

PEDIATRICS

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DOI: 10.1542/peds.2020-027425

Journal: *Pediatrics*

Article Type: Research Brief

Citation: Sisk B, Cull W, Harris JM, Rothenburger A, Olson L. National trends of cases of COVID-19 in children based on US state health department data. *Pediatrics*. 2020; doi: 10.1542/peds.2020-027425

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National Trends of Cases of COVID-19 in Children Based on US State Health Department Data

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Conflict of Interest Disclosures: The authors have no conflicts of interest to disclose.

Funding/Support: This research was supported by the American Academy of Pediatrics and the Children's Hospital Association.

Role of Funder/Sponsor: The authors are employed by the American Academy of Pediatrics and Children's Hospital Association.

Clinical Trial Registration: None

Abbreviations: Centers for Disease Control and Prevention (CDC); New York City (NYC); Washington DC (DC)

Contributors' Statement Page

Blake Sisk conceptualized and designed the study, coordinated and supervised data collection, carried out the analyses, and reviewed and revised the manuscript.

William Cull, J. Mitchell Harris, and Alex Rothenburger conceptualized and designed the study, coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

Lynn Olson conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Introduction

While there are several accessible sources providing data on COVID-19 cases, hospitalizations, and deaths in the US,^{1,2} little information has been reported on pediatric cases. However, information on COVID-19, categorized by age group, is publicly accessible on nearly all state health department websites.

A Centers for Disease Control and Prevention report in April reported that only 1.7% of confirmed COVID-19 cases were children under age 18,³ while more recent CDC data indicate 8.2% of cases were children.⁴ Although there are reports of serious illness in children from COVID-19 (including MIS-C), available data indicate children are far less likely to experience hospitalization or death.⁵⁻⁷ Yet, as US cases have surpassed 6.3 million, little data exist to understand where and how many children have been infected with COVID-19. We examine trends over 5 months in reported child COVID-19 cases using data from health department websites.

Methods

We describe pediatric COVID-19 infection in the US: number of cases and trends by geographic region, proportion of confirmed cases that are children, hospitalization rate, mortality rate.

Data are drawn from publicly available COVID-19 information posted on 49 state (NY state does not provide cases by age), 2 urban (NYC and DC) and 2 territory (Puerto Rico, Guam) health department web sites. Geographic region is based on the Census categorization: Northeast, Midwest, South, West.

Information was collected weekly on Thursdays from 4/16/2020-9/10/2020 and pooled to provide national and regional information.

Format, reporting frequency, and data metrics vary by state. Several definitions of “child” age ranges were used, primarily under 20: 0-17 (14 states and NYC), 0-18 (3 states), 0-19 (29 states and DC); along with outliers: 0-14 (2 states), and 0-20 (2 states). As of 8/13, Alabama modified the definition of a child case from 0-24 to 0-17 years; Alabama’s cases are included in the cumulative totals but are excluded from the trend analysis in Figures 1 and 2. Forty-nine states, NYC, DC, Puerto Rico, and Guam provided age distributions of confirmed COVID-19 cases (Texas provided the age distribution of only 8% of their cases on 9/10); 24 states and NYC provided information on hospitalizations; and 42 states and NYC reported information on mortality (see report for detail⁸).

Results

As of 9/10, there were 549,432 cumulative child COVID-19 US cases, a rate of 729 cases per 100,000 children. There has been substantial variation in case growth by region: in April, a preponderance of cases was in the Northeast (Figure 1). In June, cases surged in the South and West, followed by mid-July increases in the Midwest.

Over time, the proportion of COVID-19 cases that are pediatric has risen substantially (Figure 2), although below children’s share of the US population (22.6%).⁹ While currently children represent 10% of the cumulative number of reported cases, the history behind that cumulative number shows substantial change. In April, less than 3% of the reported cases were pediatric. In the last 8 weeks, children represented between 12-15.9% of new weekly reported cases.

Although children are a growing percentage of total cases, hospitalization, and death due to COVID-19 is uncommon. On 9/10, children represented 1.7% of total hospitalizations and about 2% of child cases resulted in hospitalization. Children made up 0.07% of total deaths and 0.01% of child cases resulted in death. These rates have remained stable across the study period.

Discussion

Data compiled from state health departments confirm that children can contract COVID-19, although severe disease appears to be uncommon. Child cases have risen concomitantly with the general population, with the geographic profile of case growth shifting from the Northeast in April, to the South and West in June, and to the Midwest in July. The data are limited by states' heterogeneous data reporting methods, and it is unknown how many children have been infected but not tested. It is unclear how much of the increase in child cases is due to increased testing capacity, although CDC data from public and commercial laboratories show the share of all tests administered to children ages 0-17 has remained stable at 5-7% since late April.¹⁰ Going forward, states should continue to report cases, testing, hospitalizations, and mortality by age so that the effects of COVID-19 on children's health can be closely monitored.

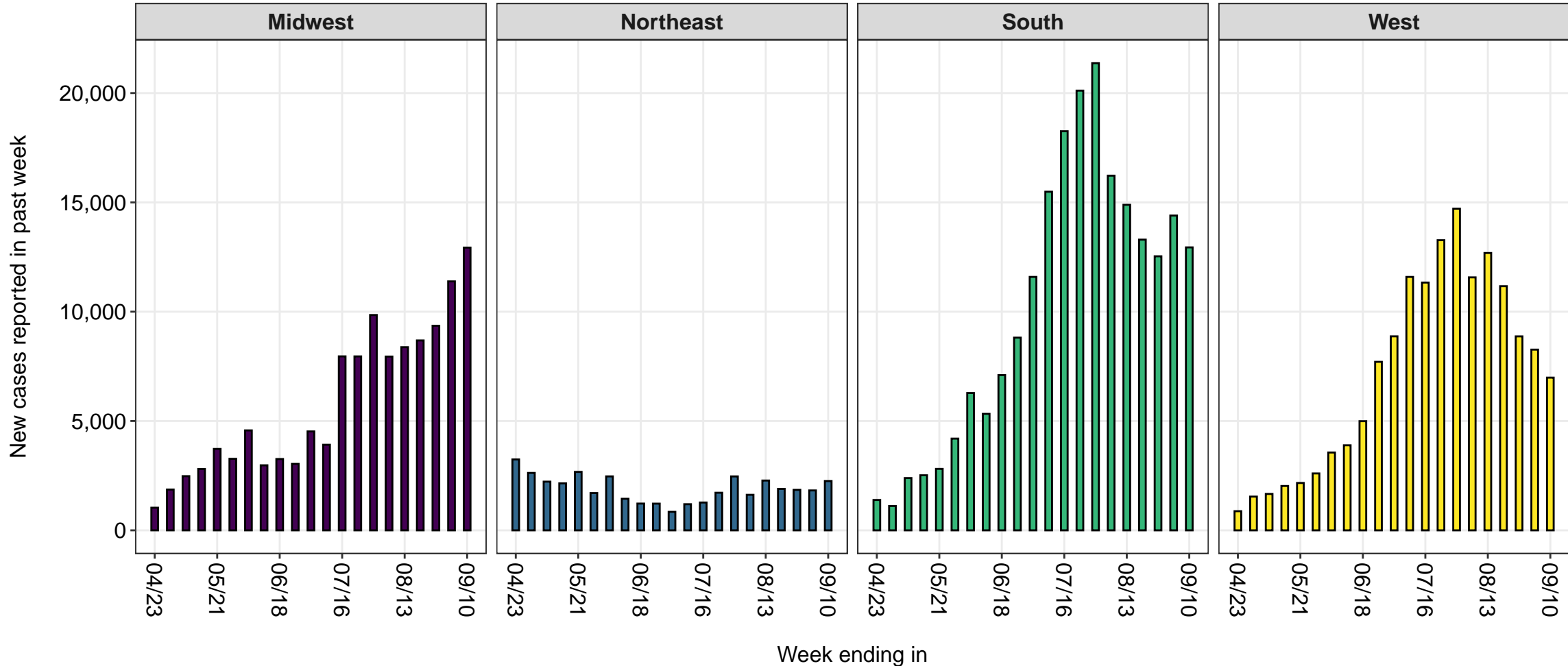
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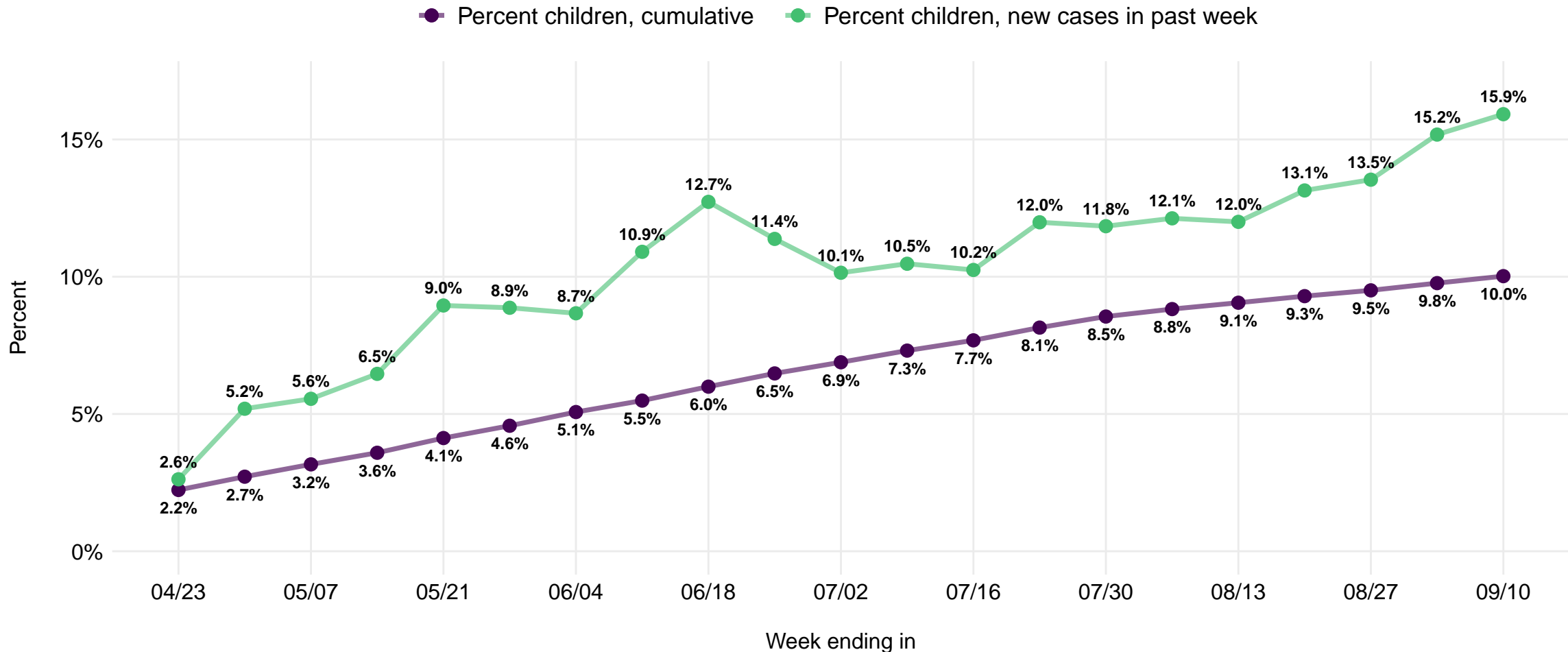
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Figure 1. New Child COVID-19 Cases Reported in the Past Week, by Region



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Figure 2. Percent of COVID-19 Cases that were Children: Cumulative and New Cases in Past Week



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