

Which children and young people are at higher risk of severe disease and death after SARS-CoV-2 infection: a systematic review and individual patient meta-analysis.

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This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.

Background: We aimed to use individual patient data to describe pre-existing factors associated with severe disease, primarily admission to critical care, and death secondary to SARS-CoV-2 infection in children and young people (CYP) in hospital.

Methods: We searched Pubmed, European PMC, Medline and Embase for case series and cohort studies that included all CYP admitted to hospital with 30 CYP with SARS-CoV-2 or 5 CYP with PIMS-TS or MIS-C. Eligible studies contained 1) details of age, sex, ethnicity or co-morbidities, and 2) an outcome which included admission to critical care, mechanical invasive ventilation, cardiovascular support, or death. Authors of eligible studies were approached for individual patient data (IPD). We used random effects meta-analyses for aggregate study-level data and multilevel mixed effect models for IPD data to examine risk factors (age, sex, comorbidities) associated with admission to critical care and death. Data shown are odds ratios and 95% confidence intervals (CI).

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet



Which children are at higher risk of severe disease after SARS-CoV-2 infection?

Findings: 81 studies were included, 57 in the meta-analysis (of which 22 provided IPD) and 26 in the narrative synthesis. Sex was not associated with critical care or death. Compared with CYP aged 1-4 years, infants had increased odds of admission to critical care (OR 1.63 (95% CI 1.40-1.90)) and death (OR 2.08 (1.57-2.86)). Odds of death were increased amongst CYP over 10 years (10-14 years OR 2.15 (1.54-2.98); >14 years OR 2.15 (1.61-2.88)). Number of comorbid conditions was associated with increased odds of admission to critical care and death for COVID-19 in a dose-related fashion. For critical care admission odds ratios were: 1 comorbidity 1.49 (1.45-1.53); 2 comorbidities 2.58 (2.41-2.75); ≥3 comorbidities 2.97 (2.04-4.32), and for death: 1 comorbidity 2.15 (1.98-2.34); 2 comorbidities 4.63 (4.54-4.74); ≥3 comorbidities 4.98 (3.78-6.65). Odds of admission to critical care were increased for all comorbidities apart from asthma (0.92 (0.91-0.94)) and malignancy (0.85 (0.17-4.21)) with an increased odds of death in all co-morbidities considered apart from asthma. Neurological and cardiac comorbidities were associated with the greatest increase in odds of severe disease or death. Obesity increased the odds of severe disease and death independently of other comorbidities.

Interpretation: Hospitalised CYP at greatest vulnerability of severe disease or death from SARS-CoV-2 infection are infants, teenagers, those with cardiac or neurological conditions, or 2 or more comorbid conditions, and those who are obese. **These groups should be considered higher priority for vaccination and for protective shielding when appropriate.** Whilst odds ratios were high, the absolute increase in risk for most comorbidity was small compared to children without underlying conditions.

EXPERT COMMENT

"When children are admitted to hospital with SARS-CoV-2 infection, those at greatest risk of severe disease or death are: teenagers, those with cardiac or neurological conditions, or 2 or more comorbid conditions, and children who are significantly obese. These groups should be considered higher priority for vaccination and for protective shielding when appropriate. As study also quantifies the additional risk related to comorbidities in infected children; however it is likely that some or all of this risk relates to the underlying condition rather than SARS-CoV-2 infection. Therefore, further population-based research using comparator groups which identify the risk of severe disease due to COVID-19 and the underlying risk due to comorbidity is required to develop a safe approach."

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With warm regards,

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