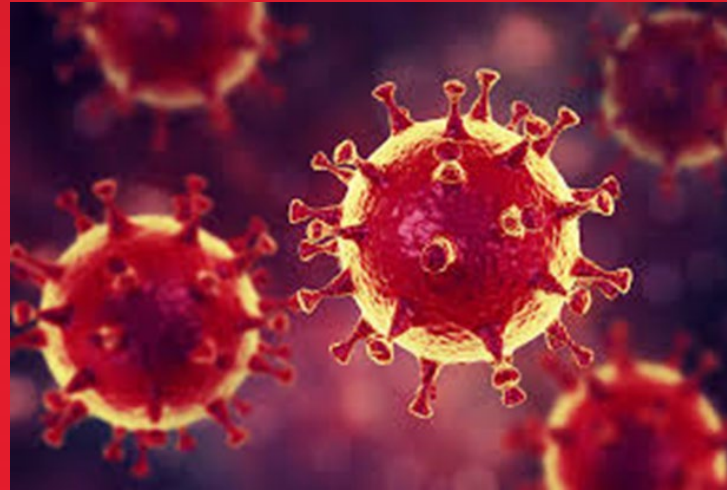




Impact of SARS-CoV-2 on the Pediatric Population

November 30, 2021

NASEM Roundtable

Roberta L. DeBiasi, MD, MS

Chief, Division of Pediatric Infectious Diseases

Children's National Hospital/Children's National Research Institute

Professor of Pediatrics and Microbiology, Immunology and Tropical Medicine

The George Washington University School of Medicine and Health Sciences

Washington, DC

Communicating the Impact of COVID-19 on Pediatric and Young Adult Patients

- Initial reporting from China and West Coast of US suggested children largely spared from severe disease
- Initial reports from China
 - Initially < 2% of overall COVID infections , later revised to 12%
- Emergence in US on West Coast (CA, Washington state)
 - Essentially same experience as China
 - Very few hospital admissions and only handful of critically ill children
- **Experience in Europe and East Coast of US (Washington DC, New York, Philadelphia, Boston) markedly different**
 - Significant number of infections, hospitalizations, critically ill, MIS-C

Children and COVID: AAP/CHA data as of November 18, 2021

- Cases

- 6.8 million cumulative child COVID-19 cases reported
- Children represent **16.9%** of all cases cumulatively
- Children represent **25.1%** of all cases in the prior 2 weeks
- For 15th week in a row >100,000 cases/week



- Hospitalizations:

- Children still represent only up to 4.0 % of all COVID hospitalizations
- 0.1-1.9% of pediatric cases resulted in hospitalization



- Deaths

- <0.25% of COVID deaths are in children
- <0.05% of COVID cases in children result in death



Children's National COVID-19 and MIS-C: March 15, 2020- November 28, 2021

COVID 19 Disease

- Cumulative **4403** COVID+ symptomatic patients
- Cumulative **823** COVID+ patients hospitalized
 - During peak surges, up to **12** new hospitalizations per day
 - **264** (32%) critical care (234 PICU, 30 NICU)
 - **559** (68%) acute care

Multisystem Inflammatory Disease of Children (MIS-C)

- Cumulative **203**
 - 2/3 critical care



Children's National an Early Leader in Highlighting Symptomatic and Severe COVID in Children

May 12, 2020 - First Wave of 177 patients

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BRIEF REPORTS

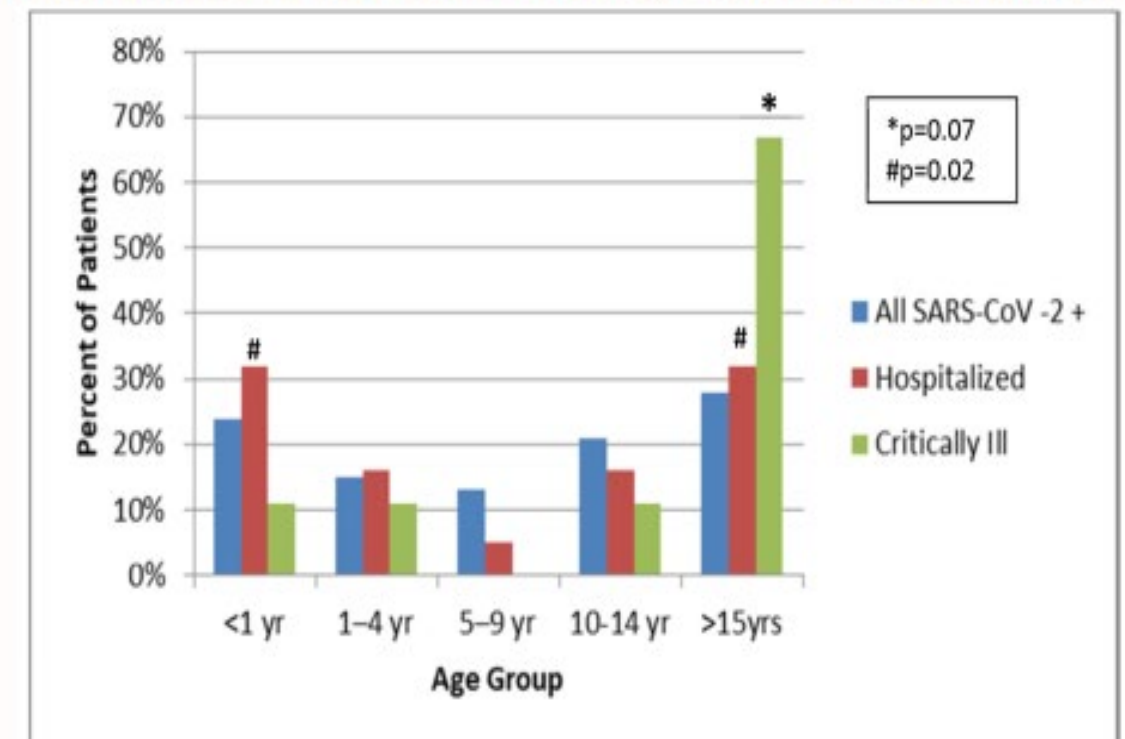


Severe Coronavirus Disease-2019 in Children and Young Adults in the Washington, DC, Metropolitan Region

Roberta L. DeBiasi, MD, MS^{1,2,3}, Xiaoyan Song, MBBS, PhD^{2,4}, Meghan Delaney, MD^{2,5}, Michael Bell, MD^{2,6}, Karen Smith, MD^{2,7}, Jay Pershad, MD^{2,8}, Emily Ansusinha, MA¹, Andrea Hahn, MD, MS^{1,2}, Rana Hamdy, MD, MPH^{1,2}, Nada Harik, MD^{1,2}, Benjamin Hanisch, MD^{1,2}, Barbara Jantusch, MD^{1,2}, Adeline Koay, MBBS^{1,2}, Robin Steinhorn, MD^{2,9}, Kurt Newman, MD^{2,10}, and David Wessel, MD^{2,6}

Despite worldwide spread of severe acute respiratory syndrome coronavirus-2, few publications have reported the potential for severe disease in the pediatric population. We report 177 infected children and young adults, including 44 hospitalized and 9 critically ill patients, with a comparison of patient characteristics between infected hospitalized and nonhospitalized cohorts, as well as critically ill and noncritically ill cohorts. Children <1 year and adolescents and young adults >15 years of age were over-represented among hospitalized patients ($P = .07$). Adolescents and young adults were over-represented among the critically ill cohort ($P = .02$). (*J Pediatr* 2020;223:199-203).

Age Distribution of All SARS-CoV-2 Positive, Hospitalized and Critically Ill Patients



DeBiasi et al. *The Journal of Pediatrics* 2020: 223:199-203



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Prepublication Release

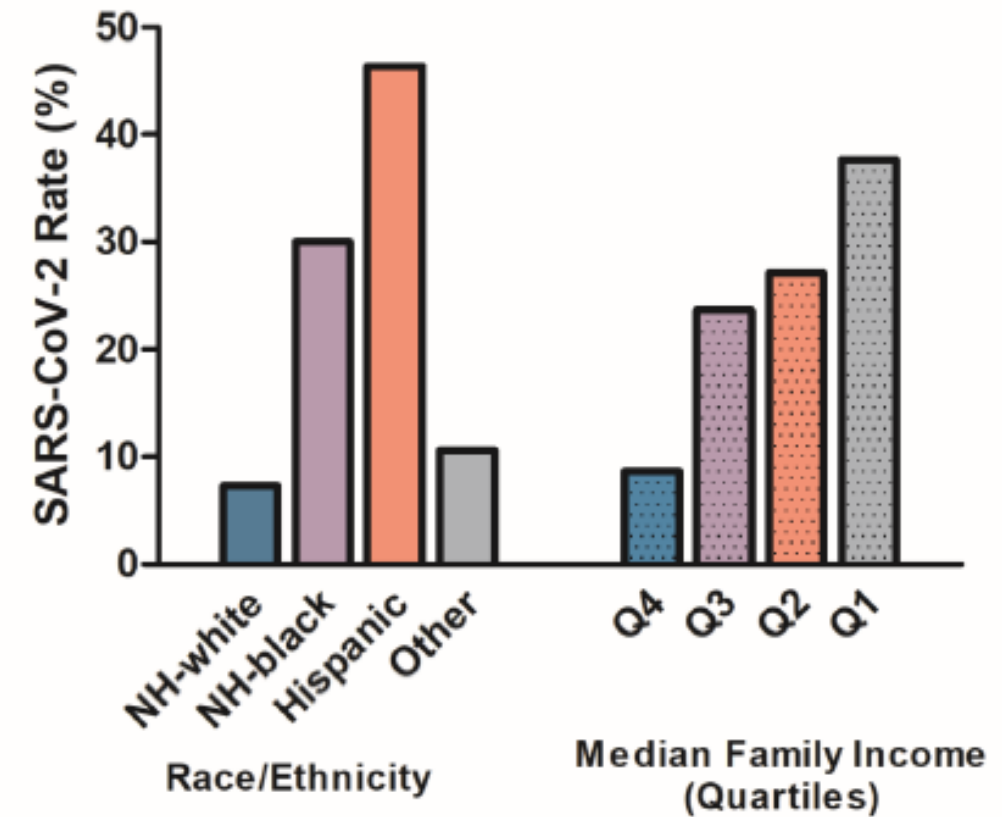
PEDIATRICS

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Racial/Ethnic and Socioeconomic Disparities of SARS-CoV-2 Infection Among Children

Monika K. Goyal, MD, MSCE, Joelle N. Simpson, MD, MPH, Meleah D. Boyle, MPH,
Gia M. Badolato, MPH, Meghan Delaney, DO, MPH, Robert McCarter, ScD,
Denice Cora-Bramble, MD, MBA

Figure 2. Rates of SARS-CoV-2 Infection by Race/Ethnicity and Socioeconomic Status



Goyal MK, Simpson JN, et al, Pediatrics. 2020 Oct;146(4) e2020009951



Children's National®

Children's National Leads in Evaluation and Care of Children with Multisystem Inflammatory Disease of Children (MIS-C)

ARTICLE IN PRESS

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ORIGINAL
ARTICLES

Multisystem Inflammatory Syndrome of Children: Subphenotypes, Risk Factors, Biomarkers, Cytokine Profiles, and Viral Sequencing

Roberta L. DeBiasi, MD, MS^{1,2,3,4}, Ashraf S. Harahsheh, MD^{2,3}, Hemalatha Srinivasalu, MD^{3,5}, Anita Krishnan, MD^{2,3}, Matthew P. Sharron, MD^{3,6}, Kavita Parikh, MD^{3,7}, Karen Smith, MD^{3,7}, Michael Bell, MD^{3,6}, Drew Michael, PhD^{3,8,9,10}, Meghan Delaney, DO^{3,8}, Joseph Campos, PhD^{3,8}, Eric Vilain, MD, PhD^{10,11}, Jonathan LoTiempo, BS^{10,11}, Jaclyn N. Kline, MD^{3,12}, Tova Ronis, MD^{3,5}, Suvankar Majumdar, MD^{6,13}, Eleanor Sadler, PharmD¹⁴, Susan R. Conway, MD^{3,6}, Charles I. Berul, MD^{2,3}, Sangeeta Sule, MD^{3,5}, Rebeca Lahoz, MD¹, Emily Ansusinha, MS¹, Jay Pershad, MD¹², Vanessa Bundy, MD^{3,15}, Elizabeth Wells, MD^{3,16}, James E. Bost, PhD¹⁷, and David Wessel, MD^{2,3,6}, on behalf of the Children's National Hospital MIS-C Taskforce

- **>5500 MIS-C cases and 48 deaths in the US to date (CDC data)**
- **Black (46%) and Latino (35%) over-represented**
 - **Black children at greatest risk (OR 4.62, 95% CI 1.15-14.10; P = .007)**
- **Established a well-characterized MIS-C cohort treated with a standardized protocol for long-term systematic follow-up**



The NEW ENGLAND JOURNAL of MEDICINE

EDITORIALS

Immunotherapy for MIS-C — IVIG, Glucocorticoids, and Biologics

Roberta L. DeBiasi, M.D.

DeBiasi RL et al, J Pediatr. 2021 Oct;237:125-135.e18
DeBiasi RL, N Engl J Med. 2021 Jul 1;385(1):74-75.



The Challenge of Early Recognition vs. Panic: CDC Guidance to Public

How to Recognize

Multisystem Inflammatory Syndrome in Children (MIS-C)

A Delayed Immune Response Related to COVID-19

Children, adolescents, or young adults who develop certain symptoms after having COVID-19 might have MIS-C. They should see a doctor if they had COVID-19, or have been in close contact with someone who had COVID-19, within the past 6 weeks and now have the following:

**Ongoing
Fever**



**PLUS more than one
of the following:**



Stomach Pain



Diarrhea



Vomiting



Skin Rash



**Blood Shot
Eyes**



**Dizziness or
Lightheadedness**

**Go to the nearest hospital Emergency Room if your child is showing
any severe MIS-C warning signs such as:**

Trouble breathing | Pain or pressure in the chest that does not go away
Confusion or unusual behavior | Severe abdominal pain | Inability to wake or stay awake
Pale, gray, or blue-colored skin, lips, or nail beds; depending on skin tone



Centers for Disease
Control and Prevention
National Center for Immunization
and Respiratory Diseases

For More Information
www.cdc.gov/mis/mis-c.html



SCAN ME

Vaccination for Kids 5-11 years of age: Communicating Safety/Efficacy

- CNH is a Pediatric Vaccine Trial Site: Pfizer
- FDA approval October 26, 2021
- CDC ACIP approval November 2, 2021
- >2000 children in study
- **90.7 % vaccine efficacy in preventing symptomatic disease**
- Similar safety profile as adults/adolescents
- Dose is 1/3 that given to age 12 and up
- 28 million kids eligible
- **To date, 8300 hospitalizations/100 deaths from COVID in this age group**

Percent of People Receiving COVID-19 Vaccine by Age and Date Administered, United States

December 14, 2020 – November 29, 2021

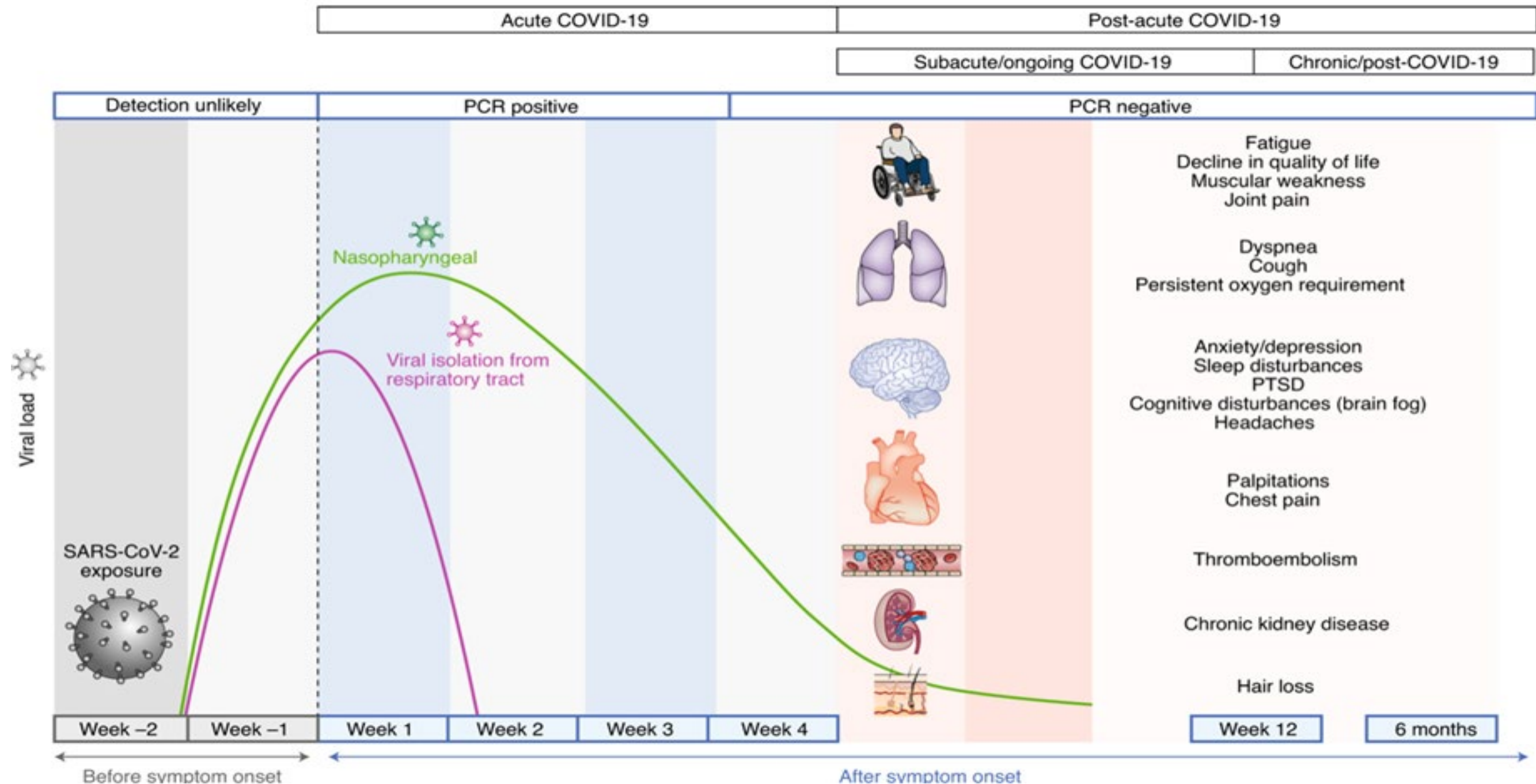
	5-11 yrs	12-17 yrs	18-24 yrs	25-39 yrs	40-49 yrs	50-64 yrs	65-74 yrs	75+ yrs
At Least One Dose	14.2%	61.0%	68.2%	71.9%	80.0%	87.3%	99.9%	97.0%
Fully Vaccinated	0.8%	51.2%	56.8%	61.2%	69.5%	76.6%	88.4%	83.2%

Age data were available for 99.9% of vaccinations.

<https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-trends>



What About “Long-COVID” in Children?



Pediatric SARS-CoV-2 and MIS-C Long-term Follow-up

Children's National Protocol Number: 00015510

National Institutes of Health (NIH) IRB Number: 000201

National Clinical Trial (NCT) Identified Number: NCT04830852

Lead Principal Investigator: Roberta DeBiasi, MD, Children's National Hospital

NIH Site Principal Investigator: Gina A. Montealegre Sanchez, MD, MS, Intramural
Clinical Management and Operations Branch, Division of Clinical Research,
National Institute of Allergy and Infectious Diseases (NIAID)

Funded by: NIAID

Version Number: v.2.0

9 June 2021

<https://clinicaltrials.gov/ct2/show/NCT04830852>

https://childrensnational.formstack.com/forms/covid_misc_study

Study Protocol: 30,000 Foot Overview

Children's National/ NIH/NIAID Partnership

- 1000 recovered **Pediatric COVID and MISC patients**, 1000 Healthy Contacts
 - Symptomatic, Asymptomatic
 - Hospitalized, Non-Hospitalized
 - Critically Ill and Non Critically Ill
- **Short/Long Term Outcomes (3 year follow-up)**
 - **Pulmonary Function**
 - **Cardiac Function and Coronary Artery Abnormalities: Echo, EKG, Cardiac MRI**
 - **Neurodevelopmental Assessment**
 - **Quality of life/Mental Health Assessment**



- Natural History, Outcomes
- Biorepository of Specimens
- Basic Science Research: Host Genetics, T cell responses, Antibody Kinetics

Secondary Challenges and Public Health Implications of SARS-CoV-2 for Children and Families

- **Housing instability**
 - Expiration of eviction bans
- **Childcare**
 - Employers returning to office, demands increasing
- **Food insecurity**
 - 20-40% increases, dependence on school attendance for nutrition
- **Behavioral health issues**
 - Dramatic increases in depression, anxiety and eating disorders
- **Obesity**
 - Rates of obesity and Type 2 Diabetes increased as children more sedentary
- **Learning loss**
 - Black and Brown students disproportionately impacted by virtual instruction and the pandemic
 - Long-term public health impact on health literacy and health outcomes

Children's National COVID-19 Leadership Throughout Pandemic

- **Testing:**
 - Rapid testing and one of first dedicated ambulatory pediatric testing sites in the US
- **Clinical Care**
 - Standardized/Optimized care for pediatric COVID and MIS-C patients
 - Multidisciplinary COVID and MIS-C Taskforce, Back to School and Spots Committees
 - Pediatric-specific therapeutics guidelines
- **Coordinated Institutional Emerging Infection Response:**
 - Multidisciplinary COVID Steering Committee
- **Education:**
 - Biweekly/Weekly Town Halls for Employee and Management Education
 - National Press/Media/Research Publications to educate and inform clinicians/public
- **Research Response:** COVID and MIS-C Databases for shared validated data
- **Vaccination:**
 - Institutional Vaccine Taskforce – Access, Equity, Mass Vaccination Clinics
 - DC DOH Advisory Committee/Taskforce for Safe and Equitable Distribution of COVID Vaccine



Acknowledgements:

Children's National Teams for Emerging Infectious Diseases Response

Special Pathogens Isolation Unit and Response Team

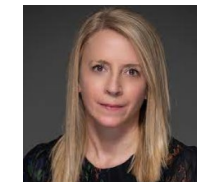
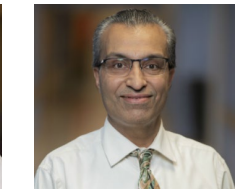
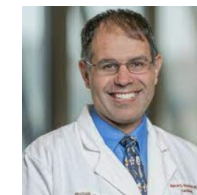


Infectious Diseases and Infection Control Divisions



MIS-C Taskforce

- Infectious Diseases: DeBiasi
- Cardiology: Harahsheh, Krishnan
- Rheumatology: Srinivasalu, Toviss, Sule
- Hematology: Suvankar,
- Critical Care: Bell, Sharron
- Hospitalist Medicine: Smith, Parikh
- Emergency Medicine: Pershad, Kline
- Lab Medicine: Delaney, Campos



Children's National