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# Racial/Ethnic and Income Disparities in Child and Adolescent Exposure to Food and Beverage Television Ads across U.S. Media Markets

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# Overview

- Obesity prevalence and related health burdens are greater among U.S. racial/ethnic minority and low-income populations.
- Targeted advertising may contribute to disparities.
- Designated media area (DMA) spot television ratings were used to assess disparities in child/adolescent exposure to food-related ads.
- Adjusted exposure to sugar-sweetened beverages and fast-food restaurants was significantly higher in areas with higher proportions of black or lower-income households.
- Geographically targeted TV ads are important to consider for assessing obesity-promoting influences in black and low-income neighborhoods.

# Introduction

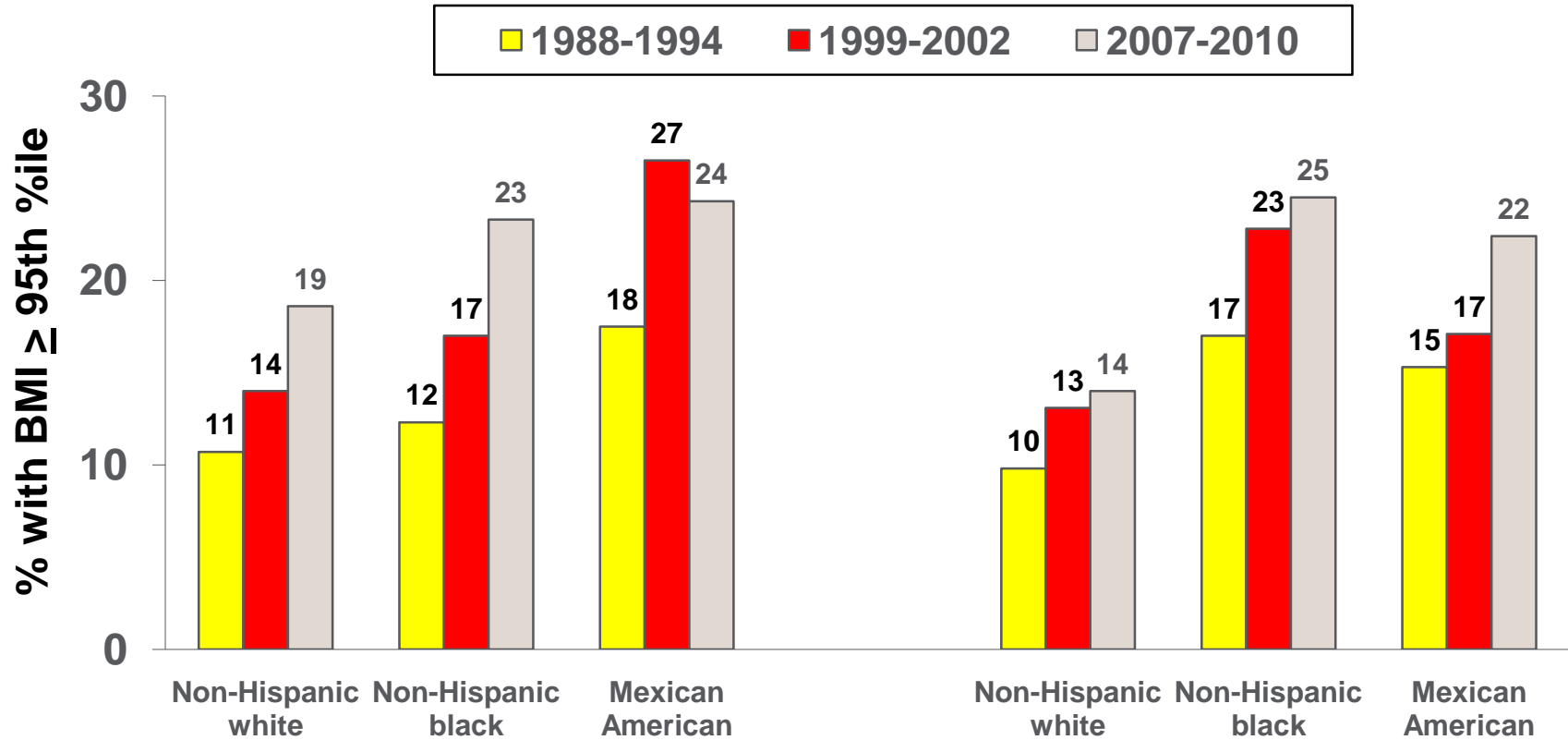
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# Obesity prevalence and related health burdens

- In 2009-2010, nearly 17% of U.S. children ages 2 to 19 were classified as obese<sup>1</sup>
- Obesity prevalence was 24.3% among non-Hispanic black children and 21.2% among Hispanic children, compared to 14% among non-Hispanic white children<sup>1</sup>
- Obesity prevalence is greater among children and adolescents living in lower-income households<sup>2</sup>
- Exposure to food-related television advertising is associated with children's purchase requests, consumption patterns and adiposity<sup>3</sup>

Sources: 1 Ogden, Carroll et al., 2012; 2 Ogden, Lamb et al., 2010; 3 Chou, Rashad et al., 2008; Institute of Medicine, 2006; Andreyeva, Kelly et al., 2011; IOM 2006 ;

# US Obesity Prevalence Trends: Children



Source: Source: Health, United States, 2011.

# Advertising to children

- In 2009, children aged 2-5 and 6-11 saw, on average, 3979 and 4636 food-related ads on television, respectively. While these numbers have been declining since 2003, they rose in 2011<sup>1</sup>
- 48 food and beverage companies spent \$1.8 billion on youth-targeted marketing in 2009, of which \$632.7 (35.4%) was on television<sup>2</sup>
- Despite industry pledges to promote only healthy products, the vast majority of television advertisements directed at children are high in saturated fat, sugar or sodium<sup>3</sup>

Sources: 1 FTC, 2008 . TV basics. TVB Local Media Marketing Solutions [http://www.tvb.org/media/file/TV\\_Basics.pdf](http://www.tvb.org/media/file/TV_Basics.pdf). Powell et al. 2011; Powell, Harris et al., 2013; 2 Federal Trade Commission, 2012; 3 Harris, Schwartz et al., 2010; Harris, Schwartz et al., 2011; Harris, Schwartz et al., 2012; Powell, Schermbeck et al., 2011; Kunkel, McKinley et al., 2009;

# Targeted advertising may contribute to childhood health disparities

- “Targeted marketing” refers to directing products and product promotions to groups of consumers or ‘segments’<sup>1</sup>
- Television ads can be **targeted locally** by demographic characteristics such as racial/ethnic or socioeconomic background.
- Marketing of foods and beverages high in saturated fat, sugar and/or sodium to children/adolescents has received particular attention as a probable contributor to childhood obesity<sup>2</sup>
- Targeted advertising of food and beverages that are high in fat or sugar based on race/ethnicity has been documented.<sup>3</sup>

Sources: **1** Kotler, 1975; Sources: **2** Federal Trade Commission, Centers for Disease Control and Prevention et al., 2011;Kraak, Story et al., 2011;Cheyne, Gonzalez et al., 2013;Powell, Schermbeck et al., 2011;Federal Trade Commission, 2012;Institute of Medicine, 2006;Center for Science in the Public Interest, 2010; **3** Grier and Kumanyika, 2008;Harris, Schwartz et al., 2010;Harris, Schwartz et al., 2011;Powell, Szczypka et al., 2010

# Targeted advertising and confounding factors

- The disproportionate exposure of black and Hispanic youth to targeted television advertising is increased by the fact that on average they are more likely to have TVs in their bedrooms and watch television an hour or more longer per day<sup>1</sup>
- Parents' education level, low- to mid-socio-economic status (SES) is correlated with youths' viewing more TV (greater than 30 additional minutes) more than their high-SES counterparts<sup>1</sup>
- Multivariate analyses suggest independent racial/ethnic and SES associations with children's and adolescents' TV viewing time<sup>2</sup>

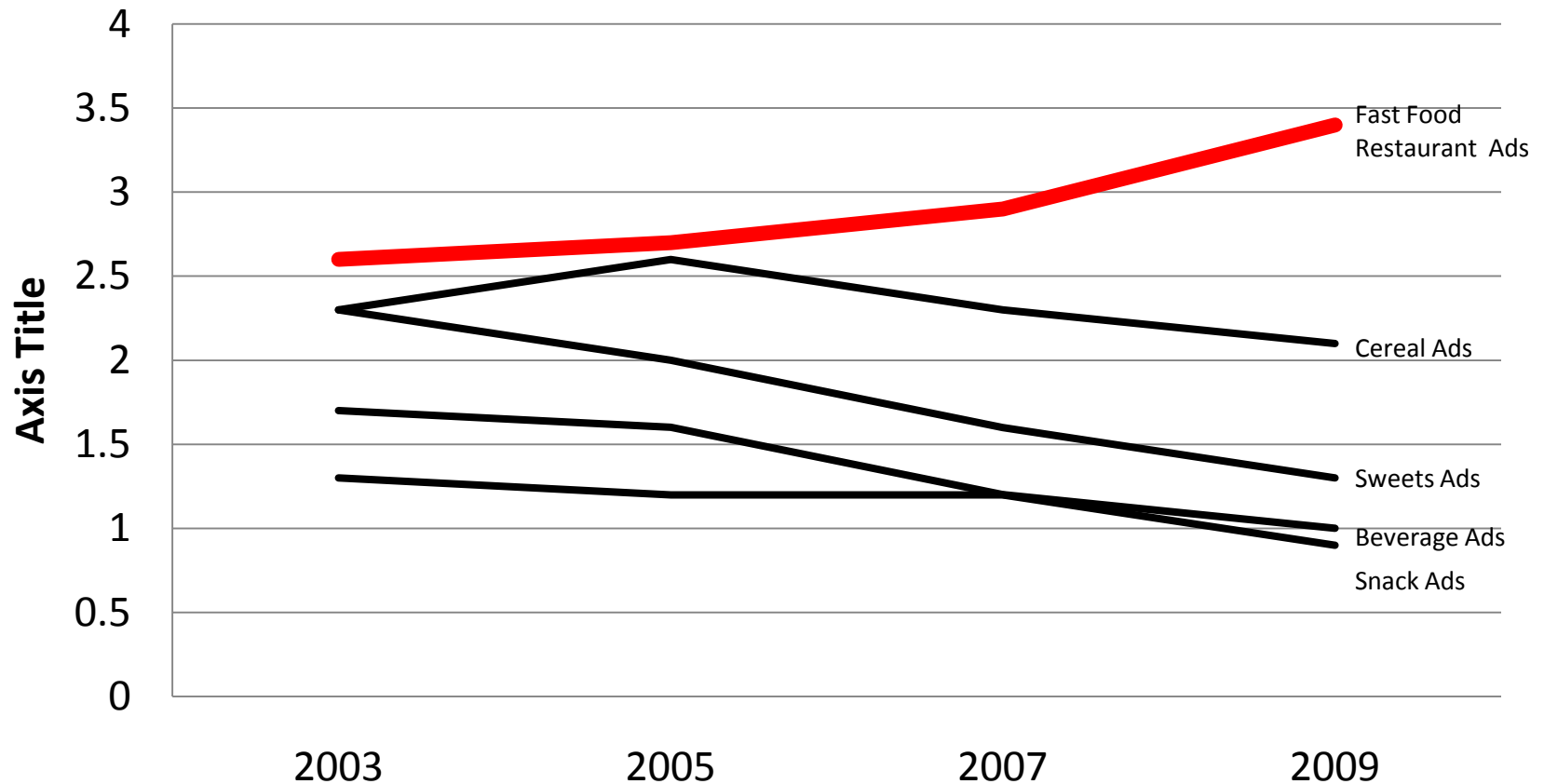
Sources: 1 Rideout, Foehr et al., 2010; 2 Gorely, Marshall et al., 2004; Hoyos Cillero and Jago, 2010



# Background: Trends in Children's Exposure to Food and Beverage Advertising

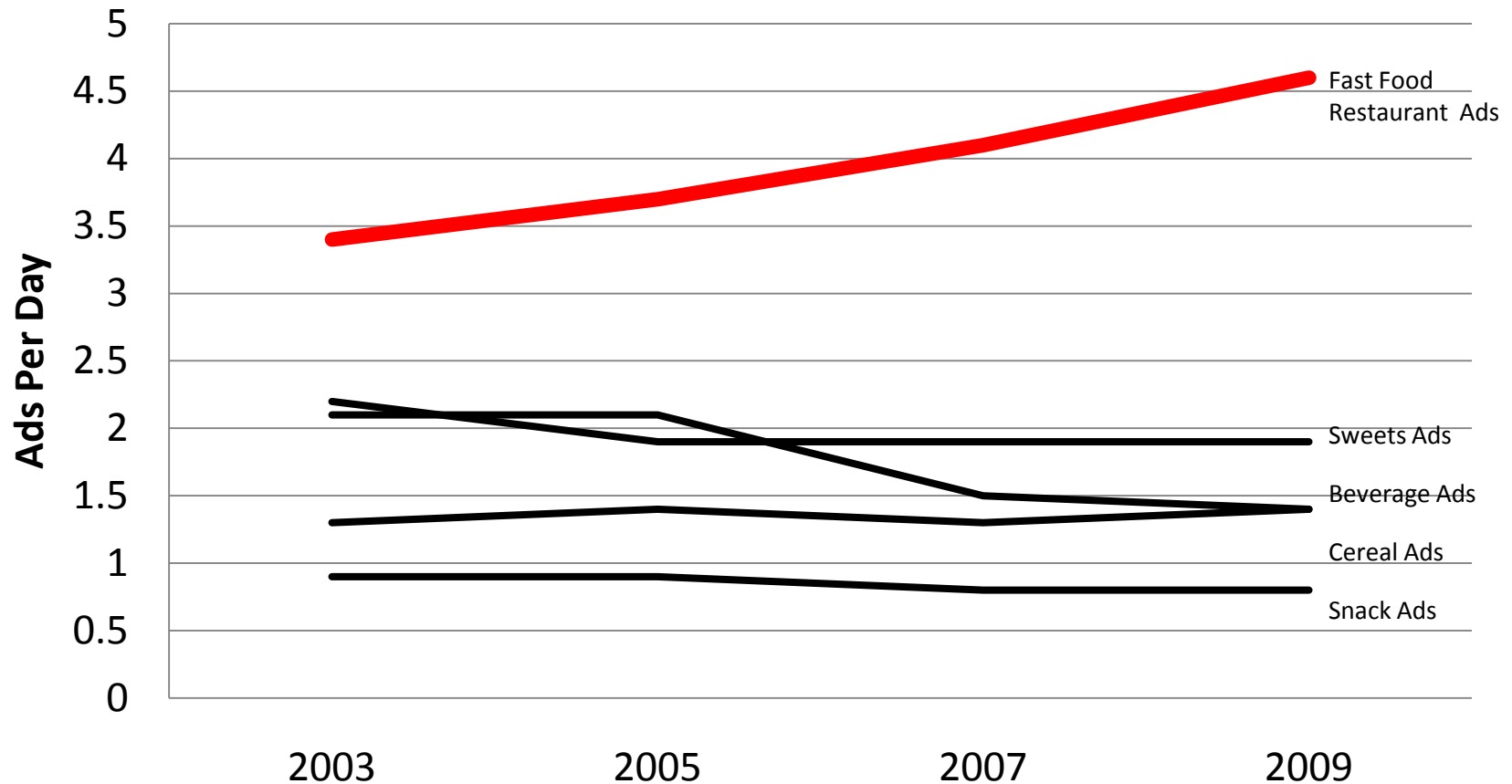
# Exposure to Food Advertisements per Day for Children by Year

## Children Ages 6-11 Years

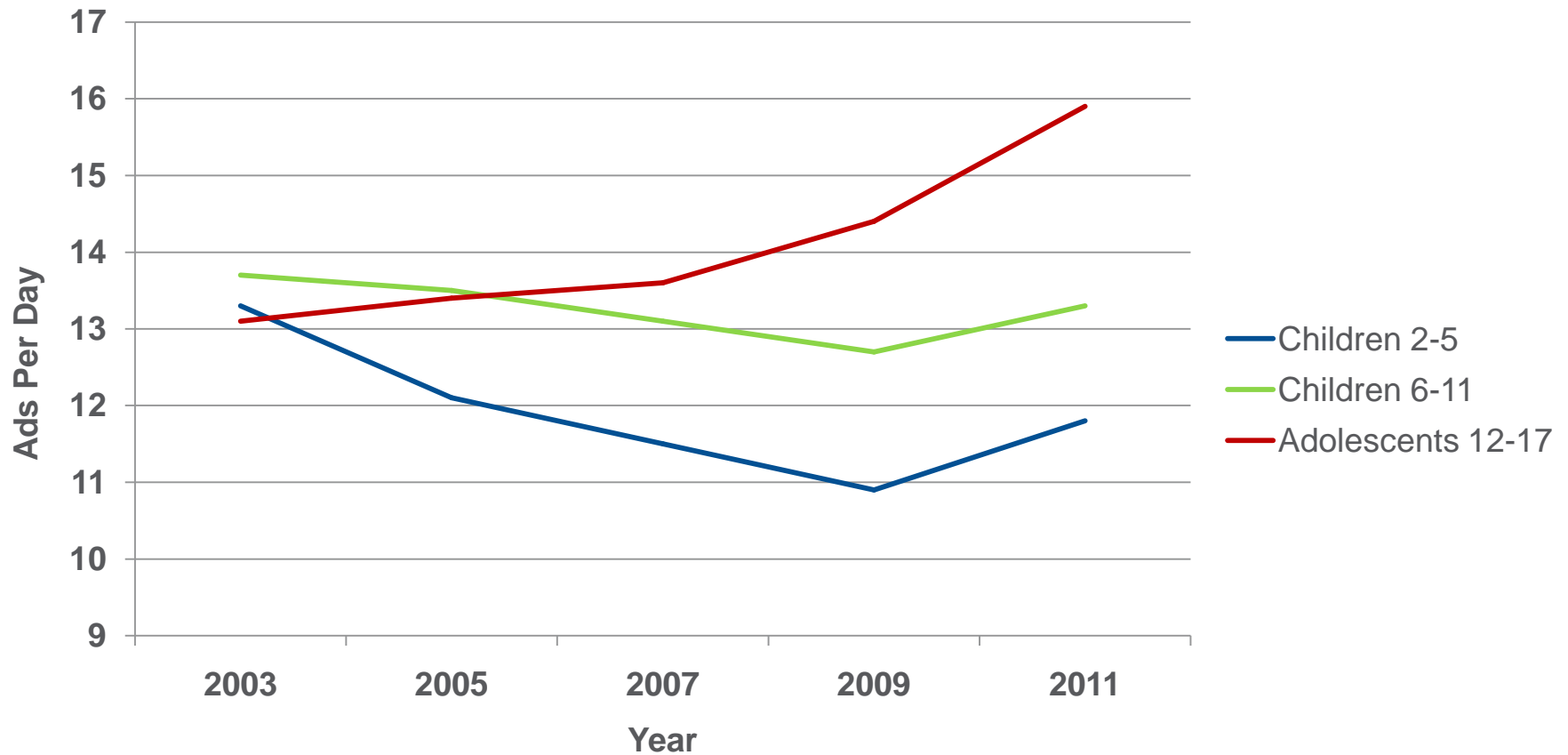


# Exposure to Food Advertisements per Day for Adolescents by Year

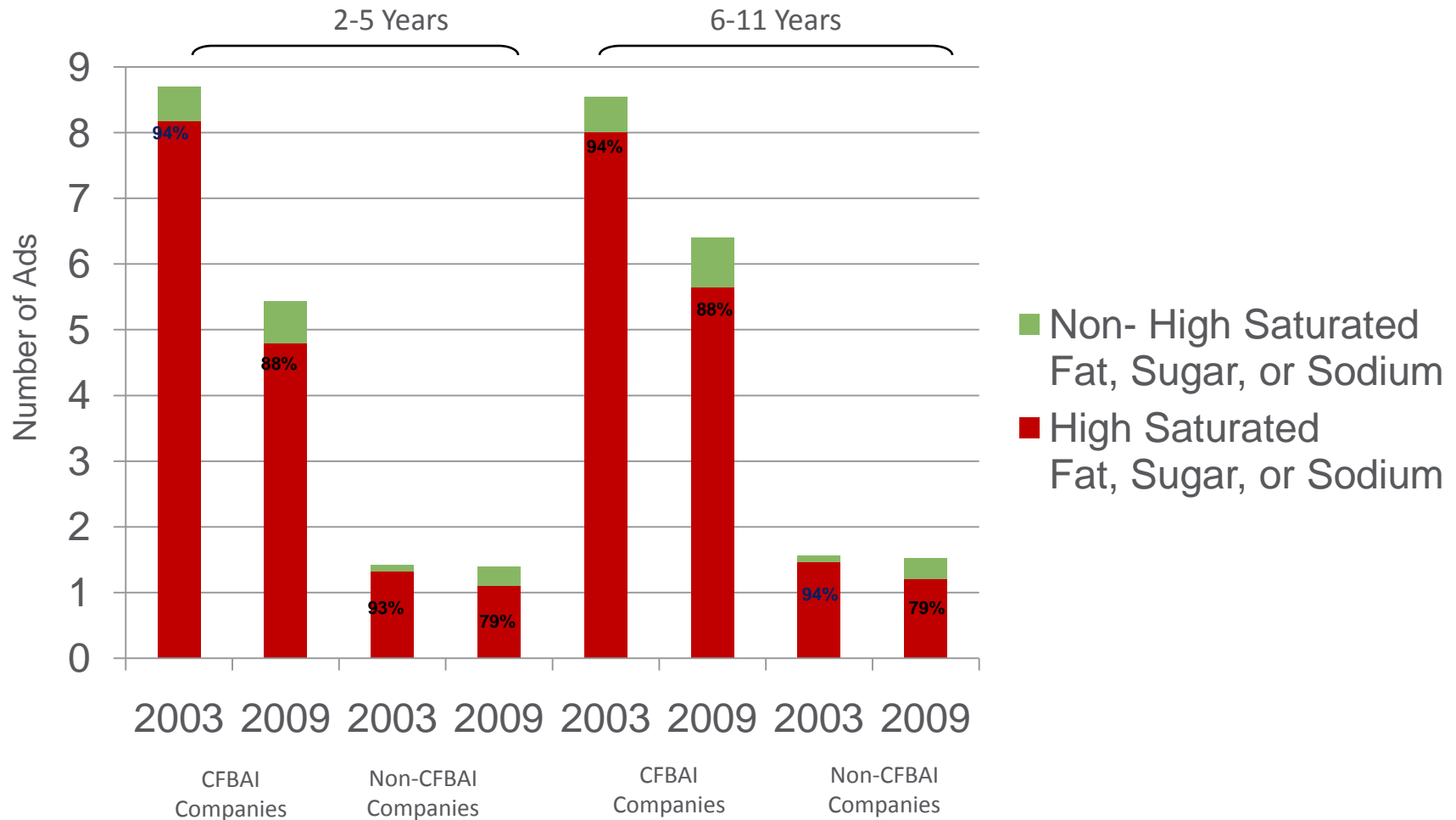
## Adolescents Ages 12-17 Years



# Total Exposure to Food-related Television Advertisements per Day, by Age Group and Year



# Exposure to Food and Beverage Ads by High Saturated Fat, Sugar, or Sodium; by CFBAI, Age, and Year



# Data and Methods

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# Outcome: Exposure to Targeted Ads

- The Nielsen Media Company provides TV-ratings data by “Designated market areas” (DMAs) – about 120 of them in the U.S.
- Outcomes: The Nielsen DMA-level ratings data on exposure to the number of local food and beverage ads seen per week across 87 DMAs and over 5-year-period (2003-2007)
- We linked Nielsen DMA-level ratings data to DMA-level Census data on racial, ethnic and SES characteristics

# Descriptive Statistics on Local Food Ads on Television (Weekly)

	Children 2-11	Adolescents 12-17
<b>Total</b>	<b>21.1</b>	<b>32.9</b>
<b>Cereal</b>	<b>1.9</b>	<b>2.1</b>
<b>Beverages</b>	<b>2.8</b>	<b>4.5</b>
<b>Sweets</b>	<b>2.5</b>	<b>3.8</b>
<b>Snacks</b>	<b>1.1</b>	<b>1.4</b>
<b>Other</b>	<b>3.5</b>	<b>5.3</b>
<b>Fast food rest.</b>	<b>7.0</b>	<b>12.1</b>
<b>Full service rest.</b>	<b>2.2</b>	<b>3.7</b>

N=435. Weight by population.



# Descriptive Statistics on Racial/Ethnic Density and Median Household Income

	Children 2-11	Adolescents 12-17
% who are white	57.2	59.2
% who are black	15.6	16.4
% who are Hispanic	20.1	17.7
% who are other	7.1	6.7
Median Household Income (\$1000)	50.0	50.0

N=435. Weight by population.

# Analysis

- Variables of interest: Percentage of children/adolescents in the DMA who are black, Hispanic, and of other race; and, median household income
- Effects are reported in **elasticities**: linking percentage change determinants to percentage change in food and beverage advertising
- Additional control variables: DMA fixed effects included to account for unobserved DMA media market-level heterogeneity
- Robust standard errors were computed and adjusted for clustering at the DMA level
- Fixed-effects multivariate analyses to assess association of **within-DMA-changes** in outcome and variables of interest

# Results

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# Local Food Ads on Television and Racial/Ethnic Density and Median Household Income by Food and Beverage Categories: Children

	Total Food & Beverage	Cereal	Sweets	Snacks	Other
% who are black	2.211*** [1.639]	0.199** [1.646]	0.358*** [2.217]	0.124*** [1.779]	0.276*** [1.244]
% who are Hispanic	-0.222 [-0.212]	0.094 [1.003]	-0.022 [-0.176]	0.022 [0.407]	0.018 [0.102]
% who are other	2.147 [0.722]	0.065 [0.244]	0.200 [0.561]	0.021 [0.138]	0.248 [0.508]
Median Household Income (\$1000)	-0.732*** [-1.739]	-0.164** [-4.355]	-0.116** [-2.306]	-0.074** [-3.407]	-0.062 [-0.892]
R Squared	0.908	0.865	0.892	0.873	0.897

N=435; DMA and year fixed-effects are not reported. \*\* p≤0.05, \*\*\*p≤0.01  
Standard errors (SE) are robust and clustered at the DMA level; Weight by population.

# Local Food Ads on Television and Racial/Ethnic Density and Median Household Income by Food and Beverage Categories: Adolescents

	Total Food & Beverage	Cereal	Sweets	Snacks	Other
% who are black	2.852*** [1.421]	0.180** [1.403]	0.407*** [1.772]	0.111** [1.303]	0.347** [1.081]
% who are Hispanic	-0.728 [-0.392]	-0.001 [-0.008]	-0.016 [-0.076]	-0.035 [-0.441]	0.129 [0.434]
% who are other	3.204 [0.657]	0.056 [0.178]	0.378 [0.677]	0.057 [0.274]	0.087 [0.111]
Median Household Income (\$1000)	-1.204*** [-1.834]	-0.148*** [-3.529]	-0.195*** [-2.587]	-0.085*** [-3.037]	-0.188*** [-1.789]
R Squared	0.913	0.862	0.902	0.896	0.886

N=435; DMA and year fixed-effects are not reported. \*\* p≤0.05, \*\*\*p≤0.01  
Standard errors (SE) are robust and clustered at the DMA level Weight by population.

# Local Food Ads on Television and Racial/Ethnic Density and Median Household Income by Beverage Subcategories: Children

	Total Beverages	SSBs	Non-SSBs	Regular Soda	Diet Soda
% who are black	0.326*** [1.803]	0.299*** [2.334]	0.027 [0.516]	0.163*** [2.932]	0.018 [1.457]
% who are Hispanic	-0.051 [-0.363]	-0.045 [-0.451]	-0.006 [-0.149]	-0.025 [-0.568]	-0.0001 [-0.020]
% who are other	0.388 [0.974]	0.313 [1.110]	0.075 [0.645]	0.247 [2.022]	0.0195 [0.736]
Median Household Income (\$1000)	-0.108*** [-1.919]	-0.106*** [-2.664]	-0.002 [-0.113]	-0.054*** [-3.137]	-0.003 [-0.809]
R Squared	0.911	0.907	0.893	0.917	0.910

N=435; DMA and year fixed-effects are not reported. \*\* p≤0.05, \*\*\*p≤0.01  
Standard errors (SE) are robust and clustered at the DMA level Weight by population.

# Local Food Ads on Television and Racial/Ethnic Density and Median Household Income by Beverage Subcategories: Adolescents

	Total Beverages	SSBs	Non-SSBs	Regular Soda	Diet Soda
% who are black	0.522*** [1.879]	0.421*** [2.179]	0.101*** [1.193]	0.246*** [2.612]	0.038** [1.702]
% who are Hispanic	-0.266 [-1.037]	-0.257 [-1.437]	-0.009 [-0.121]	-0.160 [-1.837]	-0.002 [-0.083]
% who are other	0.991 [1.469]	0.985** [2.098]	0.006 [0.028]	0.671** [2.936]	0.010 [0.187]
Median Household Income (\$1000)	-0.219*** [-2.411]	-0.181*** [-2.861]	-0.038*** [-1.380]	-0.097*** [-3.133]	-0.006 [-0.789]
R Squared	0.916	0.911	0.892	0.914	0.906

N=435; DMA and year fixed-effects are not reported. \*\* p≤0.05, \*\*\*p≤0.01  
Standard errors (SE) are robust and clustered at the DMA level Weight by population.

# Local Food Ads on Television and Racial/Ethnic Density and Median Household Income by Restaurant Subcategories: Children

	Fast Food Restaurants	Full Service Restaurants
% who are black	0.767*** [1.702]	0.161 [1.122]
% who are Hispanic	-0.200 [-0.572]	-0.083 [-0.743]
% who are other	1.136** [1.144]	0.089 [0.280]
Median Household Income (\$1000)	-0.170*** [-1.211]	-0.037 [-0.826]
R Squared	0.930	0.873

N=435; DMA and year fixed-effects are not reported. \*\* p≤0.05, \*\*\*p≤0.01  
Standard errors (SE) are robust and clustered at the DMA level Weight by population.



# Local Food Ads on Television and Racial/Ethnic Density and Median Household Income by Restaurant Subcategories: Adolescents

	Fast Food Restaurants	Full Service Restaurants
% who are black	1.061** [1.431]	0.223** [1.000]
% who are Hispanic	-0.305 [-0.444]	-0.234** [-1.132]
% who are other	1.618 [0.898]	0.018 [0.034]
Median Household Income (\$1000)	-0.319*** [-1.314]	-0.051 [-0.698]
R Squared	0.933	0.876

N=435; DMA and year fixed-effects are not reported. \*\* p≤0.05, \*\*\*p≤0.01  
Standard errors (SE) are robust and clustered at the DMA level Weight by population.

# Summary, Limits, Contributions, Policy Implications, and Acknowledgements

# Summary

- Children and adolescents living in media markets with a greater proportion of black or lower-income residents were exposed to significantly higher levels of food and beverage ads.
- Independent of income, children and adolescents living in media markets with a greater proportion of black residents had greater exposure.
- There were large differentials by race/ethnicity and income in exposure to fast-food restaurants ads and for SSBs.
- These results suggest that exposure to local TV spot ads is an important aspect of the larger picture of how food and beverage marketing that targets black communities may contribute to disparities in obesity.
- The findings suggest that TV spot ads are a form of targeted marketing that affects children and adolescents in low-income and black households, independently.

# Limits and Contribution

- This is the first paper to our knowledge to examine differences in children's and adolescents' exposure to advertisements placed in local media markets which may be targeted based on market-level demographic characteristics.
- A key limitation of this study was that we analyzed only ratings for English language channels and, therefore, had a much less complete picture for Hispanic children and adolescents.
- Another limitation was that although we were able to control for time constant unobserved DMA-level heterogeneity (i.e., unmeasured differences across media markets), we were not able to account for time-varying heterogeneity.

# Policy implications

- Exposure to geographically targeted TV ads is an important part of the larger picture of food and beverage marketing that targets black and low-income communities.
- Local ads may be particularly synergistic with other place-based forms of targeted marketing as an influence on consumption of high-calorie foods and beverages.
- Strong nutrition standards for foods and beverages promoted to both children and adolescents are needed to help reduce exposure to unhealthy products and increase exposure to healthy products.
- Media companies could play an important role serving as a gate keeper by imposing nutrition standards for any company that wishes to reach the public through its channels.

# Acknowledgements

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