Mission Peds/PICU Guidance for COVID19

COHORTING: Patients should be cohorted physically and with respect to nursing care when possible. If multiple COVID+ patients are admitted, those patients should be grouped together and cared for by the same nurse if possible to minimize exposure. In PICU, prefer G331 (if negative pressure needed) & G332. On Peds, G319 (if negative pressure needed) and G318-G315. Assigned nurse should attempt to stay at the same workstation throughout the day.

ADMISSION LABS: For any patient requiring supplemental oxygen, obtain CBC w/ differential, CRP, ESR, CMP, LDH, Ferritin, D-dimer, PT/INR, PTT, fibrinogen, Type and Screen, Pregnancy test if appropriate

UNIT PLACEMENT: Patients requiring 4L of oxygen and greater or any signs of hemodynamic instability should be admitted to the PICU.

TREATMENT:

<table>
<tr><td>Mild disease</td><td colspan="2">Supportive care.</td></tr>
<tr><td rowspan="3">Moderate disease
(requiring supplemental oxygen)

Utilize the “PD Pediatric COVID-19 and MIS-C” PowerPlan</td><td>Consider in combination with Remdesivir:
Dexamethasone</td><td>• Dosing:
○ 0.15 mg/kg/dose IV or PO daily for up to 10 days. Max dose 6 mg per dose.
May discontinue at discharge or when no longer requiring supplemental O2.</td></tr>
<tr><td>Consider:
Remdesivir</td><td>• FDA approved for hospitalized patients ≥12 years of age weighing ≥40kg. Patients <12 years OR <40kg are eligible to receive Remdesivir via the FDA’s EUA process. (Lower age/weight limit: 7 days; 3.5kg)
Provide family with FDA Fact Sheet for Health Care Providers
PROVIDER DOCUMENTATION OF RECEIPT REQUIRED FOR EUA.

• Dosing:
○ 5mg/kg IV x 1 (max dose 200 mg), then 2.5 mg/kg IV daily (max dose 100 mg) for 5-10 days.
○ Use the pediatric subplan to order Remdesivir:
PD Pediatric Remdesivir for Coronavirus 19 (COVID-19) Subplan (System)
• OK to discontinue prior to day 5 if off oxygen and ready for discharge.

• Side effects are elevated LFTs and GI upset. Follow serial LFTs to monitor for side effects.</td></tr>
<tr><td>Consider:
Lovenox
* Consider heme/onc consult</td><td>• Dosing:
○ Prophylactic: 0.5 mg/kg SQ q12h (max dose 50 mg)
○ Treatment: 1 mg/kg SQ q12h
• Use the following order set to order Lovenox: “PD Pediatric COVID-19 and MIS-C” PowerPlan
Consider continuation of anticoagulation therapy for 30 days or until mobile</td></tr>
</table>

<table>
<tr>
<td rowspan="3">Severe disease
(requiring HFNC, NIV, invasive ventilation or other organ failure)

Utilize the “PD Pediatric COVID-19 and MIS-C” PowerPlan</td>
<td>All patients:
Dexamethasone</td>
<td>• Dosing:
○ 0.15 mg/kg/dose IV or PO daily for up to 10 days. Max dose 6 mg per dose.
May discontinue at discharge or when no longer requiring supplemental O2.</td>
</tr>
<tr>
<td>Consider in combination with dexamethasone:
Remdesivir</td>
<td>• FDA approved for hospitalized patients ≥12 years of age weighing ≥40kg. Patients <12 years OR <40kg are eligible to receive Remdesivir via the FDA’s EUA process. (Lower age/weight limit: 7 days; 3.5kg)
Provide family with FDA Fact Sheet for Health Care Providers
PROVIDER DOCUMENTATION OF RECEIPT REQUIRED FOR EUA.
• Dosing:
○ 5mg/kg IV x 1 (max dose 200 mg), then 2.5 mg/kg IV daily (max dose 100 mg) for 5-10 days.
○ Use the pediatric subplan to order Remdesivir:
PD Pediatric Remdesivir for Coronavirus 19 (COVID-19) Subplan (System)
• OK to discontinue prior to day 5 if off oxygen and ready for discharge.
• Side effects are elevated LFTs and GI upset. Follow serial LFTs to monitor for side effects.
• Not recommended for patients requiring intubation/mechanical ventilation</td>
</tr>
<tr>
<td>Consider in combination with dexamethasone:
Baricitinib

Must be administered within 3 days of hospital admission</td>
<td>• EUA has been issued for children ≥2 years.
• Provide family with FDA fact sheet: https://www.fda.gov/media/143824/download
• Dosing:
○ Children ≥9 years: 4mg daily oral up to 14 days
○ Children 2-8 years: 2mg daily oral up to 14 days
• Side effects include elevated LFTs, thrombosis.
○ Required baseline labs: ALT, CBC, Hcb, SCr
○ Baricitinib is not recommended if ALT>400, ALC<200, ANC<500, Hgb<8
▪ These are not definitive cutoffs, therapy may be temporarily held or continued with provider discretion
○ If CBC and LFTs are normal at baseline, labs do not need to be repeated unless clinically indicated
○ If CBC and LFTs are abnormal at baseline or during therapy, recommend follow up labs every 3 days
○ SCr should be monitored every 3 days to adjust dose appropriately based on eGFR</td>
</tr>
<tr>
<td>Consider in combination with dexamethasone:
Tocilizumab</td>
<td>• EUA has been issued for children ≥2 years.
• Provide family with FDA fact sheet: https://www.fda.gov/media/150320/download
• Dosing:
○ 8mg/kg IV once (max dose 800mg)</td>
</tr>
</table>

	Must be administered within 3 days of hospital admission	**For patients requiring intubation/mechanical ventilation, give dexamethasone PLUS IV tocilizumab within 24 hours of admission to the PICU**
	Consider: **Convalescent Plasma** **May consider ID consult*	• Recommended via FDA's EUA process in clinical trial setting. Provide family with EUA Fact Sheet for Patients and Caregivers . PROVIDER DOCUMENTATION OF RECEIPT REQUIRED. See attached document: HCA North Carolina Division Guidance for Convalescent Plasma Use – Pediatrics. • *CONSENTS*: Mission Blood Consent **AND** Secondary Consent for Convalescent Plasma are required. (Can also be obtained from the print shop MHS-00001-222-0920) • Dosing: ○ Weight based dosing of 10 mL/kg ○ Put "Covid-19 convalescent plasma" in order comments
	Prone positioning	• Prone positioning should be done at least **12 hours/day**
	All patients: **Lovenox** ** Consider heme/onc consult*	• Dosing: ○ **Prophylactic:** 0.5 mg/kg SQ q12h (max dose 50 mg) ○ **Treatment:** 1 mg/kg SQ q12h • Use the following order set to order Lovenox: "PD Pediatric COVID-19 and MIS-C" PowerPlan • Consider continuation of anticoagulation therapy for 30 days or until mobile

PPE – All COVID+/PUI patients require full PPE including eye protection, gown, gloves, and fit-tested N-95 mask. **You may obtain green scrubs to wear during your shift if you are caring for a COVID+ patient. Eye protection is required for *all* patient care, regardless of COVID or PUI status.**

Any patient with suspected or confirmed COVID-19	Fit tested N95 or PAPR plus eye protection, gown, and gloves
Any patient with confirmed *non*-COVID respiratory infections (i.e. RSV) during or within 30 minutes of an AGP	Fit tested N95 or PAPR plus eye protection, gown, and gloves
Any patient receiving any other aerosol-generating procedures (AGPs**:** NIV, CPR, open suctioning of airways, intubation and extubation, sputum induction**)**	N95 or PAPR plus eye protection, gown, and gloves
All other patient encounters	Level 1, 2, or 3 mask or non-fit tested N95 mask with eye protection
All patients and family members should wear a level 1 mask when outside their room or when a healthcare worker enters their room	

- Utilize brown paper bags to store N-95 for your shift. You can cut the bag to make it shorter, making it easier to access your mask. If you are going to multiple COVID+ rooms, you may leave your mask and eye protection on (change gown and gloves).

- It is recommended to wear a full face shield in COVID+ rooms to help protect the N-95. If you do this, you do not need to wear a level 3 over your N-95. If you do decide to wear a level 3, this mask should be specific to this purpose. If you are wearing a level 3 mask while at the nursing station, it should be a different (clean) level 3.

COVID-19 Discharge process/education:

Provide education on signs/symptoms of DVT (swelling, pain, redness, warmth). This document can be attached to the patient's discharge to provide education on DVTs: DVT (Deep Vein Thrombosis): General Info
AAP Back to Play Recommendations: Educate families that patients who have tested positive for COVID-19 should refrain from exercise until asymptomatic for 14 days and have received clearance from the Primary Care Provider. (https://services.aap.org/en/news-room/news-releases/aap/2020/american-academy-of-pediatrics-updates-guidance-on-returning-to-sports-activities/)

Mission Peds/PICU MIS-C Management

MIS-C Case Definition: Individual less than 21 years with fever, and laboratory evidence of inflammation (ESR, CRP, d-dimer, ferritin, fibrinogen), severe illness requiring hospitalization and ≥2 organ systems involved; no alternative diagnosis and a positive COVID result, positive COVID antibodies, or exposure to a suspected or confirmed case within 4 weeks of onset of symptoms.

Consider MIS-C diagnosis for children with: fever, rash, GI upset, elevated inflammatory markers, conjunctivitis, red cracked lips, swelling of hands and feet, shock

Admission Placement: Patients should be admitted to the PICU for the following: evidence of shock *after* 40mL/kg fluid resuscitation, cardiac dysfunction on echocardiogram or moderately elevated BNP or troponin levels.

Transfer to ECMO facility if patient fails standard therapy or displays arrhythmias and/or moderate cardiac dysfunction.

TREATMENT:

	Labs/Diagnostics	Consults/Monitoring	Treatments
Suspected MIS-C *Utilize the "PD Pediatric COVID-19 and MIS-C" PowerPlan*	**Labs:** • CBC • CRP/ESR • CMP • LDH • PT/PTT • D-dimer • Fibrinogen • Ferritin • Troponin • BNP • COVID PCR • COVID antibody • Infectious labs including blood and urine culture if sepsis suspected **Diagnostic Studies:** • EKG • Consider ECHO	• Consider cardiology and/or ID consult • Telemetry • Follow serial labs daily or as needed to monitor response to treatment	*Consider*: • **Solumedrol**: 2 mg/kg day (then taper over 3 weeks) AND/OR • **IVIG**: 2 gm/kg/dose x1 (maximum 100 gm/dose). ○ May divide dose 1g/kg daily for 2 days in the setting of concern for volume overload. • **Aspirin**: 3-5 mg/kg/day; max 81 mg/day. Avoid if platelet count ≤80K • *Consider adding a proton pump inhibitor for patients receiving steroids + aspirin to decrease risk for GI bleed*

Confirmed MIS-C
 	
Utilize the "PD Pediatric COVID-19 and MIS-C" PowerPlan
	Labs:
	• CBC
	• CRP/ESR
	• CMP
	• LDH
	• PT/PTT
	• D-dimer
	• Fibrinogen
	• Ferritin
	• Troponin
	• BNP
	• COVID PCR
	• COVID antibody
	• Blood culture
	• Urinalysis/urine culture
	
	Diagnostic Studies:
	• EKG
	• Echocardiogram
		• Consider cardiology and/or ID consult
		
		• Telemetry
		
		• Follow serial labs daily or as needed to monitor response to treatment
			First line:
			• **Solumedrol**: 2 mg/kg day (then taper over 3 weeks).
			  ○ May consider increasing to 10mg/kg dose x1 for moderate disease
			
			AND
			
			• **IVIG**: 2 gm/kg/dose x1 (maximum 100 gm/dose).
			  ○ May divide dose 1g/kg daily for 2 days in the setting of concern for volume overload.
			
			AND
			
			• **Aspirin**: 3-5 mg/kg/day; max 81 mg/day. Avoid if platelet count ≤80K
			
			• *Consider adding a proton pump inhibitor for patients receiving steroids + aspirin to decrease risk for GI bleed*
			
			Consider for severe disease:
			• **High dose Solumedrol** for severe disease: 30 mg/kg daily x 3 days **and transfer** to ECMO facility
			
			AND
			
			• **Anakinra** 1-2 mg/kg/day SC; May consider increasing up to a maximum of 10 mg/kg/day **and transfer** to ECMO facility for refractory cases

Kawasaki's Disease
 	
Diagnostics:
Fever ≥5 days plus 4 out of 5 of:
-Changes in lips/oral cavities
-Conjunctivitis
-Rash
-Erythema/edema of hands/feet
-Lymphadenopathy > 1.5cm
	Labs:
	• CBC
	• CRP/ESR
	• CMP
	• LDH
	
	Consider:
	• PT
	• PTT
	• D-dimer
	• Fibrinogen
	• Ferritin
	• Troponin
	• BNP
	• COVID PCR
	• COVID antibody
	
	Diagnostic Studies:
	• EKG
	• Echocardiogram
		• Cardiology Consult
		
		• Telemetry Monitoring
			First line:
			• **IVIG**: 2 gm/kg/dose x1 (maximum 70-100 gm/dose).
			  ○ May consider repeating dose daily x1 for continued fever for 36h or worsening clinical condition.
			
			• **Aspirin**: 30-50 mg/kg/day divided q6h. Avoid if platelet count ≤80K
			  ○ Decrease to 3-5 mg/kg (max 81mg) daily once afebrile
			
			Consider:
			• **Prednisone** 1mg/kg BID for high risk or refractory cases
			
			• **Anakinra** 1-2 mg/kg/day SC; May consider increasing up to a maximum of 10 mg/kg/day **and transfer** to ECMO facility for refractory cases

MIS-C Discharge Considerations:

- Patients should have cardiology follow up within 2 weeks of discharge.
- AAP Return to Play guidelines for MISC: 3-6 months (https://services.aap.org/en/news-room/news-releases/aap/2020/american-academy-of-pediatrics-updates-guidance-on-returning-to-sports-activities/)

Resources:

CHOP clinical pathway: https://www.chop.edu/clinical-pathway/covid-disease-clinical-pathway

Cincinnati Children's: COVID-19 MIS-C Algorithm version 2.1

Duke Children's Hospital: Inpatient Management of Multisystem Inflammatory Syndrome in Children (MIS-C)

UNC Children's: Evaluation and Management of COVID-19 and Related Syndromes at UNC Children's

Levine Children's Hospital: COVID-19 Treatment Guidance – Pediatric Patients

NIH guidelines: https://www.covid19treatmentguidelines.nih.gov

American College Rheumatology: ACR COVID-19 Clinical Guidance Summary MIS-C Hyperinflammation