

Healthcare utilization following SARS-CoV-2 infection in children and adolescents with chronic conditions: An EHR-based Cohort Study from the RECOVER Program

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Background

Chronic medical conditions are a risk factor for moderate or severe COVID-19 in children¹⁻⁴, but little is known about post-acute sequelae of SARS-CoV-2 (PASC) in children with chronic medical conditions (CMCs). In order to understand whether SARS-CoV-2 Infection led to potential exacerbation of underlying chronic disease in children, we explored whether children with CMCs had increased healthcare utilization in the post-acute (28 days after infection) period compared to children with CMCs without SARS-CoV-2 infection.

Methods

We conducted a retrospective, matched-cohort study using electronic health record data collected from 8 pediatric health care systems participating in the PEDSnet network. We included children <21 years of age with a wide array of chronic conditions, defined by the presence of diagnostic codes, who were diagnosed with COVID-19 between March 1, 2020 and February 28, 2022. Cohort entry was defined by presence of a positive SARS-CoV-2 viral test (polymerase chain reaction or antigen) or diagnostic codes for COVID-19, PASC or MIS-C. A comparison cohort was matched using a stratified propensity score model and exact matching on age group, race/ethnicity, institution, test location, and month of cohort entry. A negative binomial model was used to examine our primary outcome: composite and setting-specific (inpatient, outpatient, ED) utilization rate ratios between the positive and comparison cohorts. Secondary outcomes included time to first utilization in the post-acute period, and utilization stratified by severity at cohort entry.

Results

We identified 748,692 patients with at least one chronic condition, 78,744 of whom met inclusion criteria for the COVID-19 cohort. 97% of patients from the positive cohort were matched. Cohorts were well-balanced for chronic condition clusters, total number of conditions, time since first diagnosis, baseline utilization, cohort entry period, age, sex, race/ethnicity and test location. We found that among children with chronic medical conditions, those with COVID-19 had higher healthcare utilization than those with no recorded COVID-19 diagnosis or test with utilization rate ratio 1.21, (95% CI: 1.18-1.24). The utilization was highest for inpatient care with utilization rate ratio 2.03, (95% CI: 1.85-2.23) but the utilization was increased across all settings. Hazard ratios estimated in time-to-first-utilization analysis mirrored these results. Patients with severe or moderate acute COVID-19 illness had greater increases in utilization in all settings than those with mild or asymptomatic disease.

Figure 1. Health services utilization overall and by setting for children with chronic medical conditions, comparing the COVID positive cohort to the COVID negative cohort in matched analyses.

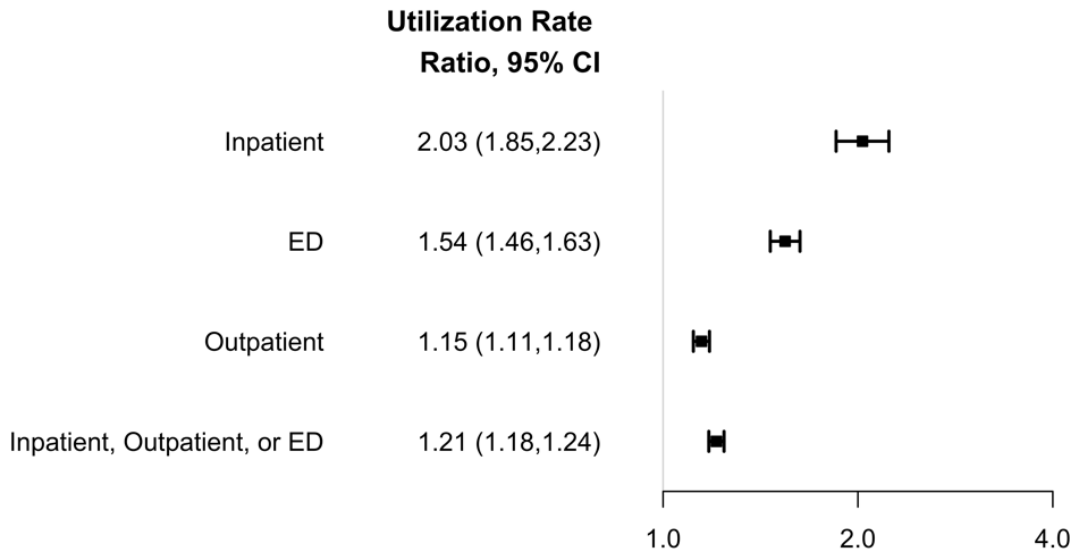
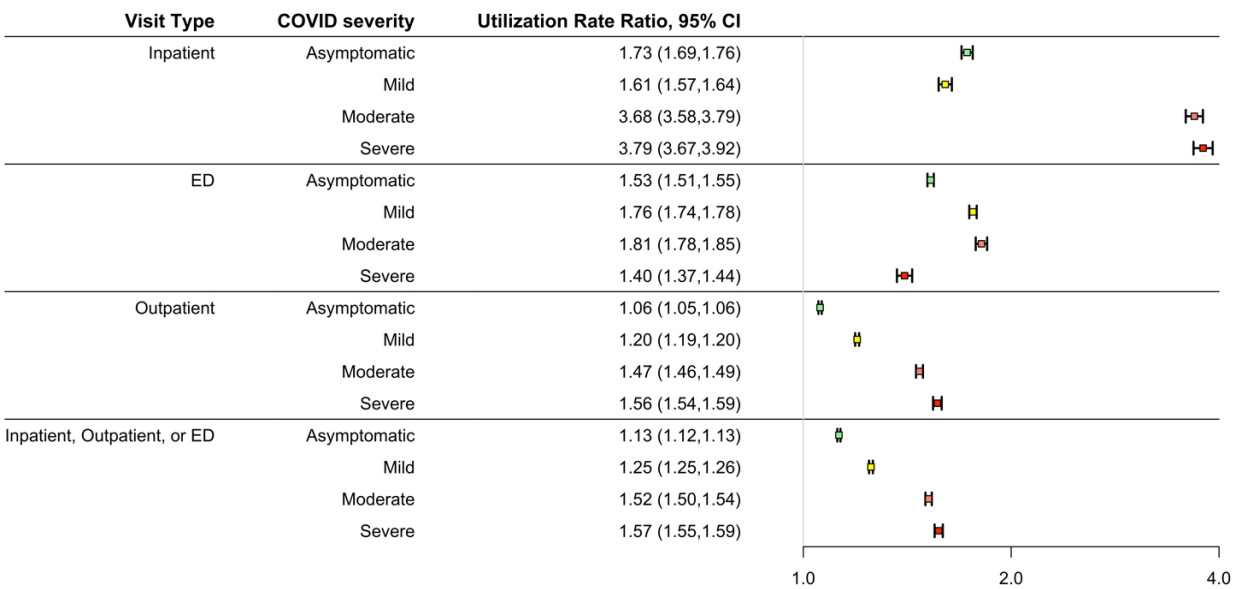


Figure 2: Utilization rate ratios by COVID severity, overall and by setting



Conclusion

We found that care utilization in all settings was increased following COVID-19 in children with chronic medical conditions in the post-acute period, particularly in the inpatient setting. Increased utilization was correlated with more severe COVID-19. Additional research is needed

to better understand the reasons for this broad PASC presentation by studying condition-specific outcomes in children with chronic disease.

References

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