

Covid-19 related lockdown and body weight changes in children

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Are youth really gaining more weight during the pandemic than in previous years?

If they are gaining more weight, are there differences by age?

Is the weight gain worse within communities of color that have been hardest hit by the pandemic and have a disproportionately high prevalence of excess weight?

What, if any, long-term impact will this weight gain have on health?

What interventions are needed to address this weight gain?



Oct 2020

Feb 2020







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Pandemic timeline in California

California had one of the highest per capita rates of COVID-19 infection in the world





Study design and population **Retrospective Cohort** School-aged youth (5–17 years old)

KPSC members 5-17 years old on March 1, 2020 N = 1,275,578

Excluded:

No continuous membership 24 months prior to March 2020 (N = 658,912) Complex chronic conditions (N = 47,316)

KPSC continuous membership 5-17 years old with no complex chronic conditions N = 569,350

No BMI between June 16, 2020 and Jan 31, 2021 (N = 371,643)

5-17 years old with 1+ BMI during COVID-19 N = 197,707

No BMI before March 16, 2020 (N = 6,198)

5-17 years old with 1+ BMI during pandemic & 1+ BMI before pandemic N = 191,509

Analytical Cohort

5-17 years old with 1+ BMI during pandemic & 1+ BMI before pandemic N = 191,509

- Similar to KPSC youth in all covariates assessed: Age, sex, race/ethnicity, weight status state-subsidized health insurance neighborhood income, education, parks

Diverse: Hispanic 50.4% Non-Hispanic White 25.3% Non-Hispanic Black 7.0% Asian/Pacific Islander 9.8%

Total BMI measures - 425,855 before COVID-19 (2.22 BMI/youth) and 283,718 during COVID-19 (1.48 BMI/youth).

Statistical analysis

- Outcomes of the study were • Distance from the median BMI for sex and age Weight adjusted for height Percent overweight or obese
- Mixed effect regression models accounting for repeated measures within child with an • parameters – accommodates missing outcomes at some time points
- Linear term best fit for the data (using AICC, BIC, and the likelihood ratio test) •
 - ullet
- parks and state-subsidized insurance.
- for body weight was further adjusted for height.

autoregressive correlation structure and maximum likelihood estimation of the covariance

But necessary to analyse three age strata (5-11, 12-15, 16-17 years) based on unadjusted penalized b-splines and visual assessment of the relationship of BMI and calendar month

Models adjusted for adjust for race/ethnicity, sex, neighborhood education and income, number of

BMI and body weight models were also adjusted for BMI-for-age group at baseline, and the model

Primary Outcome: Distance from the median BMI-for-age

16-17 years old

Primary Outcome: Distance from the median BMI-for-age

12-15 years old

Primary Outcome: Distance from the median BMI-for-age

11

5-11 years old

Secondary Outcome: Overweight and obesity

Table. Weight Changes in Youths Over an 11-Month Period Before and During the Pandemic ^a									
	Prepandemic			Pandemic					
Age group, y	Start	End	Change 1 (Δ1, 95% CI)	Start	End	Change 2 (Δ2, 95% CI)	Δ2-Δ1 (95% CI)		
Overweight or obese (≥85th percentile), rate (SD), % ^b									
5-11	34.76 (0.23)	35.70 (0.23)	0.94 (0.58 to 1.30)	36.16 (0.26)	45.74 (0.28)	9.58 (9.01 to 10.16)	8.65 (7.96 to 9.33		
12-15	39.04 (0.31)	38.52 (0.31)	-0.53 (-0.97 to -0.08)	38.74 (0.35)	43.41 (0.34)	4.67 (3.99 to 5.35)	5.19 (4.37 to 6.02)		
16-17	37.97 (0.48)	36.57 (0.46)	-1.40 (-2.04 to -0.76)	36.52 (0.50)	38.20 (0.48)	1.67 (0.75 to 2.59)	3.07 (1.94 to 4.21		
Overweight (≥85th to <95th percentile), rate (SD), % ^b									
5-11	17.22 (0.20)	16.87 (0.20)	-0.35 (-0.80 to 0.10)	16.99 (0.26)	18.86 (0.23)	1.87 (1.16 to 2.57)	2.22 (1.37 to 3.06		
12-15	19.23 (0.27)	18.82 (0.27)	-0.41 (-0.98 to 0.16)	19.69 (0.34)	19.35 (0.29)	-0.34 (-1.20 to 0.52)	0.07 (-0.98 to 1.12		
16-17	19.32 (0.41)	18.20 (0.39)	-1.12 (-1.92 to -0.31)	17.66 (0.46)	17.54 (0.40)	-0.12 (-1.23 to 0.98)	1.00 (-0.39 to 2.38		
Obesity (≥95th percentile), rate (SD), % ^b									
5-11	17.27 (0.18)	18.38 (0.18)	1.11 (0.83 to 1.39)	18.79 (0.21)	26.11 (0.25)	7.32 (6.84 to 7.80)	6.21 (5.66 to 6.76		
12-15	19.19 (0.25)	19.06 (0.25)	-0.13 (-0.47 to 0.22)	18.58 (0.27)	23.20 (0.30)	4.62 (4.06 to 5.18)	4.75 (4.09 to 5.42		
16-17	18.18 (0.37)	17.97 (0.37)	-0.21 (-0.70 to 0.28)	18.41 (0.41)	20.07 (0.41)	1.66 (0.93 to 2.39)	1.87 (0.99 to 2.75		

Comparison from NHANES: Annual increase in obesity 2000-2018: 0.2% in 6-11 yrs, 0.4% in 12-19 yrs

Woolford SJ, Sidell M, Li X, Ekse V, Young DR, Resnicow K, Koebnick C. Changes in Body Mass Index Among Children and Adolescents During the COVID-19 Pandemic. JAMA. 2021;326(14):1434–1436.

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Thank You!

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Increases in Children's BMI Rate of Change during the COVID-19 Pandemic

Samantha Lange, MPH Centers for Disease Control and Prevention

Disclaimer: The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC).

Longitudinal Cohort Definition

- Aim: to compare trends in children's BMI before and during the pandemic
- Data Source: IQVIA Ambulatory Electronic Medical Record (AEMR) dataset
- Cohort: 432,302 children 2-19y with ≥3 BMI measurements

Lange SJ, Kompaniyets L, Freedman DS, et al. Longitudinal trends in body mass index before and during the COVID-19 pandemic among persons aged 2-19 years – United States, 2018-2020. MMWR Morb Mortal Wkly Rep 2021;70:1278-1783. doi: http://dx.doi.org/10.15585/mmwr.mm7037a3

Sharp Increases in Rates of BMI Change during Pandemic

Among 432,302 children in IQVIA-

- The monthly rate of BMI change nearly doubled during the pandemic (0.100 vs. 0.052 kg/m²; slope ratio: 1.93)
- Largest increases among-
 - Children with overweight or obesity
 - Children aged 6-119

TABLE 2. Monthly Rate of Change in Children's BMI and Weight Before and During the COVID-19 Pandemic, Overall and by BMI Category and Age Group — IQVIA Ambulatory Electronic Medical Records Database, United States, January 2018–November 2020

	Prepandemic	Pandemic	Pandemic vs. P	repandemic					
Characteristics	Slope* (95% CI)	Slope (95% CI)	Difference [†] (95% Cl)	Ratio [§] (95% Cl)					
Body Mass Index (kg/m²)									
Overall	0.052 (0.051–0.052)	0.100 (0.098–0.101)	0.05 (0.05–0.05)	1.93 (1.90–1.96)					
Initial BMI Category [¶]									
Underweight	0.046 (0.044–0.047)	0.051 (0.044–0.058)	0.01 (0.00–0.01)	1.12 (0.96–1.28)					
Healthy Weight	0.044 (0.044–0.044)	0.078 (0.076–0.080)	0.03 (0.03–0.04)	1.78 (1.73–1.82)					
Overweight	0.057 (0.056–0.058)	0.121 (0.117–0.125)	0.06 (0.06–0.07)	2.13 (2.06–2.20)					
Moderate Obesity	0.070 (0.069–0.071)	0.164 (0.160–0.168)	0.09 (0.09–0.10)	2.34 (2.28–2.40)					
Severe Obesity	0.089 (0.088–0.090)	0.179 (0.173–0.185)	0.09 (0.08–0.10)	2.00 (1.93–2.07)					
Age Group (yrs)**									
3–5	-0.002 (-0.003 to -0.002)	0.040 (0.037–0.043)	0.04 (0.04–0.05)	_					
6–11	0.059 (0.059–0.060)	0.148 (0.145–0.150)	0.09 (0.09–0.09)	2.50 (2.45–2.54)					
12–17	0.072 (0.071–0.072)	0.106 (0.104–0.109)	0.03 (0.03–0.04)	1.48 (1.44–1.51)					
18–20	0.045 (0.044–0.046)	0.032 (0.027–0.037)	-0.01 (-0.02 to -0.01)	0.70 (0.59–0.82)					

Lange SJ, Kompaniyets L, Freedman DS, et al. Longitudinal trends in body mass index before and during the COVID-19 pandemic among persons aged 2-19 years – United States, 2018-2020. MMWR Morb Mortal Wkly Rep 2021;70:1278-1783. doi: http://dx.doi.org/10.15585/mmwr.mm7037a3

Ongoing Analyses

Reran with additional data

- Pandemic period: June 2020-May 2021
- Children in all BMI categories except underweight had significant increases in rates of BMI change
- Attenuation in some effects

Sub-analysis by sex Higher rate of BMI change in males

Thank you!

Questions? Email Sam Lange at <u>nya7@cdc.gov</u>