



More on kids and COVID

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Game plan

- ▶ Review a few recent articles on pediatric COVID-19 epidemiology, peds transmission, and peds clinical picture

Objectives

- ▶ Cite evidence pro and con related to transmission potential for SARS-CoV2 among children, and among children to adults

Take home messages

- ▶ A low proportion of all COVID-19 cases occur among children/adolescents in the US and worldwide
- ▶ A very low proportion of deaths has occurred so far in pediatric population of all COVID-19-related deaths
- ▶ Different studies worldwide have presented somewhat differing conclusions re: transmission potential from child to child, and child to adult...but most studies show lower risk compared with older people transmitting infection
- ▶ Different concentrations of ACE2 receptors may explain lower infection acquisition in peds populations, and, why risk increases with age
- ▶ As usual, we have more questions on this topic, than answers

Reminder about strengths of study designs re: causal inference

- ▶ RCT's
- ▶ Other clinical trials (like randomized community trials)
- ▶ Cohort studies
- ▶ Case-control studies
- ▶ Cross-sectional studies (surveys—literature reflects these)
- ▶ Case series (mostly we have these for COVID-19)
- ▶ Case studies (also a lot of these reports)
- ▶ Ecologic studies (also some new designs)

Epi snapshots for pediatric populations

- ▶ California: 22,858 peds cases/254,971 adult cases; no peds deaths
- ▶ Iceland national survey of 6% of population:
 - ▶ 0-9 years 0% infection via RT-PCR for viral RNA
 - ▶ 10-19 years 0.8% infection

USA: about 2% of all cases are <18 years

about 20% of kids hospitalized

only 17 deaths among peds nationwide, about 1/3 of that for flu (as of a week ago)

Oregon: experienced a 5 fold increase in child case numbers from May to June, while schools were closed...pointing to community transmission

Transmission snapshots

- ▶ Zhu (China): only 10% of all household clusters of COVID-19 had a pediatric index case
- ▶ US: YMCA study of 40,000 kids aged 1-14 showed NO positives
- ▶ France: 40% of teens were seropositive in household clusters, with 11% of the adult contacts of these teens showing seropositivity
- ▶ Northern France cluster: a 9 year old with mild symptoms, coinfecting with flu, showed NO subsequent SARS transmission to 112 school contacts during infectious period. Flu was transmitted, however, to contacts.
- ▶ Australia: low transmission of infected children to household contacts (NCIRS, 2020)

Transmission snapshots, cntd

- ▶ Systematic review of 31 household clusters of COVID-19 suggested that <10% of the clusters had child implicated as primary source
- ▶ Italian study suggested the opposite...a much higher proportion
- ▶ The following table shows data on SARS-CoV2 positivity among household contacts, by age group of index patient, in Korea
- ▶ (Park et al, Emerg Inf Dis Vol 26, Oct 2020). Community contacts showed much lower % of positive contacts in the same report.

Index patient age, y	No. contacts positive/no. contacts traced	% Positive (95% CI)
0-9	3/57	5.3 (1.3-13.7)
10-19	43/231	18.6 (14.0-24.0)
20-29	240/3,417	7.0 (6.2-7.9)
30-39	143/1,229	11.6 (9.9-13.5)
40-49	206/1,749	11.8 (10.3-13.4)
50-59	300/2,045	14.7 (13.2-16.3)
60-69	177/1,039	17.0 (14.8-19.4)
70-79	86/477	18.0 (14.8-21.7)
≥80	50/348	14.4 (11.0-18.4)

Symptoms/signs of pediatric COVID-19

- ▶ Fever, cough, SoB (73%) * much higher for adults
- ▶ Myalgia
- ▶ Runny nose
- ▶ Sore throat
- ▶ Headache
- ▶ Nausea/vomiting
- ▶ Abdominal pain
- ▶ Diarrhea
- ▶ MIS-C in a very small percent (see earlier presentation)

Theory/ies for less severe illness and less transmission risk in kids

- ▶ ACE2 receptors appear to be a docking station for SARS-CoV2
- ▶ Nasal biopsy study of 305 people aged 1-60 showed that ACE2 enzyme expression went up with increasing age
- ▶ Fewer receptors seems to track with less severe disease
- ▶ Another expert noted that adults have more ACE2 receptors in pulmonary tree than do children...thus more lung disease

Summary points

- ▶ Children get COVID-19 less often and in a less severe form than most adults
- ▶ Children are probably more likely to get infected from an older teen or adult, than from another child
- ▶ Children <9 years old do not seem to be a major source of outbreaks or household clusters...different story for older children, as disease incidence and prevalence climbs with age
- ▶ Stay tuned for more definitive information..still more questions than answers, especially relevant to proposed school openings

References

- ▶ Lay article/s NYT
- ▶ UCSF department of medicine has outstanding grand rounds series on COVID-19, worth checking out
- ▶ Dong Y, et al. Epi of COVID-19 among children in China. Pediatrics 2020; 145(6).

- ▶ Once again, thanks to Grazia Ori Cunningham, MPH