

Pediatric COVID-19 Education Update

What This Flyer Is:

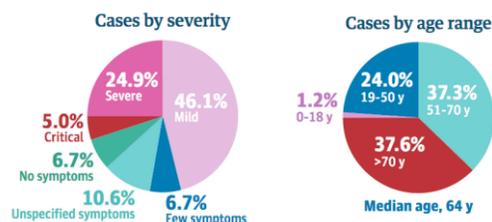
- This is intended to be a brief update regarding new/useful information about International efforts surrounding the Covid-19 pandemic. We will present biweekly updates.
- Today's volume will focus on what is known about **pediatric presentation, transmission and severity**.
- Information is meant to be evidence based, however, some will be best practice suggested by various institutions (*best practice will be in italics so as differentiate from EBM*)
- Journal names are hyperlinks to the actual article so you can click on them to read more.
- We will attempt to compile/link articles as best/quickly as we can, but if you are interested, PubMed has created a Covid search database that is linked here:
<https://www.ncbi.nlm.nih.gov/research/coronavirus/>

Great Resources on the Web:

- [CDC](#) website.
 - Sublink for [Healthcare professionals](#).
- [WHO Coronavirus](#) Website
- Pediatric Resources and Data from
 - [Don't Forget the Bubbles](#).
 - [Royal College of Pediatric and Child Health](#)
- [Johns Hopkins Coronavirus Tracking Website](#)
- [Coronavirus Tech Handbook](#): not peer reviewed and some anecdotal but full of info
- [Handbook of Covid-19 Prevention and Treatment](#): created by Zhejiang Hospital SOM
- [EMCrit Covid database](#): Internet Book of Critical Care
- [UWashington ED/ICU Resource guide](#)

Current Understanding of Pediatric Burden of Disease:

- In 3/18/2020 [NEJM](#) letter, Lu examined 1391 kids at Wuhan Children's Hospital. 171 (12.3%) had confirmed Covid, median age 6.7yrs spread evenly amongst ages contrary to other studies. 60.8% male. 49% cough, 46% pharyngeal erythema, 42% fever, 9% diarrhea, 8% fatigue, 8% rhinorrhea, 6% vomiting, 5% congestion. 29% tachypnea and 42% tachycardia. 2.3% had SaO2 <92%. CXR had ground glass appearance in 33%, local shadowing in 19%, bilateral in 13% and interstitial abnormalities in 1%. Lymphopenia was present in 3.5%. PCT and CRP were elevated in most and did seem to correlate with disease severity. 3 patients required intubation. Patients had preexisting hydronephrosis, leukemia on maintenance chemo and intussusception. The child with intussusception died 4wks after admission.
- In 3/16/20 [Pediatrics](#), Dong described 2143 presumed infected (34% confirmed, 66% suspected) children from China studied. Avg age 7 yo. Median time to symptom onset to diagnosis was 2 days. Suspected if >2 of fever, GI distress, fatigue, nml-low WBC w/ lymphopenia, increased CRP, abnl CXR. 57% males.
 - Asymptomatic 4.4%: no symptoms at all.
 - Mild 50.9%: Primarily URTI symptoms with or without fever.
 - Moderate 38.8%: Pneumonia, frequent fever, and cough, +/- wheeze, but not hypoxic OR none of these but an abnormal CT (worth noting).



- Severe: Above symptoms but more severe, usually with accompanying hypoxia <92% on RA.
- Critical: ARDS, shock, organ failure.
 - WHO defines disease classification similarly for adults and kids.
- 6% were severe or critical. 1 death in a 14yo boy.
- In 2/26/20 [Pediatric Pulm](#), Xia describes different characteristics between kids and adults in small (n=20) paper. Fever (60%), cough (65%), elevated PCT (80%) [different than adults], coinfection (40%) [adult data out of Stanford showing adults also can have coinfection (>20%) w/ rhino/entero, Flu, HMPV and RSV most common]. CXR findings varied. CT showed a “halo” sign surrounding lesions with associated “ground glass” opacities.
- In 3/13/20 [Nature Medicine](#), Xu described shedding characteristics of the virus. Very small study (n=10), used nasal and rectal PCR swabs to track disease progression/virulence. Positive nasal testing up to 22 days (median 12d) and rectal up to 30 days, long after patients were asymptomatic.
- Case study from Cui in [J. Infections Diseases](#), detailed a 55d old with Corona who developed pneumonia, myocardial injury, lactic acidosis and elevated LFT's. Despite these findings, patient required minimal interventions. Interestingly, maternal breastmilk was negative for coronavirus on multiple assays.
- In preprint in [BMJ](#), Bi traces contacts and transmission among households. 391 patients with Covid contacted 1286 people. 5% were children. Secondary infection rate was 15% for household contacts. Kids <10yo infected at similar rates as adults (7.4% vs 7.9%).
- In 2/24/20 in [JAMA](#), Wu describes the largest cohort of infected in Wuhan. >72000 cases. 14% severe, 5% critical, 2.3% fatality rate. 3.8% of Health Care Workers (HCW) infected and 63% in Wuhan; ~15% of HCW severe or critical.

Summary table of clinical features (studies where n>3)

	Cai (n=10)	Tang* (n=26)	Xia (n=20)	Liu (n=6)	Wei† (n=9)	Xu (n=10)	Zhang* (n=34)	Lu† (n=171)	TOTAL (n=286)
Symptoms									
Cough	6	12	13	6	2	5	20	83	147/286 (51.4%)
Fever	7	11	12	6	4	6	26	71	143/286 (50%)
Sore throat	4	NA	1	NA	NA	4	NA	79	88/211 (41.7%)
Rhinorrhoea	2	2	3	NA	2	2	NA	13	23/246 (28.9%)
GI upset	NA	2	5	4	NA	2	4	15	32/267 (12%)
Blood tests									
Lymphocytes									
High	1	NA	NA	0	NA	0	17	NA	18/43 (41.9%)
Low	0	NA	NA	4	NA	0	0	6	10/214 (4.7%)
CRP high (>5mg/L)	3	5	9	NA	NA	0	20	33	70/271 (25.8%)
Radiography									
X-ray									
Normal	6	8	NA	NA	NA	10	NA	NA	24/46 (52.2%)
Unilateral	4	11	NA	NA	NA	0	NA	NA	15/46 (32.6%)
Bilateral	0	7	NA	NA	NA	0	NA	NA	7/46 (15.2%)
CT									
Normal	NA	8	4	1	NA	10	6	60	89/267 (33.3%)
Unilateral	NA	11	6	0	NA	0	14	32	63/267 (23.6%)
Bilateral	NA	7	10	4	NA	0	14	77	112/267 (41.9%)

*data from pre-print and has not undergone peer review

† both studies contain patients from within the same time period at Wuhan Children's hospital so there may be overlap

- Info from CDC: disease prevalence in kids is increasing although morbidity/mortality is not. Most cases are occurring through household transmission. Most kids are not that sick. No current data on medically complex patients