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COVID-19 and Changes in Child Obesity

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Abbreviations: Body Mass Index (BMI), Children's Hospital of Philadelphia (CHOP)

Contributors' Statements

Dr. Jenssen conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript.

Ms. Kelly designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript.

Drs. Bouchelle, Mayne and Fiks and Ms. Powell conceptualized and designed the study, coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

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

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has caused economic hardship, school closings, shutdowns, limited physical activities and increased food insecurity for many families. In December 2020, the American Academy of Pediatrics (AAP) released interim guidance on how pediatricians can help children and families address healthy lifestyles and obesity management during the pandemic.¹ To best support pediatric health system obesity-prevention and management efforts, a better understanding of emerging disparities is needed to identify at-risk populations and develop focused interventions.² Through a large pediatric primary care network, we evaluated the shifting rates of obesity for patients attending visits and explored disparities based on age, race/ethnicity, insurance, and income.

Methods

The Children's Hospital of Philadelphia (CHOP) Care Network includes 29 urban, suburban and semi-rural clinics in the Philadelphia region, providing care for a diverse population of nearly 300,000 patients. With a repeated cross-sectional design, we measured body mass index (BMI) at the visit level for patients aged 2 through 17 monthly January 2019-December 2020. We included in our sample all visits during which height and weight measurements were documented. Patients who had a BMI equal to or higher than the 95th percentile were classified as obese. We further analyzed obesity rates by age, race/ethnicity, insurance, and neighborhood median household income.³ To descriptively assess pre-pandemic vs. pandemic obesity, we compared average obesity rates from June-December 2019 and June-December 2020. We chose June-December as comparison months as visit volume had returned to near-normal after the initial dramatic decline starting March 2020. This study was deemed exempt by CHOP's Institutional Review Board.

Results

We analyzed 500,417 visits that occurred from January 2019-December 2020, including 169,179 visits in the pre-pandemic period and 145,081 in the pandemic period. The sample had a mean age of 9.2 years and was 48.9% female, 21.4% non-Hispanic Black, and 30.3% publicly insured. On average, overall obesity prevalence increased from 13.7% (June-December 2019) to 15.4% (June-December 2020). This increase was more pronounced in patients aged 5 to 9 years and those who were Hispanic/Latino, Non-Hispanic Black, publicly insured, or lower income (Figure 1). These results did not change meaningfully when the analysis was limited to preventive visits. Obesity rates increased across all ages ranges, ranging from an increase of 1.0% for patients aged 13 to 17 years to 2.6% for those aged 5 to 9 years (Figure 1a). Nearly 25% of Hispanic/Latino, non-Hispanic Black, publicly insured, or lowest income quartile patients seen during the pandemic were obese compared to 11.3% of non-Hispanic white patients, 12% of non-publicly insured patients, and 9.1% of highest income quartile patients. Pre-existing disparities appeared to have worsened. Racial/ethnic differences in obesity increased from a 10-11% to 13-14% difference following the pandemic (Figure 1b). The insurance disparity increased from 9 to 11% over the same period, comparing public to commercial insurance (Figure 1c). A similar trend was observed comparing those in the lowest and highest neighborhood income quartiles, with the obesity disparity increasing from 12 to 14% (Figure 1d, based on census tract-level data).

Discussion

In our large pediatric primary care network, results show that already alarming disparities in obesity rates among children ages 2 through 17 increased since the onset of the COVID-19 pandemic. Prior to the pandemic, external epidemiologic data indicate that obesity rates were higher among non-Hispanic black and Hispanic youth than among non-Hispanic, white or Asian

youth,⁴ and obesity rates were falling in well-educated and more affluent households but continuing to rise for others.⁵ This study suggests that during the pandemic, pre-existing disparities in obesity in terms of race/ethnicity, insurance, and neighborhood socioeconomic status widened.

Efforts to reduce COVID-19 transmission have likely contributed to worsening pediatric obesity. Families with children have faced the difficulties of managing virtual schooling, limited physical activity, and increased reliance on more heavily-processed and calorie dense foods.⁶ For disadvantaged families, many of the risk factors that have been shown to promote weight gain during the summer months are present in this pandemic.⁷ These include disrupted family routines, sleep dysregulation, reduced physical activity, increased screen time, increased access to unhealthy snacks, and less consistent access to appropriately portioned meals through school.

Pediatric healthcare settings will need to support families in finding ways to address barriers to healthy lifestyles during this pandemic.¹ Pediatricians can immediately help by counseling families on strategies tailored to the child's developmental stage that build on family strengths.² New approaches could include recommending virtual activities that promote increased physical activity, connecting families to nutritious meals offered through community settings, and focusing on ways to remain safe and active outside the home, such as going to parks, walking, and biking. At the same time, the pandemic exposes the need for larger policy changes that systematically address the complex environmental determinants of dietary habits.⁸ Pediatricians can play a role in advocating for improved school lunches, addressing agriculture policies that distort market forces and promote obesity (e.g. agricultural subsidies),⁹ and promoting physical

activity through community-based changes in the built environment.¹⁰ Our results underscore the importance of such efforts now.

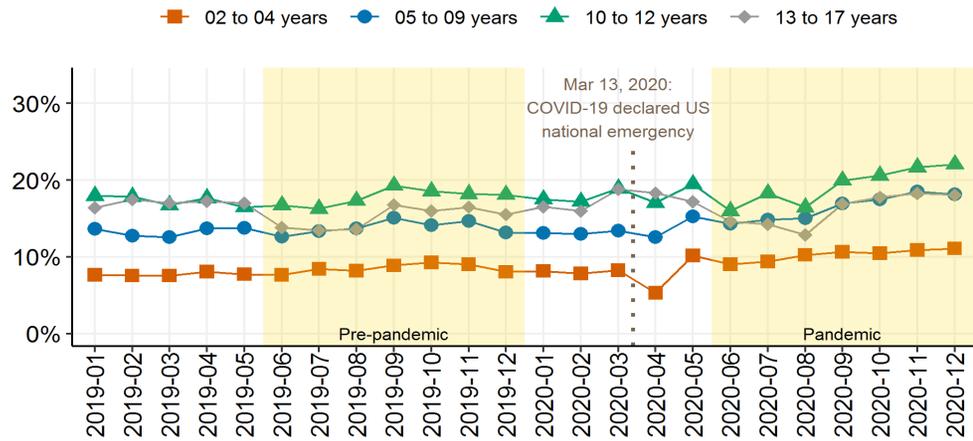
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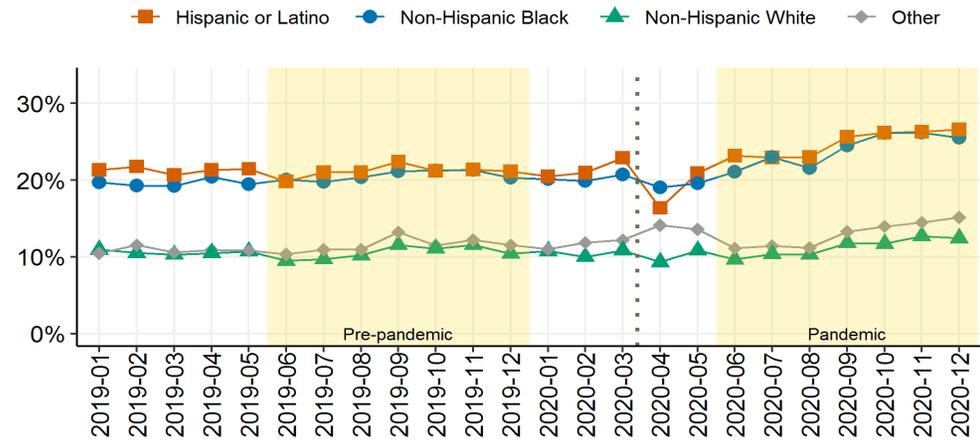
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Figure 1: Obesity Rates by Age, Race/Ethnicity, Insurance Status, and Neighborhood Median Household Income

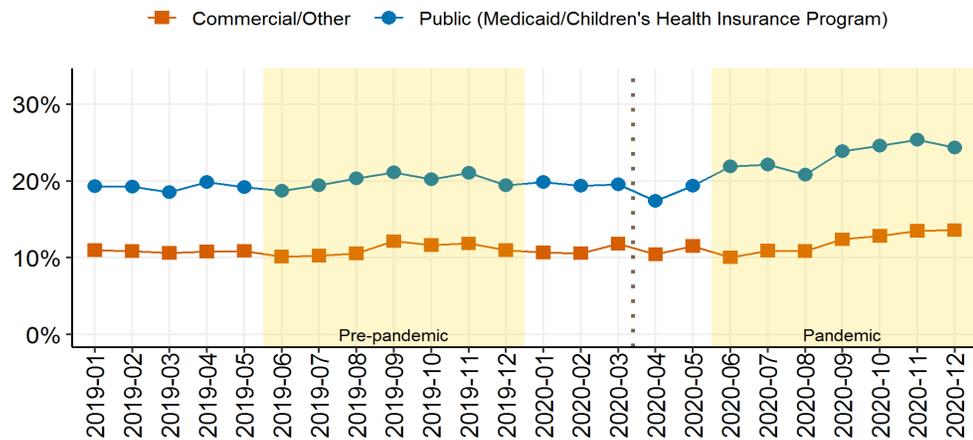
a. Age



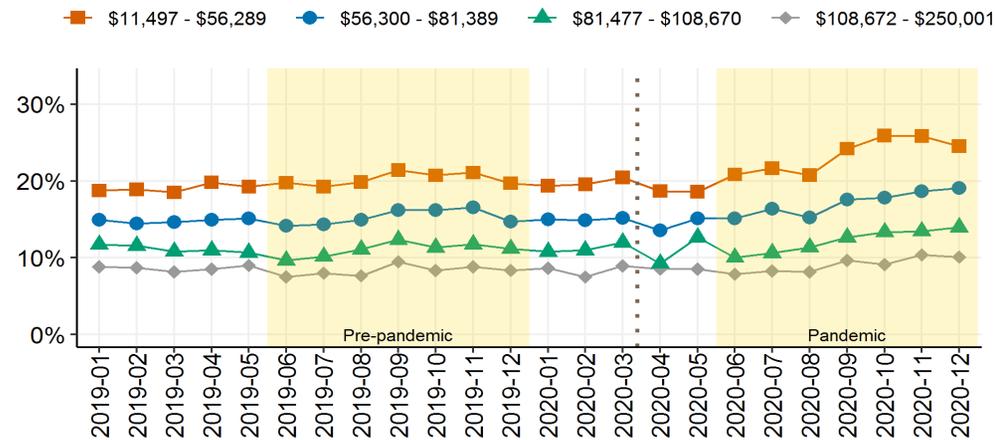
b. Race/Ethnicity



c. Insurance



d. Neighborhood Median Household Income



Month

Areas highlighted in yellow show the pre-pandemic and pandemic comparison periods

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