WASHOE COUNTY HEALTH DISTRICT
ENHANCING QUALITY OF LIFE

May 21, 2020, Vol. 40, No. 09
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EPI-NEWS

Public Health

Serving Reno, Sparks and all of Washoe County, Nevada
Telephone: 775-328-2447 | Fax: 775-328-3764 | EpiCenter@washoecounty.us | washoecounty.us/health

IN THIS ISSUE: REPORT MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN (MIS-C) ASSOCIATED WITH COVID-19

How to Report a Case of Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with COVID-19 in Washoe County?

On May 14, the Centers for Disease Control and Prevention (CDC) issued an issue of Health Advisory about Multisystem Inflammatory Syndrome in Children (MIS-C) associated with COVID-19 through CDC's Health Alert Network. The Washoe County Health District also forwarded that health advisory to all recipients of WCHD's Epi-News via email listserv or fax on May 17 here. CDC's HAN Health advisory on this topic can be found (https://emergency.cdc.gov/han/2020/han00432.asp).

In that Health Advisory, CDC highly recommended that healthcare providers who cared or were caring for patients younger than 21 years of age meeting MIS-C criteria should report suspected cases to their local, state, or territorial health department. The Washoe County Health District (WCHD) requested healthcare providers in Washoe County to report cases with MIS-C in hospitalized patients aged <21 years to the Epidemiology Program at **775-328-2447** or fax the report to **775-328-3764.**

Case Definition for Multisystem Inflammatory Syndrome in Children (MIS-C)

- An individual aged <21 years presenting with fever [i], laboratory evidence of inflammation [ii], and evidence of clinically severe illness requiring hospitalization, with multisystem (≥2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological); **AND**
- No alternative plausible diagnoses; **AND**
- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms

[i] Fever ≥38.0°C for ≥24 hours, or report of subjective fever lasting ≥24 hours
[ii] Including, but not limited to, one or more of the following: an elevated C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), fibrinogen, procalcitonin, d-dimer, ferritin, lactic acid dehydrogenase (LDH), or interleukin 6 (IL-6), elevated neutrophils, reduced lymphocytes and low albumin

Additional comments

- Some individuals may have full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection

On May 21, WCHD received a case report form developed by CDC. See the following three pages for this form. Although investigating such a case is the primary responsibility of WCHD, WCHD really appreciates some assistance from clinicians because of the extensive amount of information on this form is associated with clinical findings and patient care which requires the treating clinician's judgement, not purely based on medical record review performed by WCHD epidemiologists. The fillable format of this form can be provided upon request by sending an email to EpiCenter@washoecounty.us.

Please share this form with your frontline clinicians so they know what information they should watch for during the care of patients with COVID-19. **Effective May 21, 2020, reporting suspected MIS-C is MANDATORY in Washoe County and Nevada.**

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL
AND PREVENTION
ATLANTA, GA 30329

Multisystem Inflammatory Syndrome Associated with COVID-19 Case Report Form

MIS ID *(REQUIRED)*:_____ **Health Department ID:**_____ **NCOV ID** *(if available)*:_____

NNDSS ID *(local_record_id/case id)*:_____ **Tools for CRF data submission to supplement NNDSS case notification/data:** ○DCIPHER ○RedCap

Abstractor name: _____ **Date of abstraction:** ____/____/_____

SECTION 1 – INCLUSION CRITERIA

1.1 ☐ Age <21, AND

1.2 ☐ Fever >38.0°C for ≥24 hours, or report of subjective fever lasting ≥24 hours, AND

1.3 ☐ Laboratory markers of inflammation (including, but not limited to one or more; an elevated C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), fibrinogen, procalcitonin, d-dimer, ferritin, lactic acid dehydrogenase (LDH), or interleukin 6 (IL-6), elevated neutrophils, reduced lymphocytes and low albumin, AND

1.4 ☐ Evidence of clinically severe illness requiring hospitalization, with multisystem (≥2) organ involvement *(check all applicable below)*: AND

- **1.4.1** ☐ Cardiac (e.g. shock, elevated troponin, BNP, abnormal echocardiogram, arrhythmia)
- **1.4.2** ☐ Renal (e.g. acute kidney injury or renal failure)
- **1.4.3** ☐ Respiratory (e.g. pneumonia, ARDS, pulmonary embolism)
- **1.4.4** ☐ Hematologic (e.g. elevated D-dimers, thrombophilia, or thrombocytopenia)
- **1.4.5** ☐ Gastrointestinal (e.g. elevated bilirubin, elevated liver enzymes, or diarrhea)
- **1.4.6** ☐ Dermatologic, (e.g. rash, mucocutaneous lesions)
- **1.4.7** ☐ Neurological, (e.g. CVA, aseptic meningitis, encephalopathy)

1.5 ☐ No alternative plausible diagnosis; AND

1.6 ☐ Positive for current or recent SARS-COV-2 infection by (check all applicable below): OR

- **1.6.1** ☐ RT-PCR
- **1.6.2** ☐ Serology
- **1.6.3** ☐ Antigen test

1.7 ☐ COVID-19 exposure within the 4 weeks prior to the onset of symptoms

- **1.7.1** If yes, date of first exposure within the 4 weeks prior : *(MM/DD/YYYY)*: ____/____/_____ ☐ Unknown

SECTION 2 – PATIENT DEMOGRAPHICS

2.1 **State of Residence:** _____

2.2 **Patient zip code**/postal code *(primary residence)*: _____

2.3 **Date of birth** *(MM/DD/YYYY)*: ____/____/_____

2.4 **Sex:** ○ Male ○Female

2.5 **Ethnicity:** ○ Hispanic or Latino ○ Not Hispanic or Latino ○Refused or Unknown

2.6 **Race** *(mark all that apply, selecting more than one option as necessary)*:

- **2.6.1** ☐White
- **2.6.2** ☐Black or African American
- **2.6.3** ☐American Indian
- **2.6.4** ☐Alaska Native or Aboriginal Canadian
- **2.6.5** ☐Native Hawaiian
- **2.6.6** ☐Other Pacific Islander
- **2.6.7** ☐Asian
- **2.6.8** ☐Other
- **2.6.9** ☐Refused or Don't know

2.7 **Height:** _____ inches

2.8 **Weight:** _____ lbs

2.9 **BMI:** _____

Comorbidities:

2.10.1	Immunosuppressive disorder/malignancy	○ Yes	○ No
2.10.2	Obesity	○ Yes	○ No
2. 10.3	Type 1 diabetes	○ Yes	○ No
2. 10.4	Type 2 diabetes	○ Yes	○ No
2. 10.5	Seizures	○ Yes	○ No
2. 10.6	Congenital heart disease	○ Yes	○ No
2. 10.7	Sickle cell disease	○ Yes	○ No
2. 10.8	Chronic lung disease	○ Yes	○ No
2. 10.9	Other congenital malformations	○ Yes	○ No
2. 10.10	Other *(specify)*: _____		

2.11 Hospital admission date
(MM/DD/YYYY): ____/____/_____

- **2.11.1** Number of days in the hospital: _____

2.12 If admitted to the ICU, admission date
(MM/DD/YYYY): ____/____/_____

- **2.12.1** Number of days in the ICU: _____

2.13 **Patient outcome:** ○ Died ○ Discharged ○ Still admitted

- **2.13.2** Hospital discharge or death date
(MM/DD/YYYY): ____/____/_____

SECTION 3 – CLINICAL SIGNS AND SYMPTOMS

3.1 Did the patient have preceding COVID-like illness? ○ Yes ○ No

3.1.1 Date of symptom onset *(MM/DD/YYYY)*: ____/____/_____

3.2 Date of symptom onset of MIS *(MM/DD/YYYY)*: ____/____/_____

3.3. Fever ≥ 38.0°C: ○ Yes ○ No

3.3.1 Date of fever onset *(MM/DD/YYYY)*: ____/____/_____

3.3.2 Highest Temperature: _____ °C

3.3.3 Number of days febrile: _____

Signs and symptoms ***during present illness***

3.4.1	**Cardiac**			
	3.4.1.1	Shock	○ Yes	○ No
	3.4.1.2	Elevated troponin	○ Yes	○ No
	3.4.1.3	Elevated BNP or NT-proBNP	○ Yes	○ No
3.4.2	**Renal**			
	3.4.2.1	Acute kidney injury	○ Yes	○ No
	3.4.2.2	Renal failure	○ Yes	○ No
3.4.3	**Respiratory**			
	3.4.3.1	Cough	○ Yes	○ No
	3.4.3.2	Shortness of breath	○ Yes	○ No
	3.4.3.3	Chest pain/tightness	○ Yes	○ No
	3.4.3.4	Pneumonia	○ Yes	○ No
	3.4.3.5	ARDS	○ Yes	○ No
	3.4.3.6	Pulmonary embolism	○ Yes	○ No
3.4.4	**Hematologic**			
	3.4.4.1	Elevated D-dimers	○ Yes	○ No
	3.4.4.2	Thrombophilia	○ Yes	○ No
	3.4.4.3	Thrombocytopenia	○ Yes	○ No
3.4.5	**Gastrointestinal**			
	3.4.5.1	Abdominal pain	○ Yes	○ No
	3.4.5.2	Vomiting	○ Yes	○ No
	3.4.5.3	Diarrhea	○ Yes	○ No
	3.4.5.4	Elevated bilirubin	○ Yes	○ No
	3.4.5.5	Elevated liver enzymes	○ Yes	○ No
3.4.6	**Dermatologic**			
	3.4.6.1	Rash	○ Yes	○ No
	3.4.6.2	Mucocutaneous lesions	○ Yes	○ No
3.4.7	**Neurological**			
	3.4.7.1	Headache	○ Yes	○ No
	3.4.7.2	Altered mental state	○ Yes	○ No
	3.4.7.3	Syncope/near syncope	○ Yes	○ No
	3.4.7.5	Meningitis	○ Yes	○ No
	3.4.7.6	Encephalopathy	○ Yes	○ No
3.4.8	**Other**			
	3.4.8.1	Neck pain	○ Yes	○ No
	3.4.8.2	Myalgia	○ Yes	○ No
	3.4.8.3	Conjunctival injection	○ Yes	○ No
	3.4.8.4	Periorbital edema	○ Yes	○ No
	3.4.8.5	Cervical lymphadenopathy >1.5 cm diameter	○ Yes	○ No

SECTION 4 – COMPLICATIONS

4.1	**Arrhythmia**	○ Yes	○ No
	If yes:		
	4.1.1 Ventricular arrhythmia:	○ Yes	○ No
	4.1.2 Supraventricular arrhythmia:	○ Yes	○ No
	4.1.3 Other arrhythmia *(specify)*:	○ Yes	○ No
	_____		
4.2	Congestive heart failure	○ Yes	○ No
4.3	Myocarditis	○ Yes	○ No
4.4	Pericarditis	○ Yes	○ No
4.5	Liver failure	○ Yes	○ No
4.6	Deep vein thrombosis or PE	○ Yes	○ No
4.7	ARDS	○ Yes	○ No
4.8	Pneumonia	○ Yes	○ No
4.9	CVA or stroke	○ Yes	○ No
4.10	Encephalitis or aseptic meningitis	○ Yes	○ No
4.11	Shock	○ Yes	○ No
4.12	Hypotension	○ Yes	○ No

SECTION 5 – TREATMENTS

5.1	Low flow nasal cannula	○ Yes	○ No
5.2	High flow nasal cannula	○ Yes	○ No
5.3	Non-invasive ventilation	○ Yes	○ No
5.4	Intubation	○ Yes	○ No
5.5	Mechanical ventilation	○ Yes	○ No
5.6	ECMO	○ Yes	○ No
5.7	Vasoactive medications (e.g. epinephrine, milrinone, norepinephrine, or vasopressin) *(specify)*: _____	○ Yes	○ No
5.8	Steroids	○ Yes	○ No
5.9	Immune modulators (e.g. anakinra, tocilizumab) *(specify)*: _____	○ Yes	○ No
5.10	Antiplatelets (e.g. aspirin, clopidogrel) *(specify)*: _____	○ Yes	○ No
5.11	Anticoagulation (e.g. heparin, enoxaparin, warfarin) *(specify)*: _____	○ Yes	○ No
5.12	Dialysis	○ Yes	○ No
5.13	First IVIG	○ Yes	○ No
5.14	Second IVIG	○ Yes	○ No

SECTION 6 – STUDIES

6.1 Blood Test Results

6.1.1	Fibrinogen	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.2	CRP	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.3	Ferritin	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.4	Troponin	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.5	BNP	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.6	NT-proBNP	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.7	D-dimer	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.8	IL-6	Highest value: _____	units: _____	○ Low	○ Normal	○ High
6.1.9	Serum White blood count	Highest value: _____	Lowest value : _____	units: _____		
6.1.10	Platelets	Highest value : _____	Lowest value : _____	units: _____		
6.1.11	Neutrophils	Highest value: _____	Lowest value : _____	units: _____		
6.1.12	Lymphocytes	Highest value: _____	Lowest value : _____	units: _____		
6.1.13	Bands	Highest value: _____	Lowest value : _____	units: _____		

6.2 CSF Studies

6.2.1	White blood count	Highest value : _____	Lowest value : _____	units: _____
6.2.2	Protein	Highest value : _____	Lowest value : _____	units: _____
6.2.3	Glucose	Highest value : _____	Lowest value : _____	units: _____

6.3 Urinalysis

6.3.1	Urine White blood count	Highest value : _____	Lowest value : _____	units: _____

6.4 Echocardiogram (check if seen on ANY echocardiogram)

- **6.4.1** ☐ Not done
- **6.4.2** ☐ Normal results
- **6.4.3** ☐ Coronary artery aneurysms
  - **6.4.3.1** Max coronary artery Z-score: _____
- **6.4.4** ☐ Coronary artery dilatation
- **6.4.5** ☐ Cardiac dysfunction (decreased function), specify type:
  - **6.4.5.1** ☐ left ventricular dysfunction
  - **6.4.5.2** ☐ right ventricular dysfunction
- **6.4.6** ☐ Pericardial effusion
- **6.4.7** ☐ Pleural effusion
- **6.4.8** ☐ Mitral regurgitation, specify type: ○ mild ○ moderate ○ severe
- **6.4.9** ☐ Other *(specify)*: _____

6.5 Date of first test showing coronary artery aneurysm or dilatation *(MM/DD/YYYY)*: ____/____/_____

6.6 Abdominal imaging ☐ Ultrasound ☐ CT ○ Not done

- **6.6.1** ☐ Normal
- **6.6.2** ☐ Mesenteric lymphadenopathy
- **6.6.3** ☐ Free fluid
- **6.6.4** ☐ Other *(specify)*: _____

6.7 Chest imaging ☐ Chest x-ray ☐ CT ○ Not done

- **6.7.1** ☐ Normal
- **6.7.2** ☐ Pneumonia
- **6.7.3** ☐ Atelectasis
- **6.7.4** ☐ Pleural effusion
- **6.7.5** ☐ Other *(specify)*: _____

SARS-COV-2 testing

6.8 RT-PCR: ○ Positive ○ Negative ○ Not done
6.8.1 If performed, date *(MM/DD/YYYY)*: ____/____/_____

6.9 Antigen: ○ Positive ○ Negative ○ Not done
6.9.1 If performed, date *(MM/DD/YYYY)*: ____/____/_____

6.10 IgG: ○ Positive ○ Negative ○ Not done
6.10.1 If performed, date *(MM/DD/YYYY)*: ____/____/_____

6.11 IgM: ○ Positive ○ Negative ○ Not done
6.11.1 If performed, date *(MM/DD/YYYY)*: ____/____/_____

6.12 IgA: ○ Positive ○ Negative ○ Not done
6.12.1 If performed, date *(MM/DD/YYYY)*: ____/____/_____