Length of Stay (hours)	80.7 [75.6, 86.2]	82.8 [77.5, 88.5]	<0.001
30- Day Readmission Rates	15.2% [14.2%, 16.3%]	14.5% [13.4%, 15.6%]	<0.001
ICU Utilization	21.5% [18.3%, 25.0%]	22.5% [19.2%, 26.3%]	<0.001
Mortality	1.5% [1.2%, 1.9%]	1.4% [1.1%, 1.9%]	0.166
Cost (US Dollars)	\$13,396 [\$11,552, \$15,535]	\$13,728 [\$11,833, \$15,927]	<0.001

# Limitations

- Use of administrative data
- Our analysis focused on admissions to children's hospitals
- Individual communities were impacted differently by lockdowns and social distancing policies over time

# Conclusions

- Admissions for CMC declined by nearly 25% during the COVID pandemic
- Declines in admissions for CMC were not quite to the extent and recovered more quickly and fully compared to those without medical complexity
- The impact of the pandemic on CMC varied based on admission indication
- Overall outcomes were similar for CMC between COVID and pre-COVID periods

# Thank You!

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