

Clinical Characteristics of Pediatric Patients Hospitalized with COVID-19 in an Electronic Health Record Database

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Background

There are limited data on the clinical characteristics of pediatric patients hospitalized with COVID-19 and how these characteristics may vary with age.

Objective

To describe the baseline comorbidities, symptoms, diagnoses, laboratory results, and treatments among children and adolescents hospitalized with COVID-19 in the US.

Data Source

Optum Electronic Health Records (EHR) Database

- Patient-level database that combines electronic medical record data (medical claims, prescription, and practice management data) from over 60 US hospitals and medical groups

Optum COVID-19 EHR Database

- A low latency database consisting of a subset of patients from the EHR Database who have documented clinical care with a diagnosis of COVID-19, acute respiratory illness, or COVID-19 testing
- Captures point of care diagnostics specific to the COVID-19 patient during initial presentation, acute illness and convalescence with over 500 mapped labs and bedside observations, including COVID-19 specific testing.

Methods

Study Population

- Patients age ≤ 22 years with confirmed COVID-19 (ICD-10-CM diagnosis code U07.1 and/or a positive SARS-CoV-2 viral test) were identified between January and November 2020.
- Hospitalizations were identified by presence of an inpatient healthcare encounter.

Ascertainment of Covariates

- Demographic characteristics were assessed on the date of cohort entry (later of date of confirmed infection or date of hospitalization).
- Comorbidities were assessed in the 21 days prior to cohort entry.
- Vital signs, laboratory results, symptoms, diagnoses, and treatments during hospitalization were assessed.

Outcomes

- Critical Care: defined by Current Procedural Terminology, 4th Edition (CPT-4) codes.
- Mechanical ventilation: intubation, ventilation, ECMO defined by CPT-4 and ICD-10 procedure codes.
- Death: defined by the Social Security Administration's Death Master File or as indicated within the medical record.

Statistical Analysis

- Demographic characteristics, clinical covariates, and outcomes were examined overall and by age group.

Results

Figure 1. Flow Chart of Pediatric Patients with COVID-19

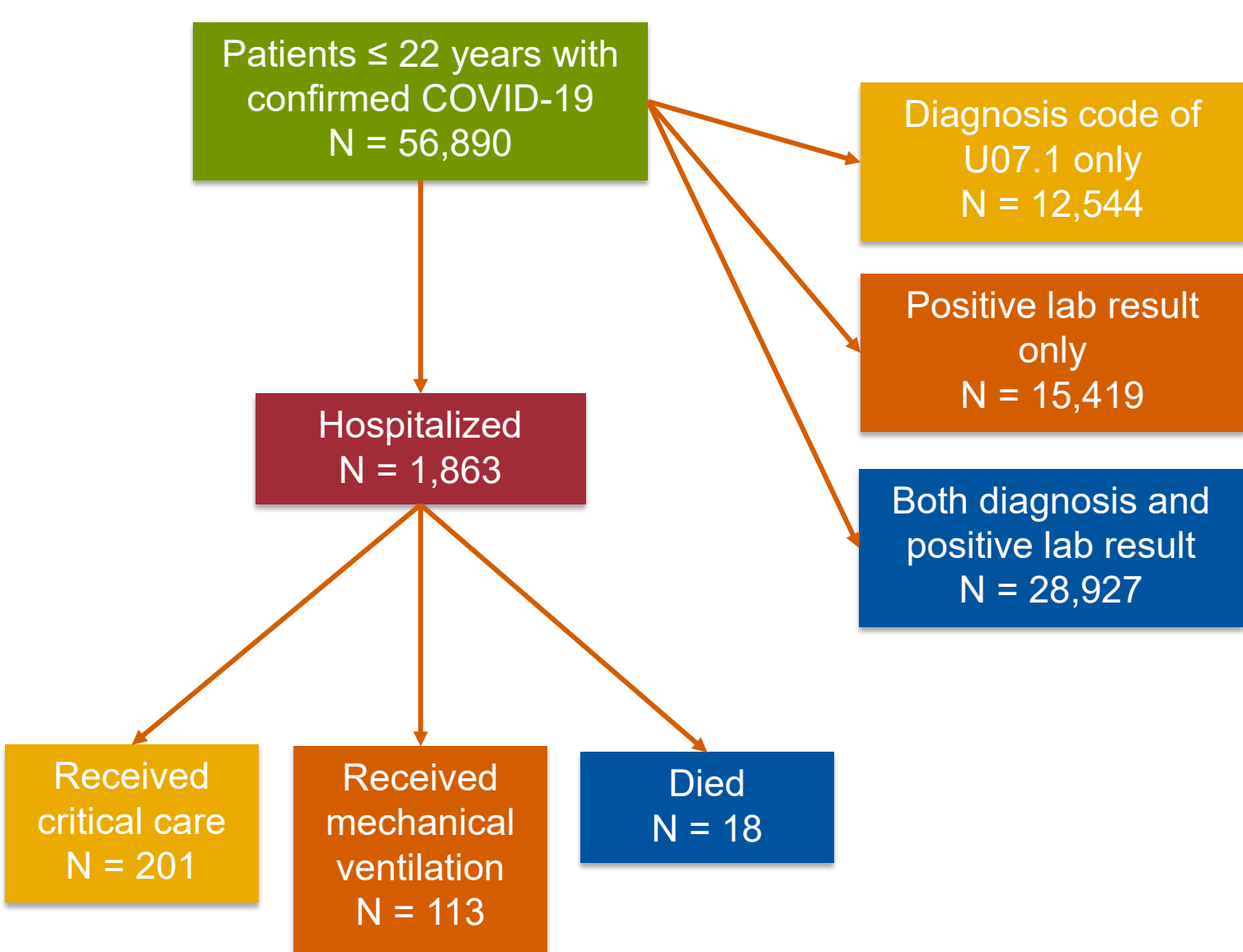


Figure 2. Hospitalized Pediatric Patients with COVID-19 per Week, by Age Group

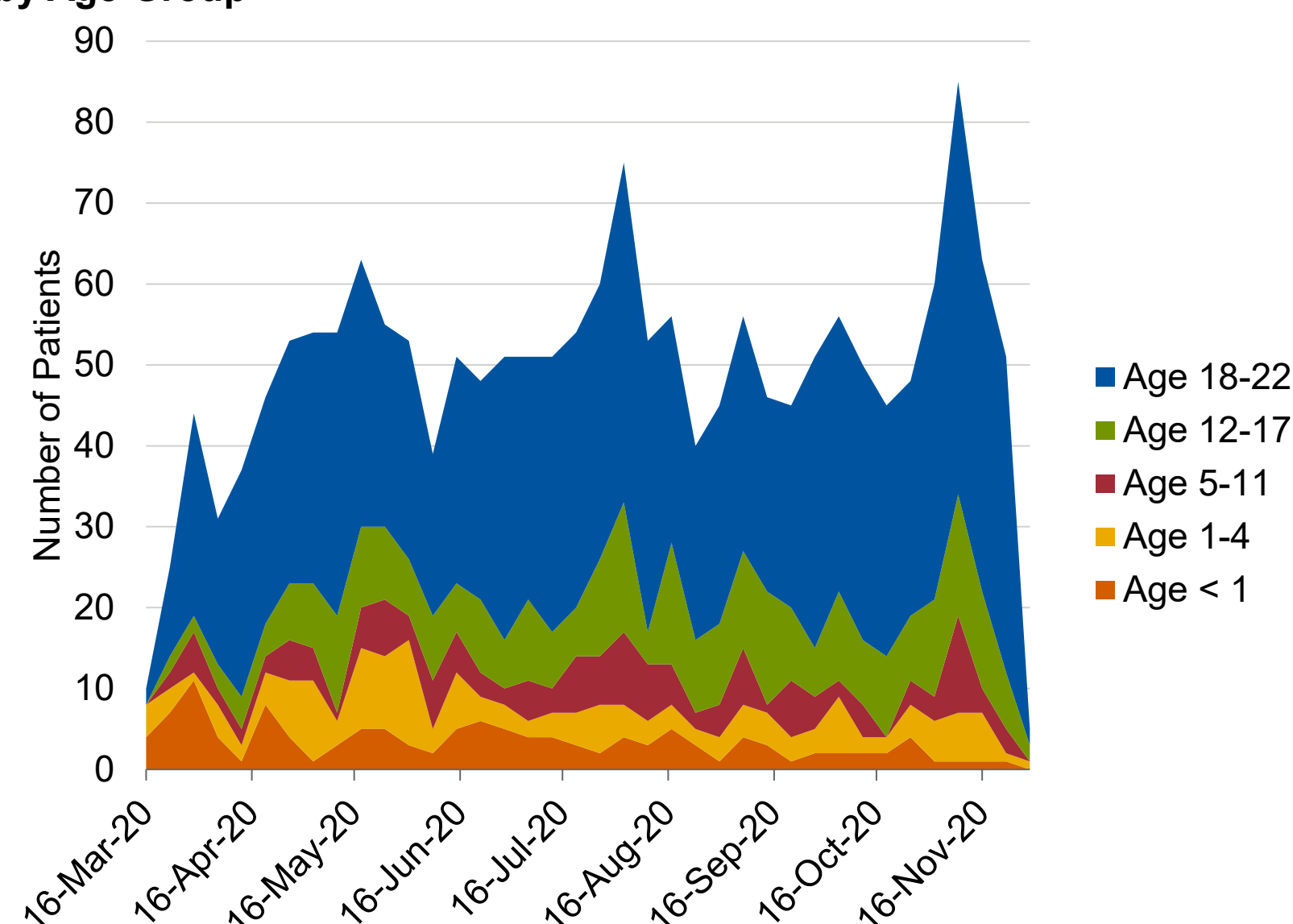


Figure 3. Demographic Characteristics and Baseline Comorbidities Among Pediatric Patients Hospitalized with COVID-19, by Age Group

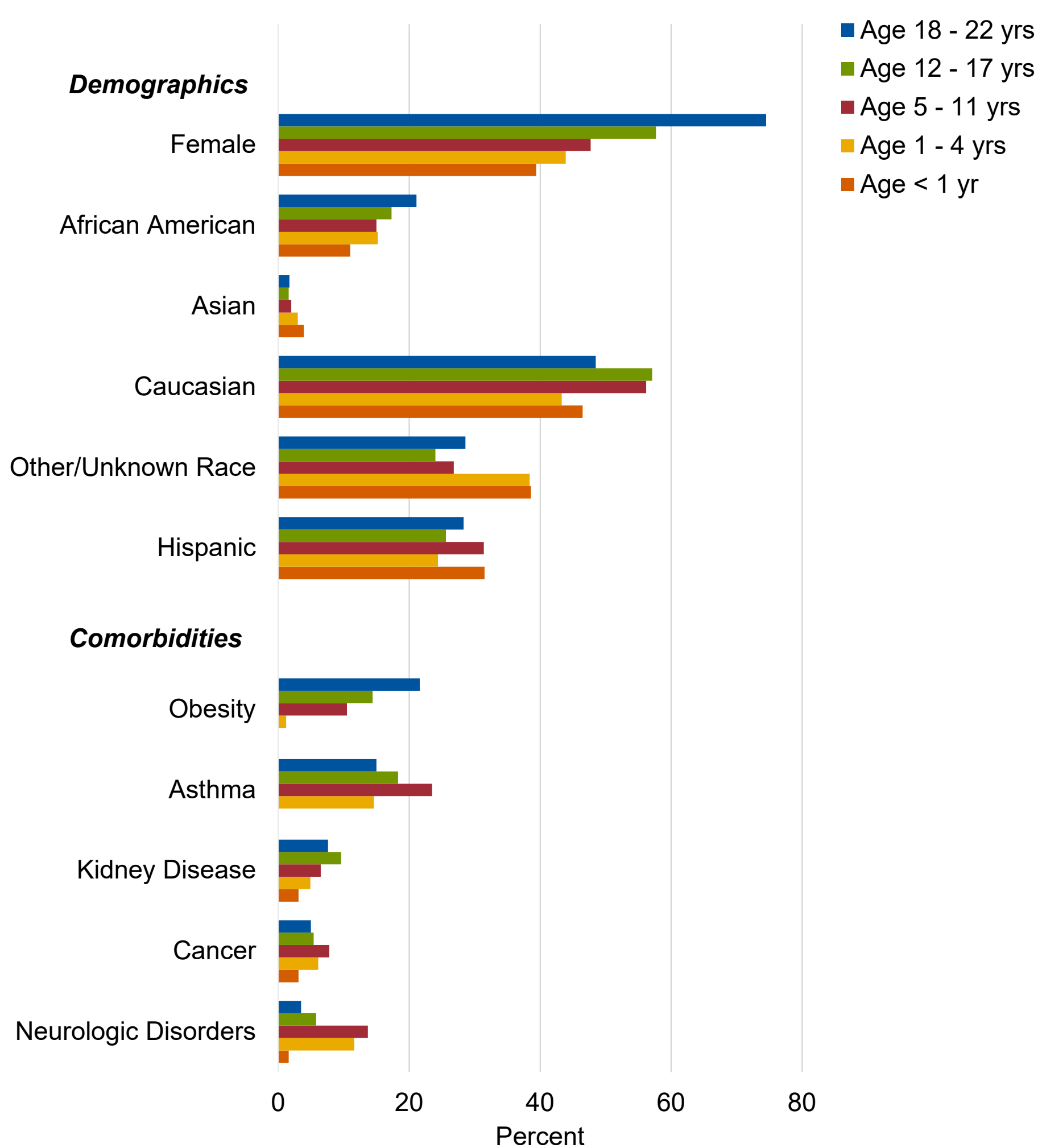
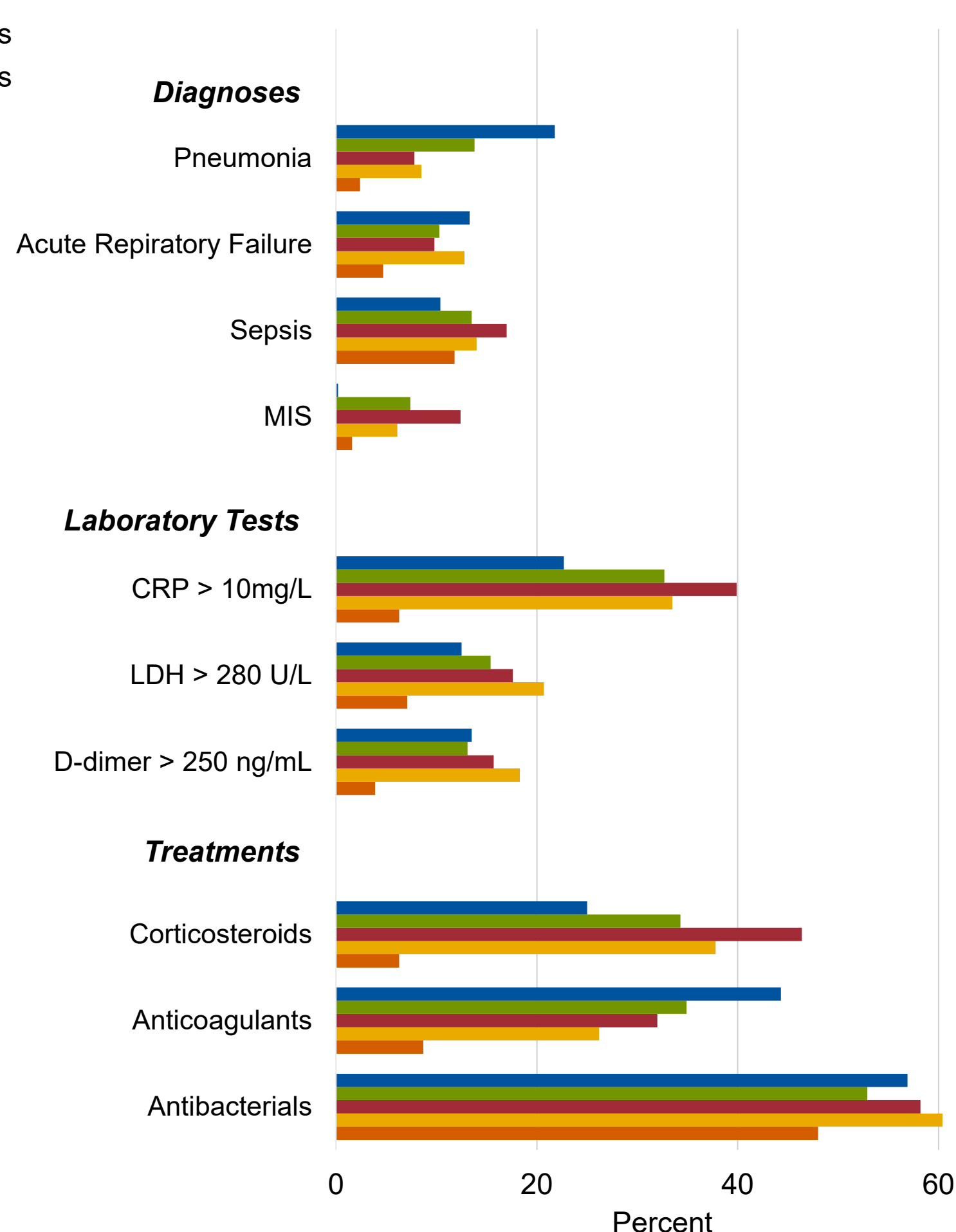


Figure 4. Diagnoses, Laboratory Tests, and Treatments During Hospitalization Among Pediatric Patients with COVID-19, by Age Group



Abbreviations: MIS, Multisystem inflammatory syndrome; CRP, C-reactive protein; LDH, lactate dehydrogenase

Discussion

- Results from this large US cohort of pediatric patients hospitalized with COVID-19 indicate that children and adolescents have relatively low prevalence of comorbidities, diagnoses, and elevated laboratory values.
- We observed that females comprised a large proportion of hospitalized patients aged 18 – 22 years; this finding should be examined in other data sources.
- A small subset of patients with multisystem inflammatory syndrome were identified; given the seriousness of this complication, further investigation of this subgroup is warranted.

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