

COVID-19 and Changes in Child Obesity

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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 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 and ethnicity, insurance, and income.

METHODS

The Children's Hospital of Philadelphia Care Network includes 29 urban, suburban, and semirural clinics in the Philadelphia region, providing care for a diverse population of nearly 300 000 patients. With a repeated cross-sectional design, we measured BMI at the visit level for patients aged 2 to 17 years monthly from January 2019 to 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 and ethnicity, insurance, and neighborhood median household income.³ To descriptively assess pre-

COVID-19 pandemic versus pandemic obesity, we compared average obesity rates from June to December 2019 and June to December 2020. We chose June to December as comparison months because visit volume had returned to near normal after the initial dramatic decline starting in March 2020. This study was deemed exempt by the Children's Hospital of Philadelphia Institutional Review Board.

RESULTS

We analyzed 500 417 visits that occurred from January 2019 to December 2020, including 169 179 visits in the prepandemic 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 to December 2019) to 15.4% (June to December 2020). This increase was more pronounced in patients aged 5 to 9 years and those who were Hispanic, non-Hispanic Black, publicly insured, or lower income (Fig 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 (Fig 1A). Nearly 25% of Hispanic, non-Hispanic Black, publicly insured, or lowest income quartile patients seen during the pandemic were obese compared with 11.3% of non-Hispanic white patients, 12% of non-publicly insured patients, and 9.1% of highest income quartile patients.

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

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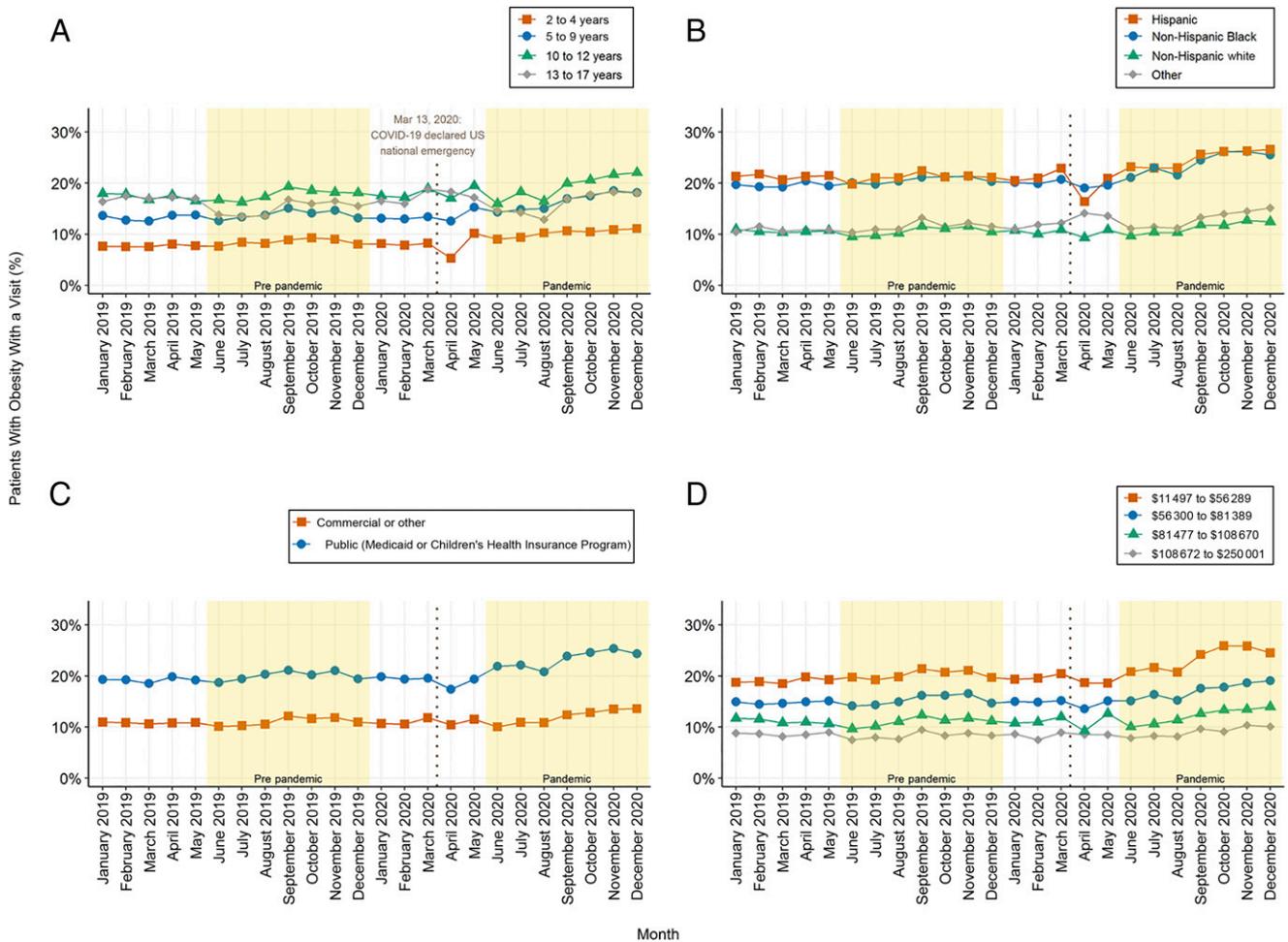


FIGURE 1 Obesity rates by age, race and ethnicity, insurance status, and neighborhood median household income. A, Age. B, Race and ethnicity. C, Insurance. D, Neighborhood median household income. Areas highlighted in yellow show the prepandemic and pandemic comparison periods.

Preexisting disparities appeared to have worsened. Racial and ethnic differences in obesity increased from a 10% to 11% difference to a 13% to 14% difference during the pandemic (Fig 1B). The insurance disparity increased from 9% to 11% over the same period, comparing public to commercial insurance (Fig 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% (Fig 1D, based on census tract-level data).

DISCUSSION

In our large pediatric primary care network, results reveal that already

alarming disparities in obesity rates among children ages 2 through 17 increased since the onset of the COVID-19 pandemic. Before the pandemic, external epidemiological data indicate that obesity rates were higher among non-Hispanic Black and Hispanic youth than among non-Hispanic white or Asian American 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, preexisting disparities in obesity in terms of race and 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 health care 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 (eg, 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.

ABBREVIATION

COVID-19: coronavirus disease 2019

REFERENCES

1. American Academy of Pediatrics. American Academy of Pediatrics raises concern about children's nutrition and physical activity during pandemic. Available at: <http://services.aap.org/en/news-room/news-releases/aap/2020/american-academy-of-pediatrics-raises-concern-about-childrens-nutrition-and-physical-activity-during-pandemic/>. Accessed December 10, 2020
2. Daniels SR, Hassink SG; Committee on Nutrition. The role of the pediatrician in primary prevention of obesity. *Pediatrics*. 2015;136(1). Available at: www.pediatrics.org/cgi/content/full/136/1/e275
3. Manson S, Schroeder J, Van Riper D, Kugler T, Ruggles S. *IPUMS National Historical Geographic Information System: Version 15.0*. Minneapolis, MN: IPUMS; 2020
4. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of Obesity among Adults and Youth: United States, 2015-2016. In: *NCHS Data Brief*. 2017;1-8
5. Ogden CL, Carroll MD, Fakhouri TH, et al. Prevalence of obesity among youths by household income and education level of head of household - United States 2011-2014. *MMWR Morb Mortal Wkly Rep*. 2018;67(6):186-189
6. Rundle AG, Park Y, Herbstman JB, Kinsey EW, Wang YC. COVID-19-related school closings and risk of weight gain among children. *Obesity (Silver Spring)*. 2020; 28(6):1008-1009
7. Franckle R, Adler R, Davison K. Accelerated weight gain among children during summer versus school year and related racial/ethnic disparities: a systematic review. *Prev Chronic Dis*. 2014;11:E101
8. Mozaffarian D, Rogoff KS, Ludwig DS. The real cost of food: can taxes and subsidies improve public health? *JAMA*. 2014;312(9):889-890
9. Franck C, Grandi SM, Eisenberg MJ. Agricultural subsidies and the American obesity epidemic. *Am J Prev Med*. 2013;45(3):327-333
10. Petersen R, Pedroso MS. Economic benefits of promoting safe walking and biking to school: creating momentum for community improvements. *Am J Prev Med*. 2021;60(1):e41-e43

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