



Mountain Area
Health Education Center
North Carolina

Acute Care of the Patient with COVID-19

COVID-19 in the Pediatric Patient



Date: Wednesday, October 7, 2020

Time: 12:00pm – 1:00pm

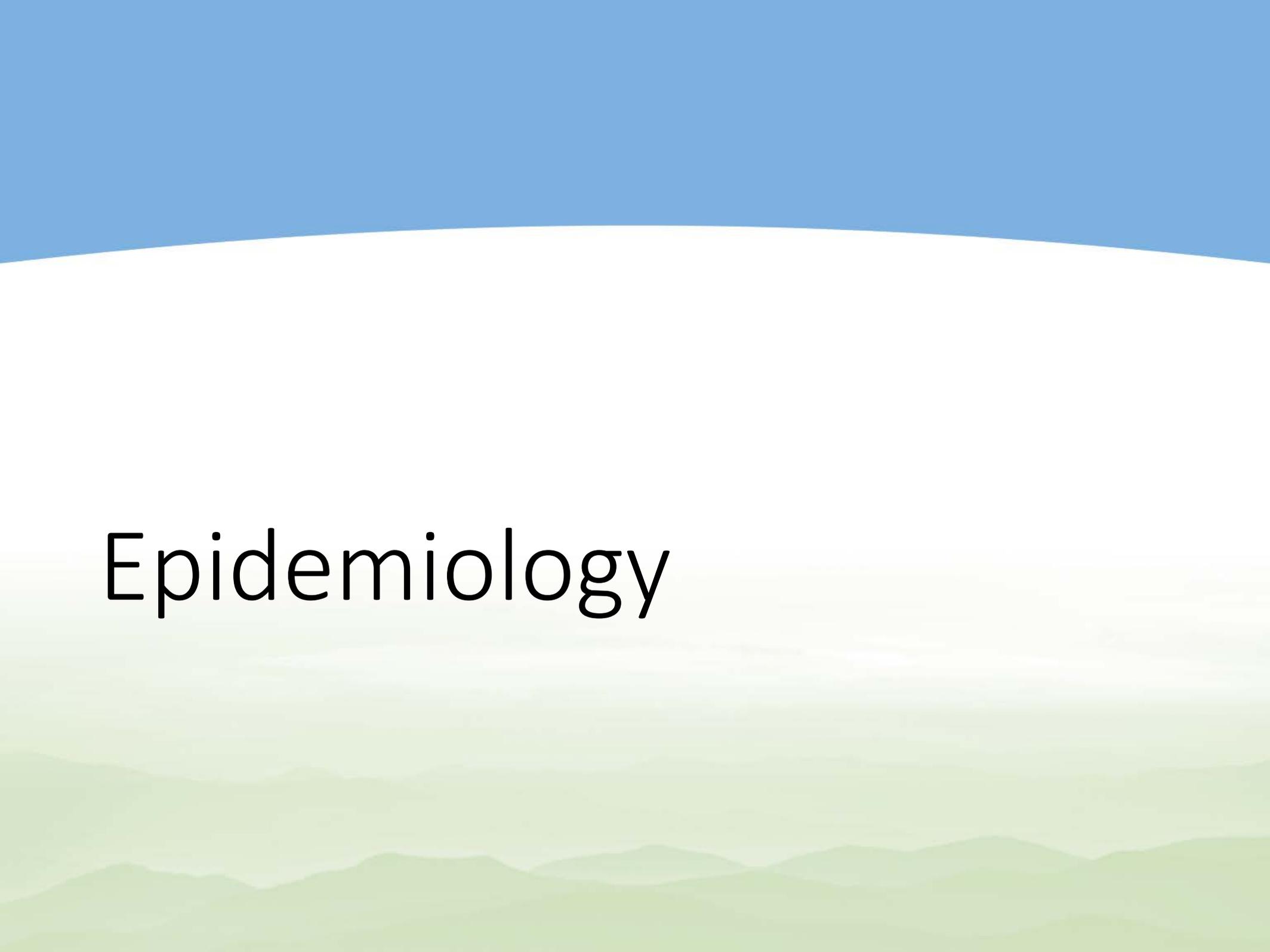
Location: Webex Only

Register: www.mahec.net/event/63880

Speaker: Calvin Tomkins, MD MHA
Asheville Pediatric Associates

Agenda

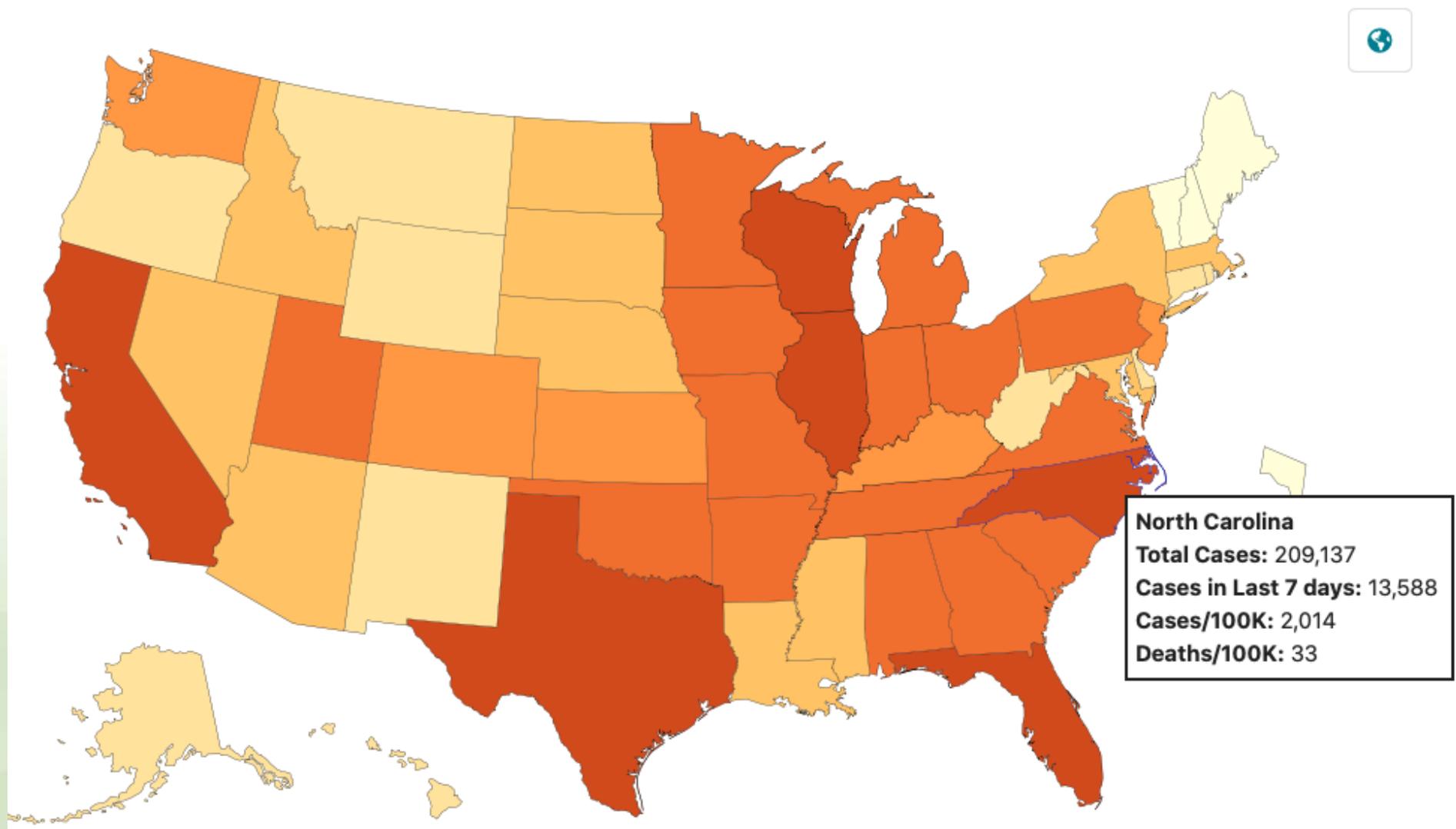
- Epidemiology: US, NC
- Clinical considerations
 - Pediatric COVID
 - MIS-C
 - Newborns



Epidemiology

COVID Cases – last 7 days...(10/1/20)

US COVID-19 Cases Reported to the CDC in the Last 7 Days, by State/Territory



NC New Cases: Phase 3 started...

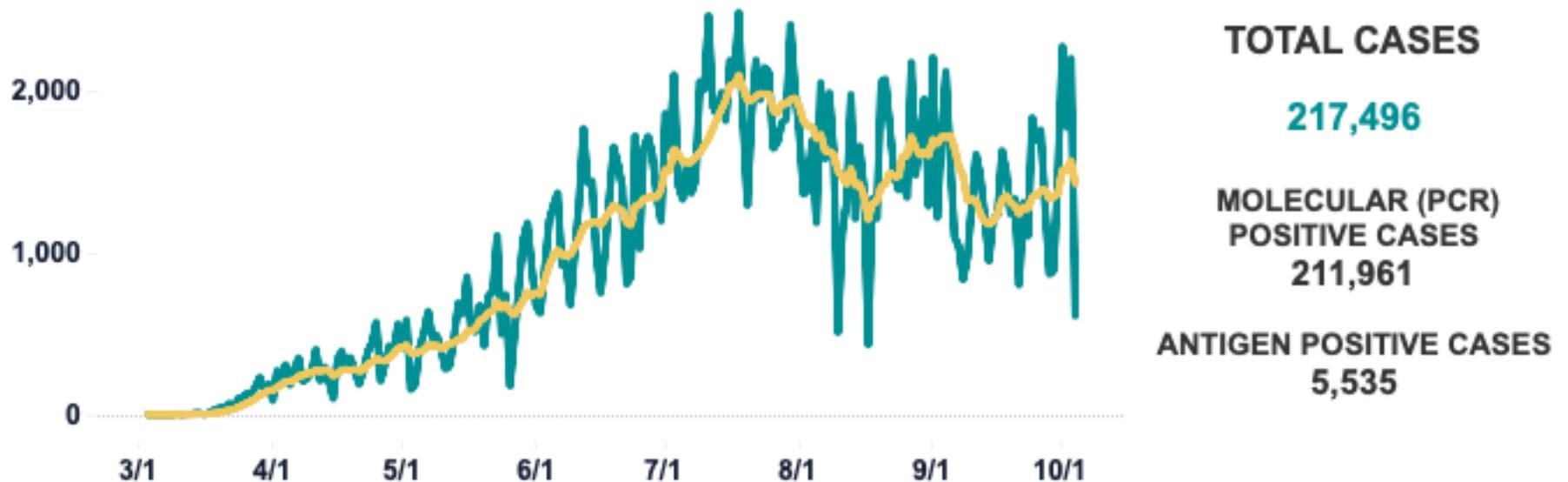
Daily Cases



Top Graph - Select By:

- CASES by Date Reported
- CASES by Date of Specimen Collection
- DEATHS by Date of Death

Is North Carolina seeing a downward trajectory over 14 days, or sustained leveling in new cases?



COVID Pediatric Epidemiology

Up To Date.

- Testing: children comprise ~10% of lab confirmed cases
- Transmission:
 - ↑'s with age
 - respiratory droplet > contact > (?)airborne
 - Asymptomatic pediatric spread possible, pre-symptomatic seems low
- Hospitalization rate:
 - <18yo: 8 in 100,000 general pop
 - <2yo: 24 in 100,000
 - 2-4% of COVID+ <18yo are hospitalized, of those: 33% requiring ICU, 6% req vent
 - Underlying conditions can elevate risk 5x
- Health disparity
 - 2.1 per 100,000 white children hospitalized
 - 5x higher in blacks
 - 8x higher in hispanics

Pediatric transmission?: US Schools Have Avoided Spike In COVID-19 Cases, Early Data Show [\(Reuters \(10/2\)\)](#)

Dr. Nathaniel Beers, co-author of the **American Academy of Pediatrics'** school opening guidelines:

“U.S. schools from kindergarten to high school have avoided a spike in COVID-19 cases, early data show, but medical experts say the real test is coming as students in large densely-populated cities such as New York and Miami return to classrooms.”

“There is starting to be some reassuring data that when you put in place the **right measures** – and have control of community spread ... you can open schools safely.”

COVID-19: Waning Antibody Response?

[\(Antibody correspondences in NEJM, September 23, 2020\)](#)

A series of correspondences in the *New England Journal of Medicine* revisit the suggestion that antibody responses to SARS-CoV-2 decrease quickly, particularly among patients with mild disease.

- "Very recent reports of well-documented cases of SARS-CoV-2 reinfection appear to validate our concerns that declining antibody levels may reflect waning immunity."

Coronavirus reinfections: three questions scientists are asking

Nature 585, 168-169 (2020)

How common is reinfection?

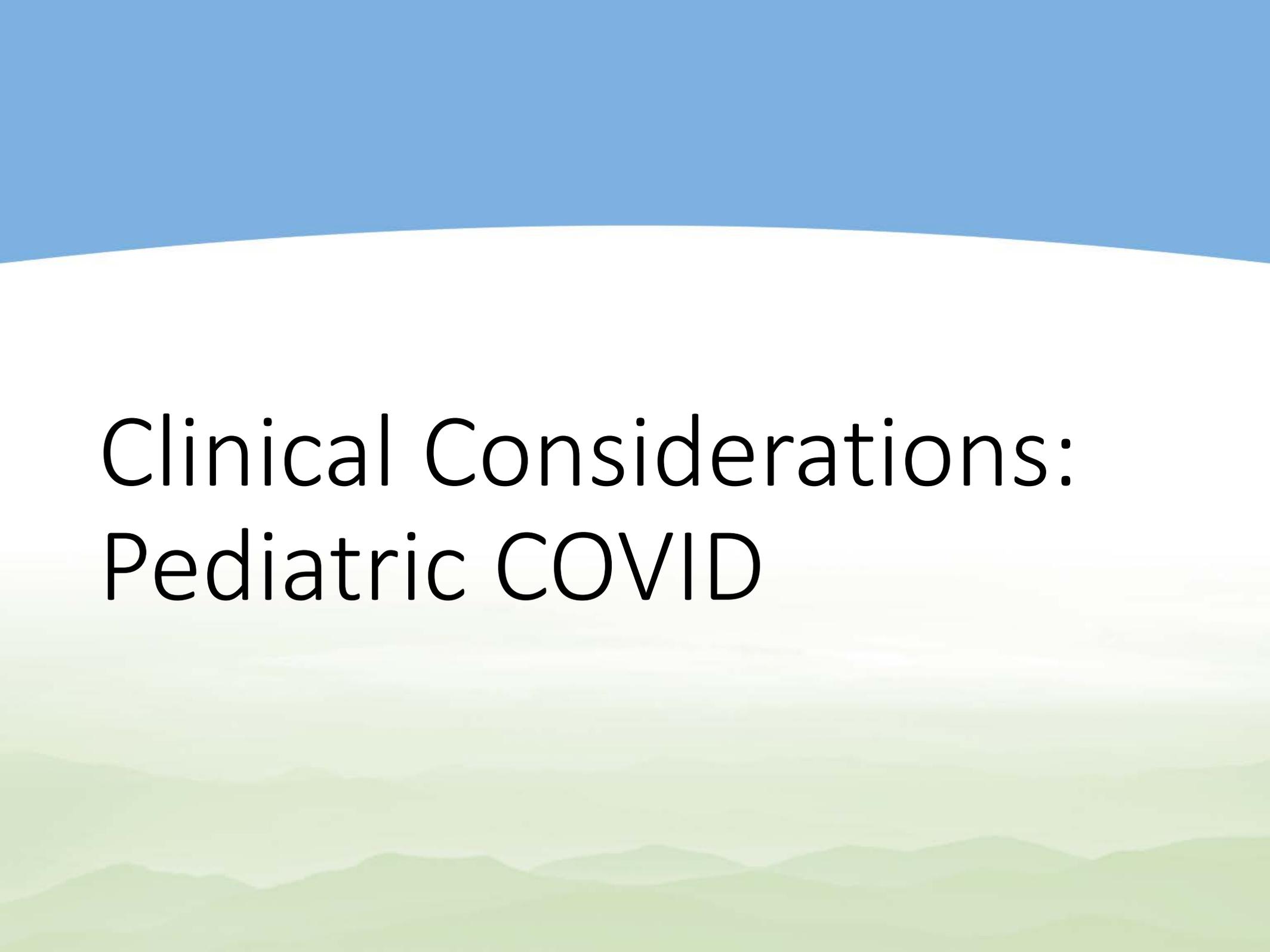
- Separate variants of the virus

Are reinfections more or less severe than the first?

- Variables = initial dose of virus, viral variants, and changes in a person's overall health
- Sorting out 'immunological memory' v. 'antibody-dependent enhancement' [rare]

What implications do reinfections have for vaccine prospects?

- Booster shot needed?



Clinical Considerations: Pediatric COVID

Clinical Manifestations: Pediatric COVID

The incubation period in children: 2-14 days with an average of 6 days
Asymptomatic pediatric patients account for 16-45% of COVID+ cases, depending on study.

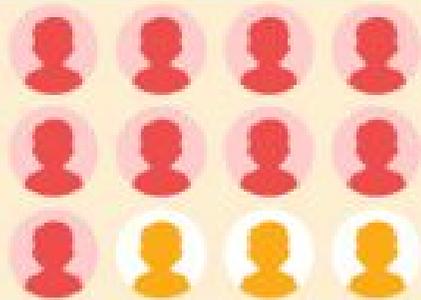
- Fever
- Fatigue
- Headache
- Myalgia
- Cough
- Nasal congestion or rhinorrhea
- New loss of taste or smell
- Sore throat
- Shortness of breath or difficulty breathing
- Abdominal pain
- Diarrhea
- Nausea or vomiting
- Poor appetite or poor feeding

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/pediatric-hcp.html>

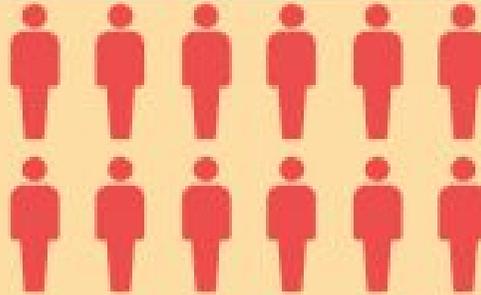
Transmission Dynamics of COVID-19 Outbreaks Associated with Child Care Facilities — Salt Lake City, Utah, April–July 2020

CDC MMWR / September 18, 2020 / 69(37);1319–1323

Children who likely got COVID-19 at two Utah child care centers spread it to household members



12 kids likely got COVID-19 in 2 child care centers; 3 didn't have symptoms



12 people who had contact with the children outside the child care centers got infected* including some parents and siblings



1 parent required hospitalization

SLOW THE SPREAD OF COVID-19 IN CHILD CARE CENTERS

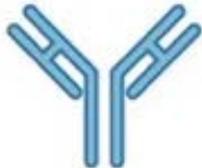
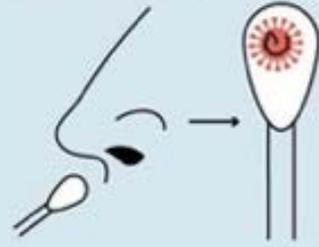
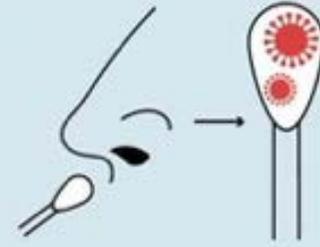
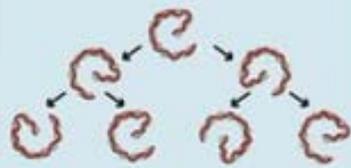
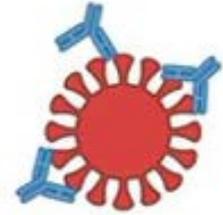
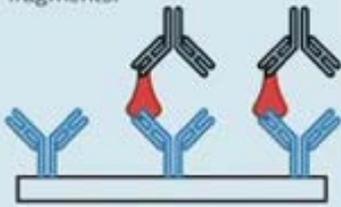
*confirmed or probable

- ✓ Test contacts of patients with COVID-19
- ✓ Wash hands frequently
- ✓ Stay home when sick
- ✓ Encourage adults and children 2 years and older to wear masks
- ✓ Clean and disinfect frequently

Testing <https://lungevity.org/sites/default/files/COVID-19/types-of-coronavirus-testing-print.pdf>

Types of coronavirus testing

What they tell you, what they don't and why it matters.

Type of test	Molecular test	Antibody test	Antigen test
	<p>Molecular tests detect genetic material from the virus.</p> 	<p>These tests detect antibodies: Y-shaped molecules made by the immune response to disable a virus or mark it for destruction.</p> 	<p>This is the newest of the three testing types. These tests detect antigens: pieces of a virus that the immune system recognizes. A single virus has many antigens.</p> 
Sample collection	<p>A nasal or throat swab collects infected cells.</p> 	<p>A blood draw collects antibodies produced by immune cells.</p> 	<p>A nasal swab collects infected cells.</p> 
Detection	<p>A series of chemical reactions copies viral genetic material. If you're not infected there won't be any viral material to copy.</p> 	<p>The test measures whether these antibodies bind to the novel coronavirus.</p> 	<p>Chemicals fragment the virus, and then antibodies attached to a plate detect these fragments.</p> 
What the test tells you	If you are infected now.	If you were infected in the past.	If you are infected now.

NC DHHS: Negative antigen test results should be considered in the context of a patient's recent exposures, history and the presence of clinical signs and symptoms consistent with COVID-19, and confirmed with an FDA authorized molecular assay, if necessary, for patient management.

Considerations for SARS-CoV-2 Diagnostic Testing

Symptoms	Exposure (<6'x15min, crowds)	Test?
+COVID Symptoms	No known exposure	Y
No Symptoms	+Known Exposure: <6'x15min	Y
No Symptoms	+Crowd>10 people, -masks, or -distancing	Y
No Symptoms	No known exposure	Usually not

CDC: Quarantine v. Isolation

Quarantine keeps someone who might have been exposed to the virus away from others in community

- should quarantine for 14 days since last exposure —excluding people who have had COVID-19 within the past 3 months,

Isolation keeps someone who is infected with the virus away from others, even in their home.

- 10 days after symptoms (or +test in asymptomatic) first appeared, and
- >24 hours with no fever without fever-reducing medication **and**
- Other symptoms of COVID-19 are improving** Loss of taste and smell may persist for weeks/months

***Special considerations exist in the context of healthcare worker shortages; call your health department.*

AAP: Return to Sports during COVID

- COVID-19 and risk of myocarditis: all children and adolescents with exposure or +COVID, regardless of symptoms, require a rest period and must be asymptomatic for >14 days before returning to exercise and/or competition.
- AAP: All +COVID athletes be cleared by PCP.
 - Focus on: cardiac symptoms, ie, chest pain, shortness of breath, fatigue, palpitations, or syncope.
- +COVID & Moderate symptoms: must be asymptomatic for at least 14 days and obtain clearance from PCP
- MIS-C patients: restricted from exercise for 3 to 6 months and cleared by PCP and appropriate pediatric subspecialist
- Cardiac symptoms, prolonged fever: should have an EKG performed and potentially be referred to a pediatric cardiologist for further assessment and clearance.

The Impact of COVID-19 Social Distancing on Other Infections in Children

Hatoun J et al. Social distancing for COVID-19 and diagnoses of other infectious diseases in children. *Pediatrics* 2020 Sep 2; [e-pub].

Study of **large pediatric primary care network** in Massachusetts: analyzed data of acute otitis media, bronchiolitis, common cold, croup, gastroenteritis, influenza, nonstreptococcal pharyngitis, pneumonia, sinusitis, skin and soft tissue infections, streptococcal pharyngitis, and urinary tract infection (UTI). Weekly incidence among children ages 0 to 17 years was compared during the same periods in 2019 and 2020

- Less social interaction during the COVID-19 pandemic has led to an impressive **reduction in common childhood infectious diseases**.
- As expected, **diagnosis rates per 100,000 patients were significantly lower** after social distancing. Some differences were striking; for example, influenza, croup, and bronchiolitis almost disappeared (<1 case per 100,000).

How Do COVID-19 Symptoms Compare with Seasonal Influenza Symptoms in Children?

Song X et al. JAMA Netw Open 2020 Sep 1

Study compared:

- 315 +COVID-19, <18yo diagnosed in spring 2020 and
- 1402 patients with seasonal influenza 2019–2020 season at one hospital system
- Children with COVID-19 were older than those with flu:
 - median age, 8.4 vs. 3.9 years
 - requiring hospitalization: median age, 9.7 vs. 4.2 years
- Hospitalization rates were similar COVID-19 v. influenza:
 - Hosp: 17% v. 21%
 - Intensive care admission 6% v. 7%
 - Mechanical ventilation 3% and 2%
 - Hospitalized +COVID-19 more often had underlying medical conditions.
- +COVID-19 more frequently reported systemic symptoms (fever, headache, myalgias) compared with all influenza patients

Mental Health, Substance Use, and Suicidal Ideation During COVID

MMWR / August 14, 2020 / 69(32);1049–1057

During late June, 40% of U.S. adults reported struggling with mental health or substance use*

ANXIETY/DEPRESSION SYMPTOMS



STARTED OR INCREASED SUBSTANCE USE



TRAUMA/STRESSOR-RELATED DISORDER SYMPTOMS



SERIOUSLY CONSIDERED SUICIDE†



*Based on a survey of U.S. adults aged ≥18 years during June 24–30, 2020

†In the 30 days prior to survey

For stress and coping strategies: bit.ly/dailylifecoping

Helping Children Cope

CDC July 1, 2020

Not all children and teens respond to stress in the same way.

- Regression
- Excessive worry or sadness, Irritability and “acting out” behaviors in teens.
- Unhealthy eating or sleeping habits.
- Poor school performance or avoiding school, difficulties with attention
- Anhedonia
- Somatic complaints
- Use of alcohol, tobacco, or other drugs.

Ways to support your child

- [Talk with your child](#); Reassurance
- Limit news exposure
- Maintain regular routines.
- Be a role model: Take breaks, sleep, exercise, eat well, connect.

Get immediate help for parents in a crisis

- Disaster Distress Helpline: 800-985-5990
- [National Suicide Prevention](#): 800-273-TALK
- [Nat. Dom. Violence Hotline](#): 800-799-7233
- [National Child Abuse](#) : 800-422-4453
- [National Sexual Assault](#): 800-656-HOPE

Vaccine Priority

[Vaccine priority report from the National Academies of Science, Engineering, and Medicine](#) (Oct, 4, 2020)

The National Academies of Sciences, Engineering, and Medicine recommendations to the U.S. DHHS:

- Phase 1a: high-risk healthcare workers and 1st responders, 5% pop
- Phase 1b: ≥ 2 comorbid conditions, 10% pop
- Phase 2: teachers, and daycare workers; 30–35% pop
- Phase 3: young adults, children, essential 40–45%
- Phase 4: everyone else

In each group, access should be prioritized for geographic areas that are more socially vulnerable.

Note: COVID may not meet criteria for school required vax – due to low morbidity

Dr. Fauci: COVID-19 vaccines for children must ‘strike a balance’

October 03, 2020



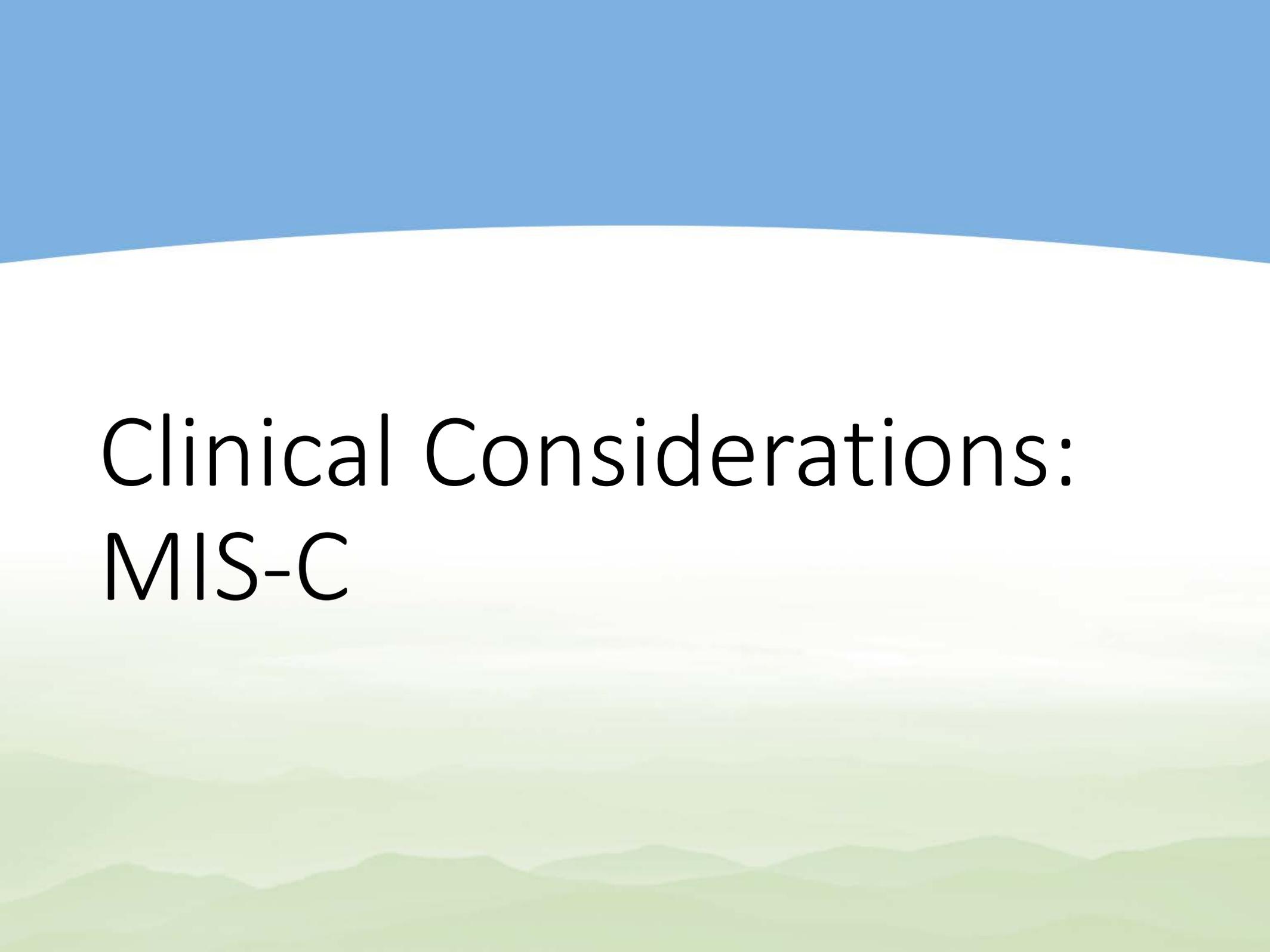
“You have to strike a balance of making sure you get a vaccine — if it’s safe and effective — to children in a timely manner while you’re also very attentive to the extra potential risk you’d see in a child given the vulnerability of children.”

COVID-19 Deaths Among People Under Age 21 Detailed

MMWR / September 18, 2020 / 69(37);1324–1329

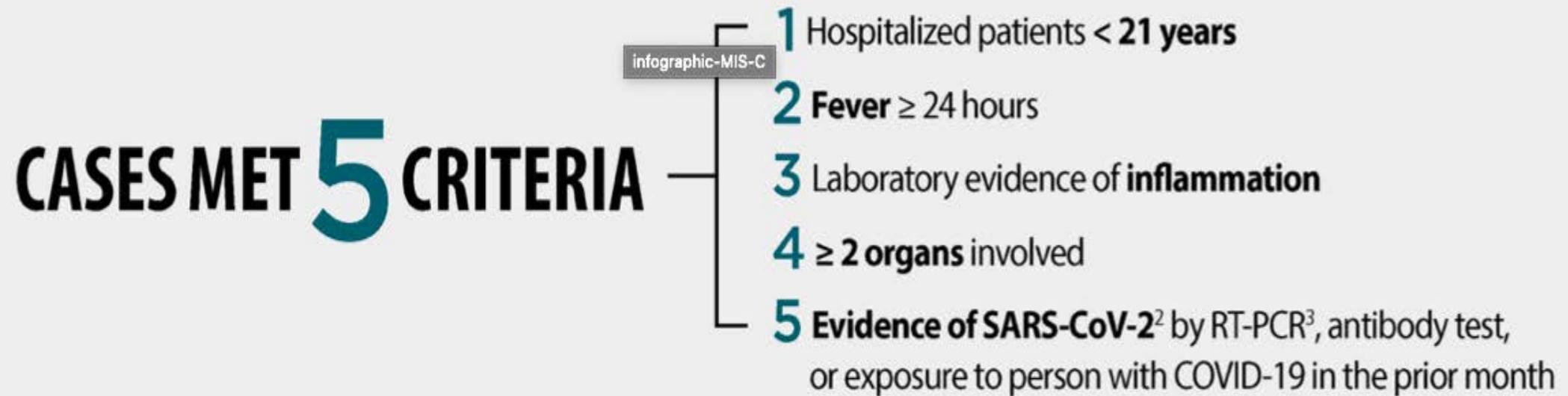
CDC researchers identified 121 deaths related to COVID-19 or multisystem inflammatory syndrome in children (MISC) <21yo, US February - July.

- **75% of COVID deaths < 21yo had underlying health conditions**
- **Older children affected:**
 - 70% aged 10 through 20 years,
 - 20% were in children aged 1 through 9, and
 - 10% occurred in those under 1 year.
- **Latino and Black** youth were disproportionately affected, **74% of deaths.**
- The most common underlying conditions were
 - chronic lung disease (mostly asthma),
 - obesity,
 - neurologic/developmental conditions, and
 - cardiovascular conditions.
- **AAP for children with complex needs:** "Families can promote the practice of face covering use at home to enable [these children with underlying conditions] to become accustomed to situations where face coverings are more necessary."
- The **researchers call for** "clear, consistent, and developmentally, linguistically, and culturally appropriate COVID-19 **prevention messages**" for young people, particularly those at increased risk.



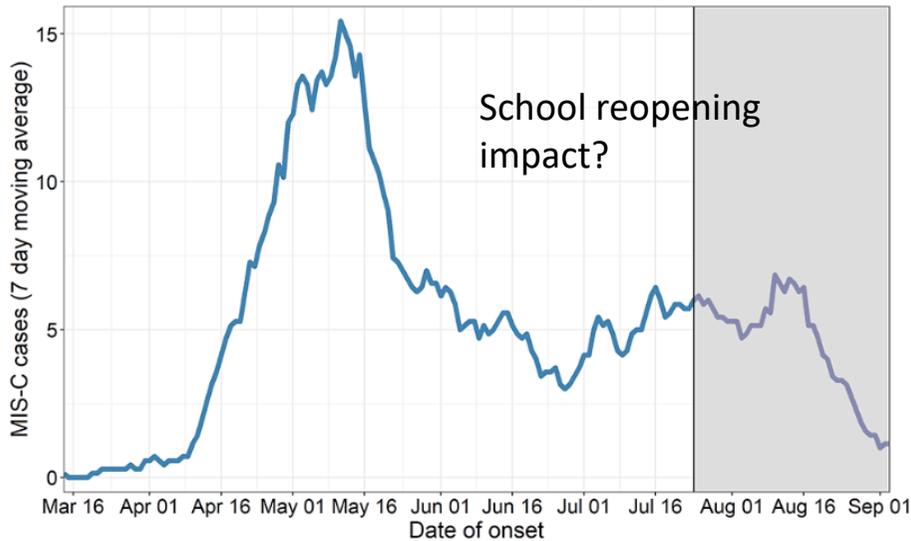
Clinical Considerations: MIS-C

Multisystem inflammatory syndrome in children (MIS-C): Case Definition

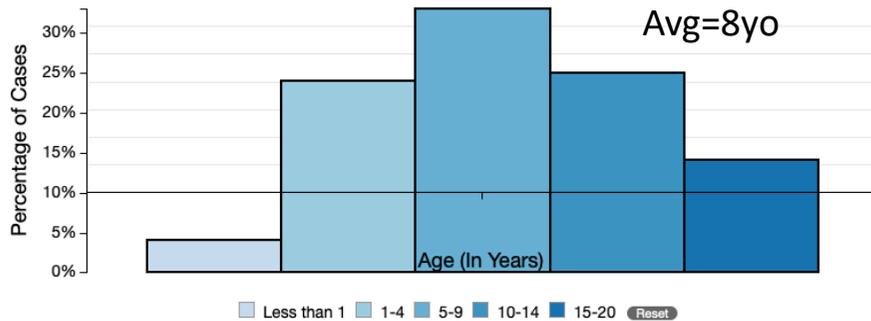


MIS-C: Epidemiology (CDC: 9/17/2020)

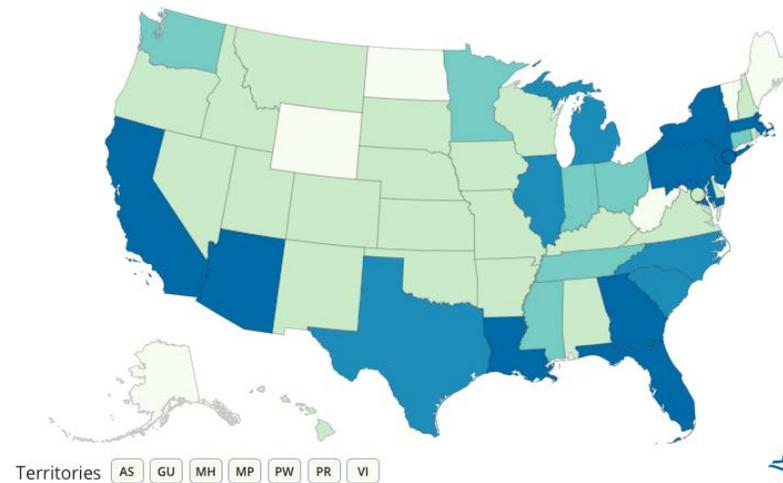
MIS-C Cases (7-Day Moving Average)



Cases by Age Group

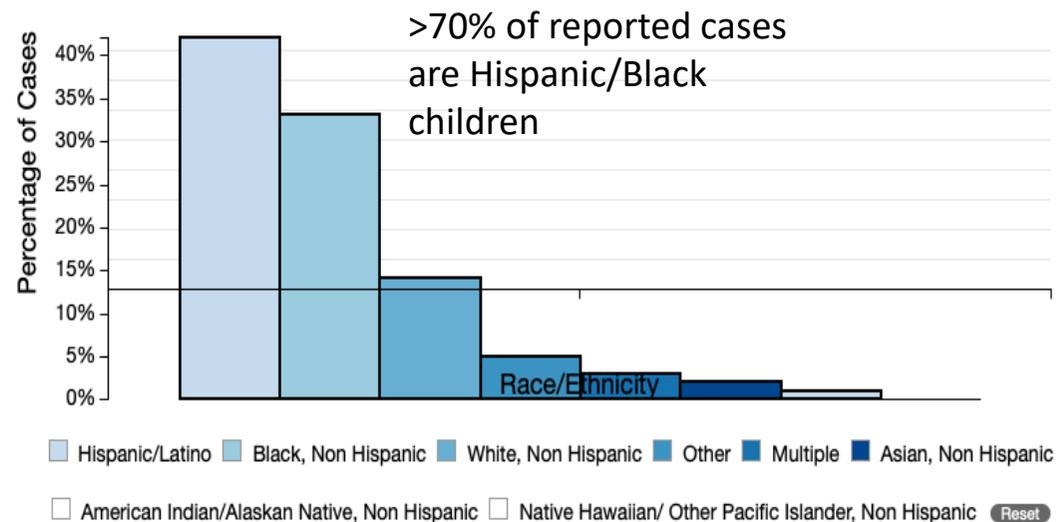


MIS-C Case Ranges by Territory, State, New York City, and Washington, DC*



CASES: 935
DEATHS: 19

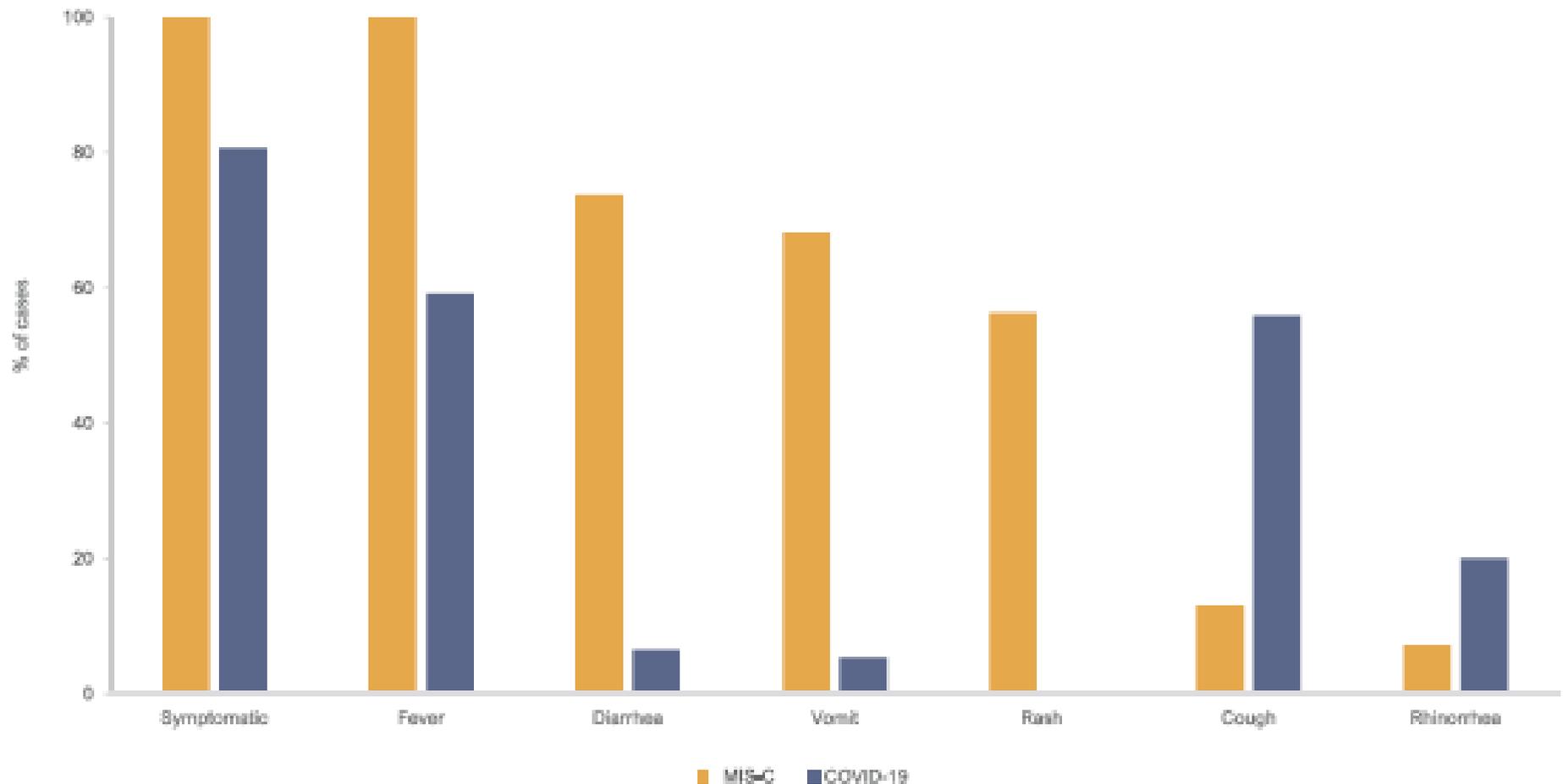
Cases by Race & Ethnicity



MIS-C: Primary care assessment – *not simply worse COVID*

M. Ahmed et al / *EclinicalMedicine* 00 (2020) 100527

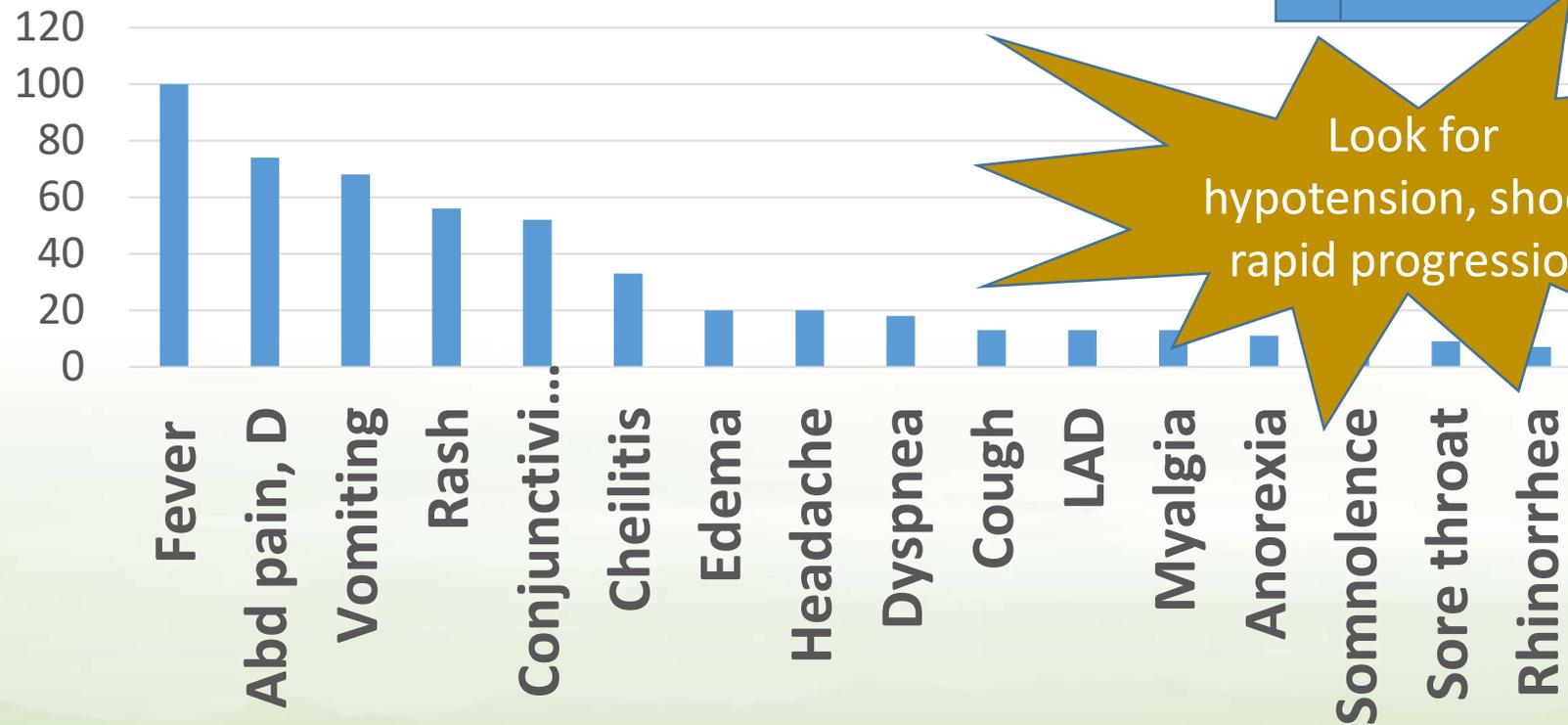
Signs and Symptoms in MIS-C vs. COVID-19



MIS-C: Symptomatology

LABS:
Lymphopenia <1000
Platelets <150,000
Neutrophilia.

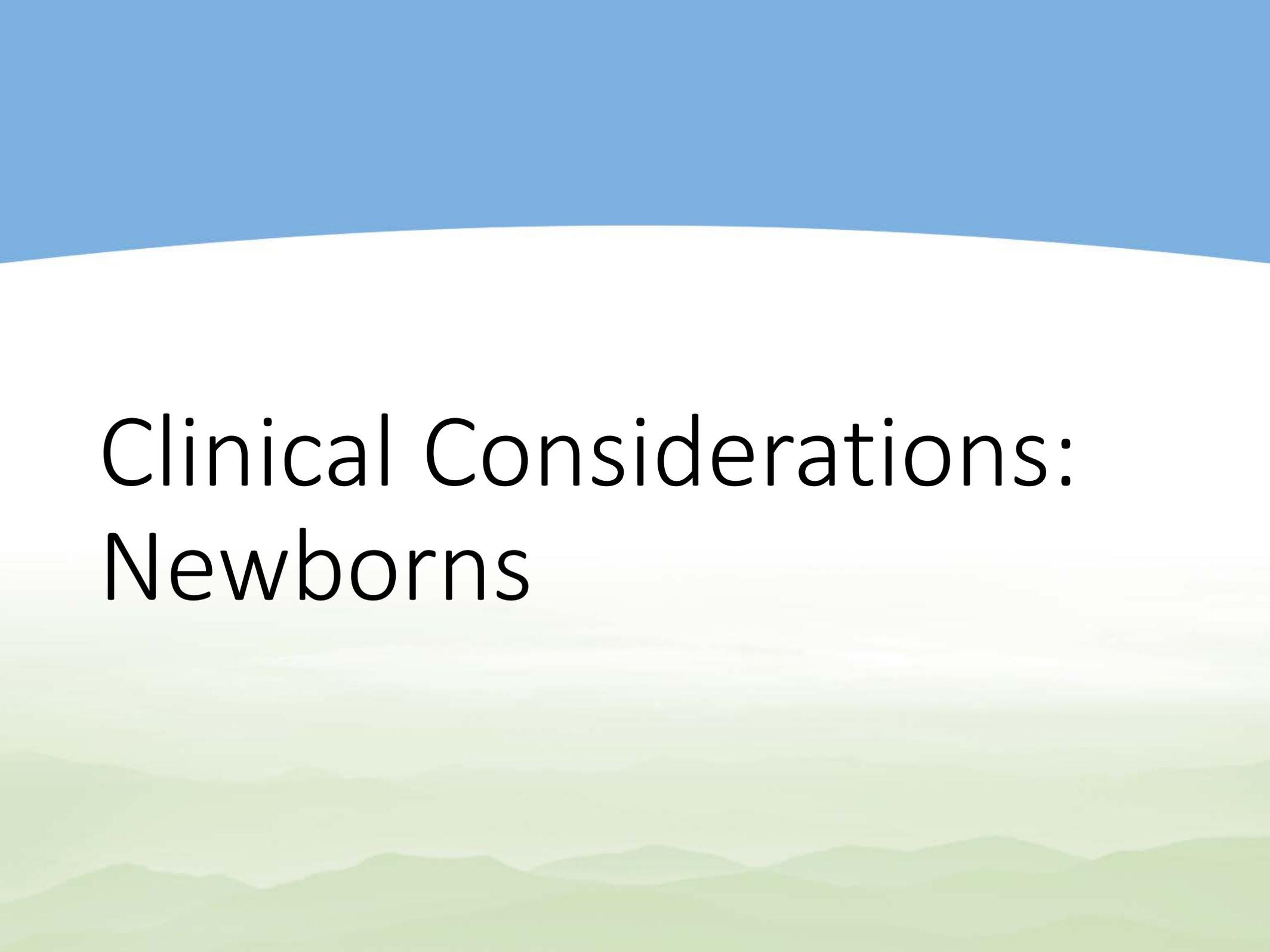
MIS-C: Symptom Prevalence



Look for
hypotension, shock,
rapid progression

MIS-C: Diagnostic W/U (CDC)

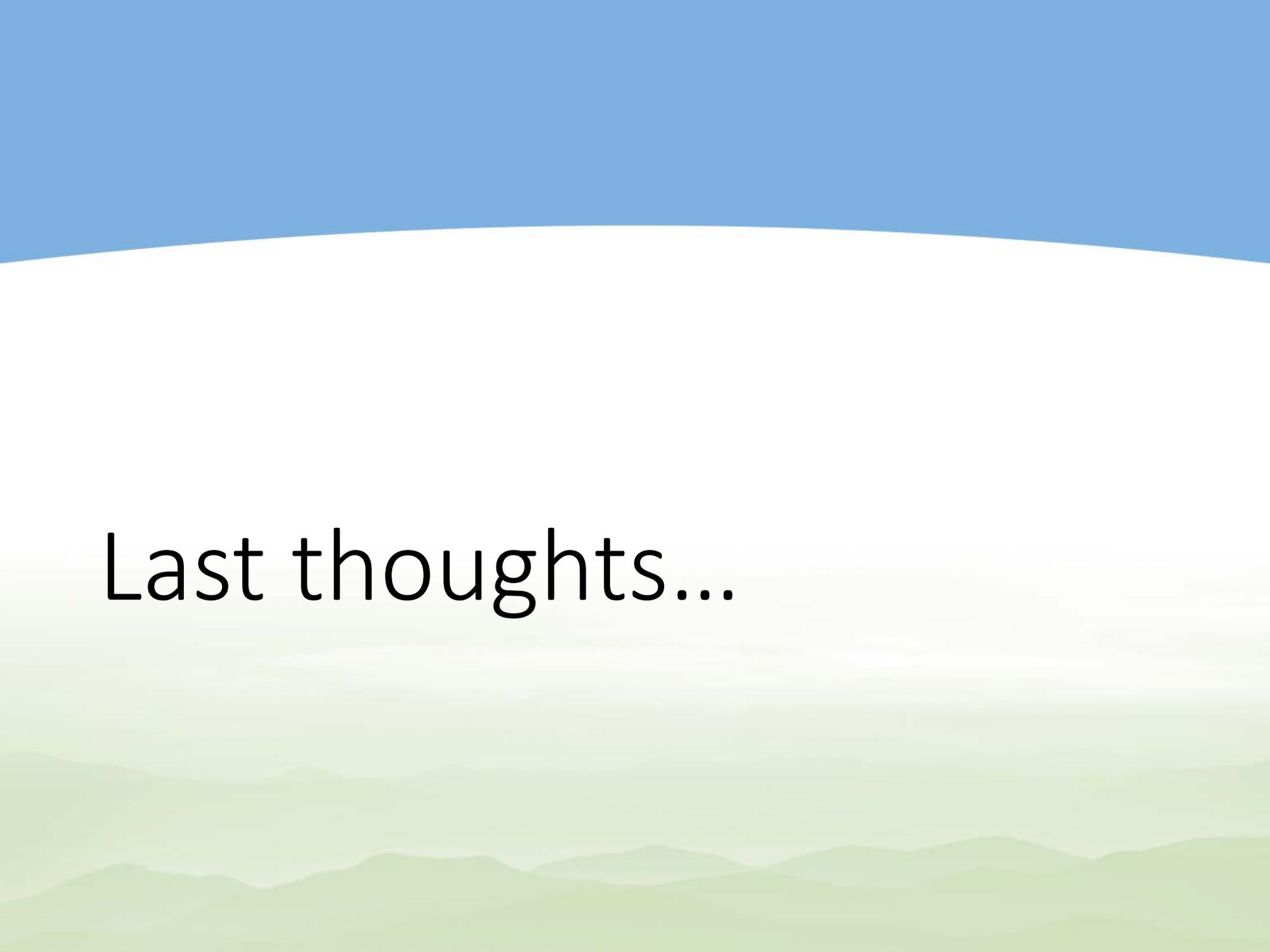
- Primary care evaluation:
 - Vital signs, assessment of perfusion and oxygen saturation
 - Early consultation and coordination with Peds Hospitalist; Peds ID.
 - Laboratory:
 - CBC with diff
 - CMP
 - UA
 - Inflammatory markers: ESR, CRP, ferritin, LDH, pro-BNP, troponin, and fibrinogen
- Inpatient Mgt: Stabilization, IVIG, steroids



Clinical Considerations: Newborns

Vertical transmission (AAP)

- 2% of babies born to +COVID mothers, test positive
- Routine care regarding
 - Delayed cord clamping
 - Skin-to-skin care
 - Rooming in
 - Lactation
- +COVID moms mask, distancing, hand hygiene as appropriate
- Test newborn at 24hr; & @48hr if neg @24hr.

The background of the slide features a stylized landscape. At the top, there is a solid blue sky. Below it is a white, curved horizon line that separates the sky from the land. The land consists of several layers of green, rounded mountain ranges, with each successive range in the distance becoming progressively lighter and more faded, creating a sense of depth and atmosphere.

Last thoughts...

Halloween, edited. (CDC, Oct 2020)



Many traditional Halloween activities can be high-risk for spreading viruses.

Lower risk activities – Stay at Home or at safe distance

- Decorating your house, apartment, or living space
- Doing a Halloween visual scavenger hunt in neighborhood
- Virtual Halloween costume contest

Moderate risk activities

- One-way trick-or-treating, grab and go at the end of a driveway
- A Halloween mask \neq cloth mask(2 breathable layers); don't double up
- Outdoor Halloween movie night with local family friends > 6 feet
 - If screaming will likely occur, greater distancing is advised

Higher risk activities

- Traditional trick-or-treating
- Attending crowded costume parties hold indoors

Addressing Health Equity (CDC)

Your office can mitigate ethnic disparities!:

- Increase testing for racial and ethnic minority populations (think: additional risk factor)
- Provide [telehealth](#) options
- Train employees at all levels of the organization to identify and interrupt all forms of discrimination; provide them with [training](#) in [implicit bias](#).
- Increase translation services

Thank you!

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