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SYNOPSIS

Review of "Infectivity of severe acute respiratory syndrome coronavirus 2 in children compared with adults"

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One-minute summary

- In this study, the authors compared the infectivity of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in children (<18 years) and adults (≥18 years) in Manitoba (March to December 2020). For all variables below, shared superscript letters indicate no significant difference (p>0.05). For example, culture positivity in those aged 0–10 years and 11–17 years were not significantly different from one another, but culture positivity in those aged 11–17/0–10 years was significantly different from those ≥18 years.
  - **Culture positivity:**
    - 0–10 years: 19% (95% confidence interval [CI]: 11–28)[a]
    - 11–17 years: 23% (95% CI: 14–34)[a]
    - ≥18 years: 44% (95% CI: 35–53)[b]
  - **Median (interquartile range [IQR]) cycle threshold (Ct):**
    - 0–10 years: 25.1 (17.7–31.3)[a]
    - 11–17 years: 22.2 (18.3–29.0)[a]
    - ≥18 years: 18.7 (17.9–30.4)[b]
  - **Median (IQR) 50% tissue culture infective dose ($TCID_{50}$):**
    - 0–10 years: 1,171 (316–5,620)[a]
    - 11–17 years: 316 (178–2,125)[a]
    - ≥18 years: 5,620 (1,171–17,800)[b]
  - **Median (IQR) Log RNA copies/mL:**
    - 0–10 years: 5.4 (3.5–7.8)[a]
    - 11–17 years: 6.4 (4.2–7.6)[ab]
    - ≥18 years: 7.5 (5.2–8.3)[b]
- Culture positivity in children was 55% lower compared to adults (odds ratio [OR]: 0.45; 95% CI: 0.28–0.72).
- The authors concluded that children were not the main source of SARS-CoV-2 transmission, supported by lower culture positivity, viral concentration and higher Ct values when compared to adult specimens.

Additional information

- The authors quantified the rates of SARS-CoV-2 culture positivity from reverse transcription polymerase chain reaction (RT-PCR)-positive nasopharyngeal swabs, and then measured the viral load and titres in culture-positive specimens. Ct values were from RT-PCR targeting the envelope gene of SARS-CoV-2.
    - **Total RT-PCR-positive patients and percent of patients that were asymptomatic:**
        - 0–10 years: n=97; 48%[a]
        - 11–17 years: n=78; 24%[b]
        - ≥18 years: n=130; 7%[c]
    - **Median (IQR) days from symptom-onset to test:**
        - 0–10 years: 1 (1–4)[a]
        - 11–17 years: 2 (1–3.5)[a]
        - ≥18 years: 1 (1–4)[a]
- Culture positivity, in a sub-analysis, did not differ among children aged 0–4 years compared to children 5–10 years.
- In multivariable analyses, Ct values for children were predictive of positive culture (OR: 0.81; 95% CI: 0.69–0.94). The symptom to test time, age and sex were not predictors of positive culture.
- The authors performed receiver operating characteristic analyses of Ct to discriminate between children with and without positive culture. Ct was an accurate predictor of culture positivity for children (area under the operatory curve [AUC]: 0.87; 95% CI: 0.81–0.93) and similarly for adults (AUC: 0.89; 95% CI: 0.83–0.96).
- There was significantly higher median viral concentration ($p<0.001$) and lower median Ct ($p<0.001$) in culture-positive specimens compared to culture-negative specimens.
    - **Median (IQR) viral concentration:**
        - Culture-positive: 8.1 (7.4–8.2)
        - Culture-negative: 5.2 (3.2–6.8)
    - **Median (IQR) Ct:**
        - Culture-positive: 16.8 (16.3–18.8)
        - Culture-negative: 25.8 (20.7–31.9)

PHO reviewer's comments

- Since this study was performed in 2020, prior to the emergence of variants of concern (VOCs) and the rollout of the vaccines in Manitoba, further research is needed to confirm the authors' results in a setting with VOC community transmission.
- Currently, there has not been any published research on how the VOCs may behave differently in children compared to the wild-type virus, but this is an area of growing interest.
- With the prioritization of the older population to receive the vaccines and the current lack of availability of vaccines authorized for use in children, there may be a shift towards a proportionately higher burden of infection among younger populations.

Citation

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