



Pediatrics and COVID-19

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Disclaimer

The content that I am presenting today does not represent the views of my clients or employers. I am not here in representation of any local, state, or federal government entities.

Objectives

- At the end of this presentation the attendees will be able to:
 - Identify the current reported transmission, mortality, and hospitalization rates for children of SARS-CoV-2
 - Understand current information and data that is available concerning children and COVID-19
 - Summarize the current recommendations from the NIH, AAP, and CDC concerning children wearing masks, and returning to school

Background Information

- Incubation period: ranges from 2 days to 2 weeks, the average is 6 days
- Period of being contagious: for mild/moderate illness 10 days or less
 - Immunocompromised/immunosuppressed/severe/critical illness: 20 days or less
- Droplet transmission
- Airborne transmission is possible in poorly ventilated areas that are densely populated or when a patient that has COVID-19 is given a respiratory treatment

CDC Data for Alaskan Natives/American Indians

- New diagnosis of COVID-19 is 3.5 times higher for American Indians and Alaskan Natives when compared to their white counterparts
- Children 18 and under has the highest rate of infection

American Indian and Alaskan Natives Infection Rates and Risk

- In May Native Americans had the highest per capita rate of infection in the United States
- Higher risk of severe illness due to having comorbidities of diabetes, hypertension, and other chronic conditions

Navajo Nation Transmission Reports

- The spread of COVID-19 was attributed to the following factors:
 - More than one generation lives in the same home
 - Lack of running water
 - Limited number of grocery stores, gas stations, and food

Transmission

- A large study from South Korea where effective contact tracing efforts are being recorded informed us that children less than 10 years of age transmitted less than adults do
- Children between the ages of 10-19 were reported to be equally infectious as adults
- More recent data within the USA reports that children may be responsible for as much as 10% of new cases that occur in children

Transmission Case Studies

- France, 9 year old boy with COVID-19 and 2 other viral illnesses (Influenza A and Picovirus) came into contact with 80 children that attended a total of 3 schools without any proven transmission of COVID-19
- Australia, 9 year old boy and 9 staff members with COVID-19 had contact with a total of 735 students and 128 staff that attended a total of 15 schools, only 2 infections were traced back to the original 10 patients that were positive

Transmission continued

- Household contact studies from multiple countries has shown that children more frequently became infected after being exposed to an infected adult as opposed to transmitting to the adult

Update: Breaking News

The New York Times

Outbreaks Drive U.N.C. Chapel Hill Online After a Week of Classes

The university chose to abandon in-person instruction for undergraduates after at least 177 students tested positive for the coronavirus.



Review of Symptoms

- Fever
- Fatigue
- Headache
- Myalgia
- Cough
- Nasal congestion or rhinorrhea
- New loss of taste or smell

Review of Symptoms

- Sore throat
- Shortness of breath or difficulty breathing
- Abdominal pain
- Diarrhea
- Nausea or vomiting
- Poor appetite or poor feeding

Multisystem Inflammatory Syndrome in Children (MIS-C)

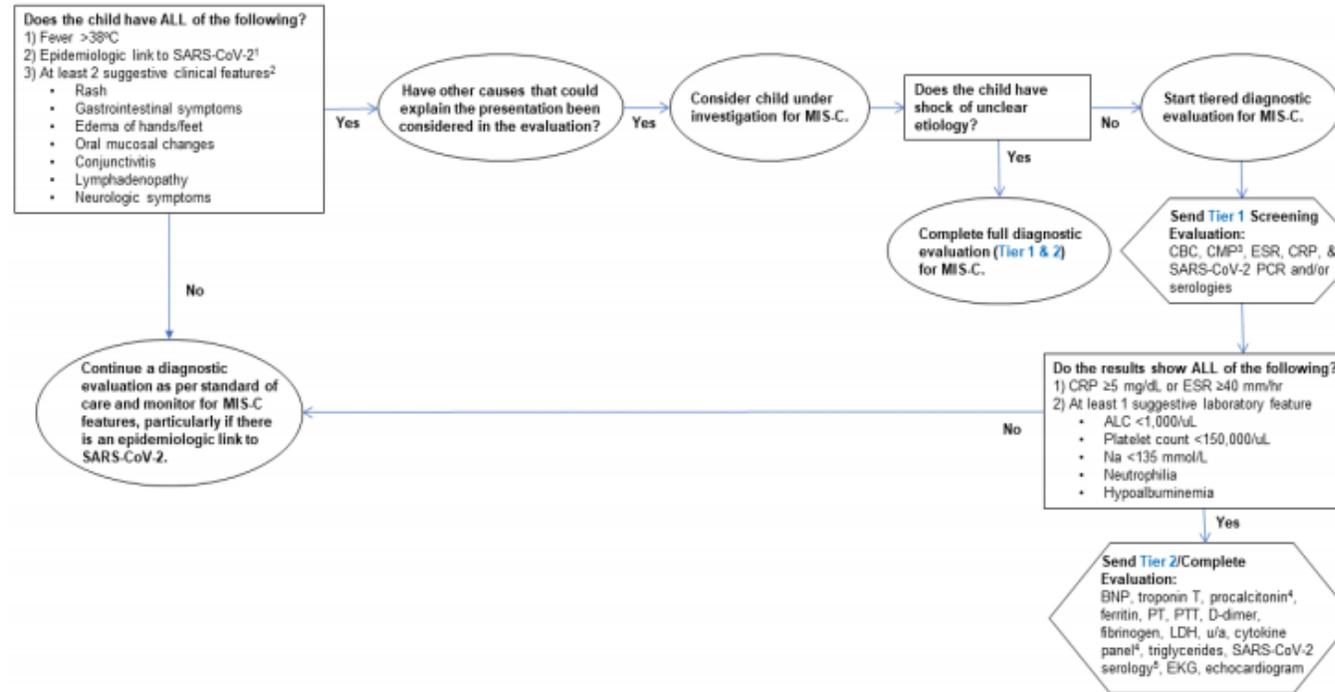


Figure 1. Diagnostic Pathway for MIS-C

¹An epidemiologic link to SARS-CoV-2 infection is defined as a child with ANY of the following criteria: positive SARS-CoV-2 polymerase chain reaction (PCR), positive SARS-CoV-2 serologies, preceding illness resembling COVID-19, or close contact with confirmed or suspected COVID-19 cases in the past 4 weeks.

²Rash, (polymorphic, maculopapular, or petechial, but not vesicular); GI symptoms, (diarrhea, abdominal pain, or vomiting); oral mucosal changes, (red and/or cracked lips, strawberry tongue, or erythema of the oropharyngeal mucosa); conjunctivitis, (bilateral conjunctival injection without exudate); neurologic symptoms, (altered mental status, encephalopathy, focal neurologic deficits, meningismus, or papilledema).

Multisystem Inflammatory Syndrome in Children (MIS-C)

- “Kawasaki disease like symptoms that has been reported at times with gastrointestinal signs and symptoms and/or neurologic signs and symptoms
- Toxic shock syndrome-like features with hemodynamic instability.
- Cytokine storm/macrophage activation or hyperinflammatory features.
- Abnormal clotting, poor heart function, diarrhea and gastrointestinal symptoms, acute kidney injury.
- Shortness of breath suggestive of congestive heart failure. Respiratory symptoms typically reported in adults with COVID-19 may not be present in pediatric patients with MIS-C”.

(American Academy of Pediatrics, 2020a)

TABLE 2. Reported serum laboratory values for multisystem inflammatory syndrome in children (MIS-C) cases (N = 570), by latent class analysis (LCA) group* — United States, March–July 2020



Laboratory test	LCA class 1			LCA class 2			LCA class 3			p-value
	No.	Median	IQR	No.	Median	IQR	No.	Median	IQR	
Fibrinogen, peak (mg/dL)	151	557	(449–713)	87	566	(430–662)	105	546	(426–681)	0.67
D-dimer, peak (mg/L)	158	3.0	(1.6–4.9)	106	2.6	(1.2–5.1)	128	1.7	(0.8–3.2)	<0.01
Troponin, peak (ng/mL)	162	0.09	(0.02–0.48)	109	0.05	(0.01–0.30)	130	0.01	(0.01–0.08)	<0.01
BNP, peak (pg/mL)	53	1,321	(414–2,528)	30	198	(76–927)	25	182	(30–616)	<0.01
proBNP, peak (ng/L)	103	4,700	(1,261–13,646)	68	1,503	(247–6,846)	92	507	(176–2,153)	<0.01
CRP, peak (mg/L)	166	21	(14–29)	122	16	(9–25)	144	14	(6–23)	<0.01
Ferritin, peak (ng/mL)	159	610	(347–1,139)	108	422	(207–825)	132	242	(116–466)	<0.01
IL-6, peak (pg/mL)	54	65	(24–258)	27	41	(21–131)	29	69	(7–118)	0.24
Platelets, nadir (10 ³ cells/μl)	115	131	(102–203)	76	172	(103–245)	68	150	(113–237)	0.15
Lymphocytes, nadir (cells/μl)	72	695	(400–1,093)	49	1,200	(790–2,025)	42	1,420	(723–2,250)	<0.01

What is the risk?

What are the trends telling us?

- Between 7/9/2020 and 8/6/2020 there has been a 90% increase in positive cases in children
- Nearly 10% of the COVID-19 positive test were from children as of August 6, 2020 from the beginning of the pandemic (data from 49 states, Puerto Rico, Guam, Washington, D.C. and New York City)

Hospitalization Rates

- Children that were less than two years of age stood the highest risk for hospitalization
- Approximately one-third of children that are hospitalized from COVID-19 are admitted to an ICU
- The risk of hospitalization for children with COVID-19 overall is lower than that in adults

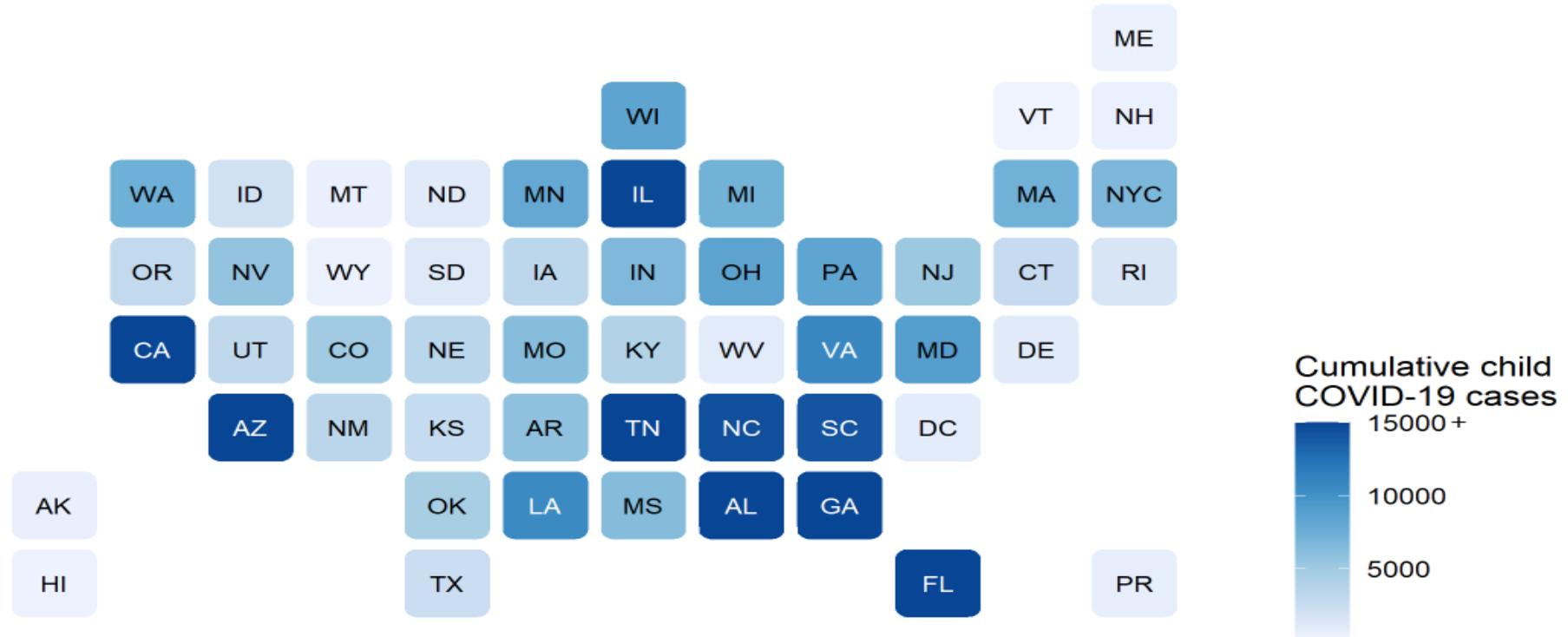
Hospitalization Rates

- Nearly half of the hospitalized children had comorbidities
- The most common comorbidities were obesity, chronic lung disease, and prematurity

Mortality Rates

- The CDC reports a mortality rate of 0.0-0.4% in children within the USA
- 90 deaths in children within the USA have been reported (AAP Committee on Infectious Diseases, 2020)

Cumulative Number of Reported Child COVID-19 Cases in the US as of 8/6/20



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Source: AAP and CHA analysis of data posted by state/local health departments (49 states, NYC, DC, and PR)



Texas Memorial Stadium home to the Longhorns has a seating capacity of about 100,000 to help create a visual. Photo credit: [Texas Longhorn Stadium](#)

Recommendations from AAP and CDC

- Children 2 years of age and older should wear a fabric mask if safe to do so (for most children it is safe but if there are questions have them speak with their Pediatricians)
- Children should return to school when it is safe within the region to do so
- Teach them about hand hygiene and encourage them to practice it

Updates

- T-Cell Immunity

<https://directorsblog.nih.gov/2020/07/28/immune-t-cells-may-offer-lasting-protection-against-covid-19/>

- ACE2 Receptor study HEROS by NIH

<https://www.nih.gov/news-events/news-releases/study-determine-incidence-novel-coronavirus-infection-us-children-begins>

Resources

- CDC Tribal Communities: Plan, Prepare, and Respond Tool

<https://www.cdc.gov/coronavirus/2019-ncov/community/tribal/index.html>

- CDC Public Health Grand Rounds

<https://www.cdc.gov/grand-rounds/index.html#:~:text=What%20is%20Grand%20Rounds%3F,protect%20people%20and%20save%20lives.>

- Indian Health Service

<https://www.ihs.gov/coronavirus/resources/>

Resources continued

- Urban Indian Health Institute

<https://www.uihi.org/resources/covid-19-fact-sheets-for-providers-employers-and-the-general-public/>

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