

COVID-19 in Children

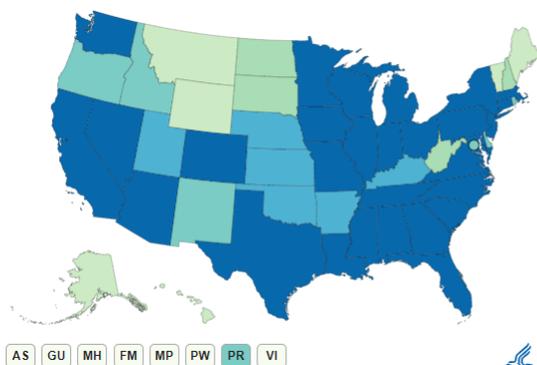
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Cases by jurisdiction



Reported Cases

- 0 to 1,000
- 1,001 to 5,000
- 5,001 to 10,000
- 10,001 to 20,000
- 20,001 to 40,000
- 40,001 or more

- Kansas:**
- 26,172 cases
 - 1,644 hospitalizations
 - 335 deaths
 - 252,764 negative tests



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<https://www.childrensmc.org/kansas/covid-19and-kansas>



Burden of COVID-19 among children

- US; 2% of cases were <18 years
- China; 2.2% of cases were <19 years
- Italy; 1.2% of cases were ≤ 18 years
- Spain; 0.8% of cases were <18 years

- Most cases in China had a confirmed household contact

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



Pediatric COVID-19 is less severe than adults

- 2143 pediatric patients
 - 731 (34.1%) lab confirmed cases
 - 1412 (65.9%) suspect cases
- Median age: 7 years
- Almost all (94.1%) had non-severe disease
 - 4.4% asymptomatic
 - 50.9% mild
 - 38.8% moderate
 - 5.2% severe
 - 0.6% critical

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Dong Y, et al. Epidemiology of COVID-19 Among Children in China. Pediatrics. 2020;145(6):e20200702



COVID-19 Symptoms Adults

- King County Washington HCW
- Most developed fever, cough, myalgias
- 1/3 had diarrhea, chills, or shortness of breath
- 2/3 worked while symptomatic

Table. Clinical Course and Outcomes of Health Care Personnel With Confirmed SARS-CoV-2 Infection—King County, Washington

	No. (%)		
	Total health care personnel (N = 48)	Onset with fever, cough, shortness of breath, or sore throat (n = 40 [83.3%])	Onset without fever, cough, shortness of breath, or sore throat (n = 8 [16.7%])
Initial symptoms			
Cough	24 (50.0)	24 (60.0)	0
Fever ^a	20 (41.7)	20 (50.0)	0
Myalgias	17 (35.4)	15 (37.5)	2 (25.0)
Headache	8 (16.7)	7 (17.5)	1 (12.5)
Chills	7 (14.6)	5 (12.5)	2 (25.0)
Sore throat	7 (14.6)	7 (17.5)	0
Coryza	6 (12.5)	4 (10.0)	2 (25.0)
Shortness of breath	5 (10.4)	5 (12.5)	0
Malaise	5 (10.4)	3 (7.5)	2 (25.0)
Diarrhea	3 (6.3)	3 (7.5)	0
Voice hoarseness	2 (4.2)	1 (2.5)	1 (12.5)
Anorexia	1 (2.1)	1 (2.5)	0
Nausea/vomiting	1 (2.1)	1 (2.5)	0
Abdominal pain	1 (2.1)	0	1 (12.5)
Symptoms over illness course			
Cough	42 (87.5)	36 (90.0)	6 (75.0)
Fever ^a	36 (75.0)	32 (80.0)	4 (50.0)
Myalgias	29 (60.4)	25 (62.5)	4 (50.0)
Headache	20 (41.7)	17 (42.5)	3 (37.5)
Chills	16 (33.3)	14 (35.0)	2 (25.0)
Diarrhea	16 (33.3)	13 (32.5)	3 (37.5)
Shortness of breath	15 (31.3)	13 (32.5)	2 (25.0)
Malaise	14 (29.2)	9 (22.5)	5 (62.5)
Sore throat	12 (25.0)	10 (25.0)	2 (25.0)
Coryza	10 (20.8)	8 (20.0)	2 (25.0)
Nausea/vomiting	8 (16.7)	6 (15.0)	2 (25.0)
Anorexia	3 (6.3)	3 (7.5)	0
Voice hoarseness	2 (4.2)	1 (2.5)	1 (12.5)
Abdominal pain	1 (2.1)	0	1 (12.5)
Outcomes			
Hospitalized	3 (6.3)	3 (7.5)	0
Intensive care unit admission	0	0	0
Death	0	0	0
Worked while symptomatic ^b	31 (64.6)	27 (67.5)	4 (50.0)
Days worked while symptomatic, median (range)	2 (1-10)	2 (1-10)	2.5 (1-5)
Days from symptom onset to resolution of all symptoms, median (range)	10 (1-21)	10 (1-21)	4 (3-18)

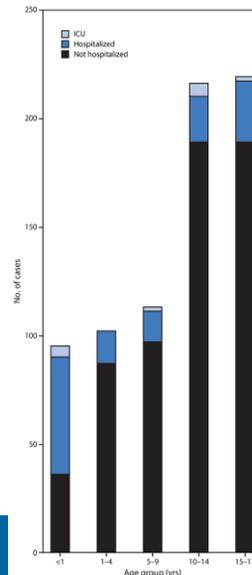
Chow E, et al. Symptom Screening at Illness Onset of HCP with SARS-CoV-2 Infection in King County, Washington. JAMA. ePub April 17, 2020.

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Pediatric COVID-19 symptoms are different

TABLE. Signs and symptoms among 291 pediatric (age <18 years) and 10,944 adult (age 18–64 years) patients* with laboratory-confirmed COVID-19 — United States, February 12–April 2, 2020

Sign/Symptom	No. (%) with sign/symptom	
	Pediatric	Adult
Fever, cough, or shortness of breath [†]	213 (73)	10,167 (93)
Fever [‡]	163 (56)	7,794 (71)
Cough	158 (54)	8,775 (80)
Shortness of breath	39 (13)	4,674 (43)
Myalgia	66 (23)	6,713 (61)
Runny nose [§]	21 (7.2)	757 (6.9)
Sore throat	71 (24)	3,795 (35)
Headache	81 (28)	6,335 (58)
Nausea/Vomiting	31 (11)	1,746 (16)
Abdominal pain [¶]	17 (5.8)	1,329 (12)
Diarrhea	37 (13)	3,353 (31)



Coronavirus Disease 2019 in Children — United States, February 12–April 2, 2020. MMWR Morb Mortal Wkly Rep 2020;69:422–426.

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Prospective surveillance of symptomatic children demonstrated low COVID-19 rates

Site Location	Specimen Collection Date Range ^a	All	
		Age range tested (yrs)	n/N (%) positive
Rochester, NY	1/2/20–3/30/20	0–17	0/370 (0)
Pittsburgh, PA	1/2/20–3/20/20	0–17	0/758 (0)
Cincinnati, OH	2/1/20–3/31/20	0–17	1/302 (0.3)
Nashville, TN	2/2/20–3/30/20	0–17	0/402 (0)
Kansas City, MO	2/3/20–3/31/20	0–15	0/264 (0)
Houston, TX	1/2/20–3/22/20	0–17	0/604 (0)
Seattle, WA	1/1/20–3/31/20	0–16	3/487 (0.6)
All sites	1/1/20–3/31/20	0–17	4/3187 (0.1)

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Rha B et al. SARS-CoV-2 Infections in Children- Multi-Center Surveillance, United States, January-March 2020. JPIIDS. Epub June 19, 2020.



Contact Tracing of Adults & Children South Korea

Rates of coronavirus disease among household and nonhousehold contacts, South Korea, January 20–March 27, 2020

Index patient age, y	Household		Nonhousehold	
	No. contacts positive/no. contacts traced	% Positive (95% CI)	No. contact positive/no. contacts traced	% Positive (95% CI)
0–9	3/57	5.3 (1.3–13.7)	2/180	1.1 (0.2–3.6)
10–19	43/231	18.6 (14.0–24.0)	2/226	0.9 (0.1–2.9)
20–29	240/3,417	7.0 (6.2–7.9)	138/12,393	1.1 (0.9–1.3)
30–39	143/1,229	11.6 (9.9–13.5)	70/7,407	0.9 (0.7–1.2)
40–49	206/1,749	11.8 (10.3–13.4)	161/7,960	2.0 (1.7–2.3)
50–59	300/2,045	14.7 (13.2–16.3)	166/9,308	1.8 (1.5–2.1)
60–69	177/1,039	17.0 (14.8–19.4)	215/7,451	2.9 (2.5–3.3)
70–79	86/477	18.0 (14.8–21.7)	92/1,912	4.8 (3.9–5.8)
≥80	50/348	14.4 (11.0–18.4)	75/1,644	4.6 (3.6–5.7)
Total	1,248/10,592	11.8 (11.2–12.4)	921/48,481	1.9 (1.8–2.0)

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Park YJ, Choe YJ, Park O, Park SY, Kim YM, Kim J, et al. Contact tracing during coronavirus disease outbreak, South Korea, 2020. Emerg Infect Dis. 2020 Oct.



Multisystem Inflammatory Syndrome in Children (MIS-C)

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

- An individual aged <21 years presenting with fever, laboratory evidence of inflammation[¶], 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

[¶]Fever ≥38.0°C for ≥24 hours, or report of subjective fever lasting ≥24 hours

[¶]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

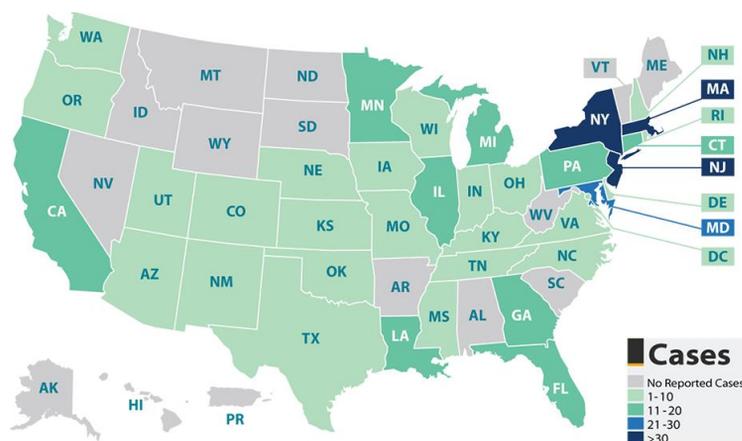
- Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection

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https://emergency.cdc.gov/han/2020/han00432.asp?deliveryName=USCDC_511-DM28431

 Children's Mercy

Reported MIS-C Cases in US July 15, 2020

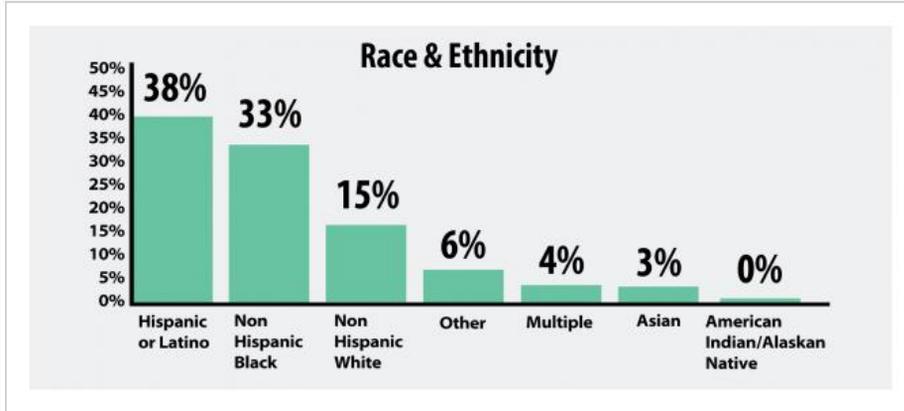


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<https://www.cdc.gov/mis-c/cases/index.html>

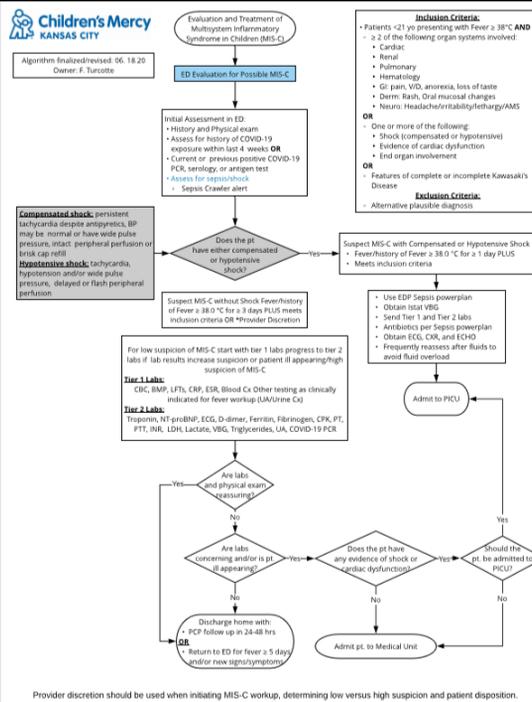
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MIS-C Race & Ethnicity



28/342 (8%) did not report race/ethnicity data

<https://www.cdc.gov/mis-c/cases/index.html>



Summary

- Children represent a small portion of COVID-19 infections & typically have more mild symptoms than adults
- MIS-C is a rare multisystem inflammatory syndrome that occurs following COVID-19 infections with low mortality
- Most MIS-C cases have occurred in Latino & Black children
- Consider MIS-C in children who meet case definition
- Utilize tier 1 & 2 laboratory evaluation to aid in suspected diagnosis
- Refer any patient in which there is suspicion