

The Role of the Policy and the Food Environment on Childhood Obesity

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Design with Intent: Building Environments that Shape Healthy Behavior, 11.3.17



Overview

- Why obesity policy, what does this mean?
- Overview of prior obesity policy work
- Childhood obesity and food access

Food Guide Pyramid

A Guide to Daily Food Choices

Fats, Oils, & Sweets
USE SPARINGLY

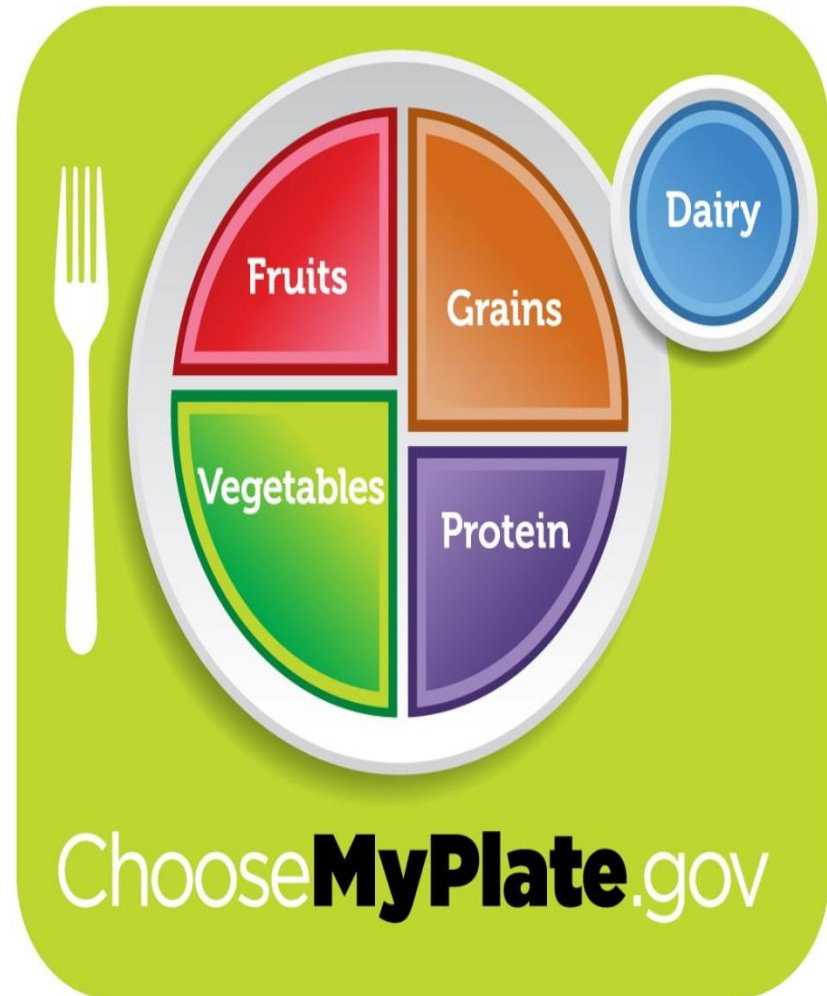
Milk, Yogurt,
& Cheese
Group
2-3 SERVINGS

Vegetable
Group
3-5 SERVINGS

KEY

□ Fat (naturally occurring) □ Sugars

MyPyramid



YOU JUST ATE 26 PACKS OF SUGAR.

All those extra calories bring on obesity, diabetes and heart disease.

(Large 32oz. soda)

Are you pouring on the pounds?
Find out at nyc.gov/health/drinkingfat

Become a fan at [facebook.com/drinkingfat](https://www.facebook.com/drinkingfat)

NYC Health

Michael R. Bloomberg
Mayor
Thomas Carilli
Commissioner

**PORTIONS HAVE GROWN
SO HAS TYPE 2 DIABETES, WHICH
CAN LEAD TO AMPUTATIONS**

CUT YOUR PORTIONS. CUT YOUR RISK.
» Call 311 for your Healthy Eating Packet

Made possible by funding from the Department of Health and Human Services.
65010 New York City Department of Health and Mental Hygiene.

NYC Health

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Mayor
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Commissioner



Calorie Labeling

DOLLAR MENU

SMALL FRIES	230	\$1	SMALL DRINK	0-160
PARFAIT	160	\$1	3 COOKIES	450-480
2 PIES	540	\$1	SUNDAE	280-340

SANDWICHES

HAMBURGER	250	1.00	DOUBLE CHEESEBURGER	440	1.59
McCHICKEN®	360	1.29	CHEESEBURGER	300	1.19
McNUGGETS®	10 PCS. 460	3.49	20 PCS. 930	5.99	
CHICKEN SELECTS®	3 PCS. 400	3.29	1/2 600	4.49	1/2 1320 8.99

FRENCH FRIES

FRENCH FRIES	230	1.00	380	1.79	500	2.09
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
BEVERAGES

Coca-Cola	Diet Coke	Sprite	ORANGE					
Minute Maid Lemonade	POWERADE Mountain Blast	Strawberry Passion Awareness	Nestle Iced Tea					
SMALL	CAL 0-160	1.29	MEDIUM	CAL 0-240	1.59	LARGE	CAL 0-350	1.89
ORANGE JUICE	CAL 140	1.49	CAL 180	1.79	CAL 250	2.19		
APPLE JUICE BOX	CAL 90	.99	BOTTLED WATER	CAL 0	1.49			
LOW FAT MILK	CHOCOLATE	CAL 170	OR WHITE	CAL 100	.99			
COFFEE	CAL 0	.99	CAL 0	1.29	CAL 0	1.49		
KID'S MEAL								

HAPPY MEAL

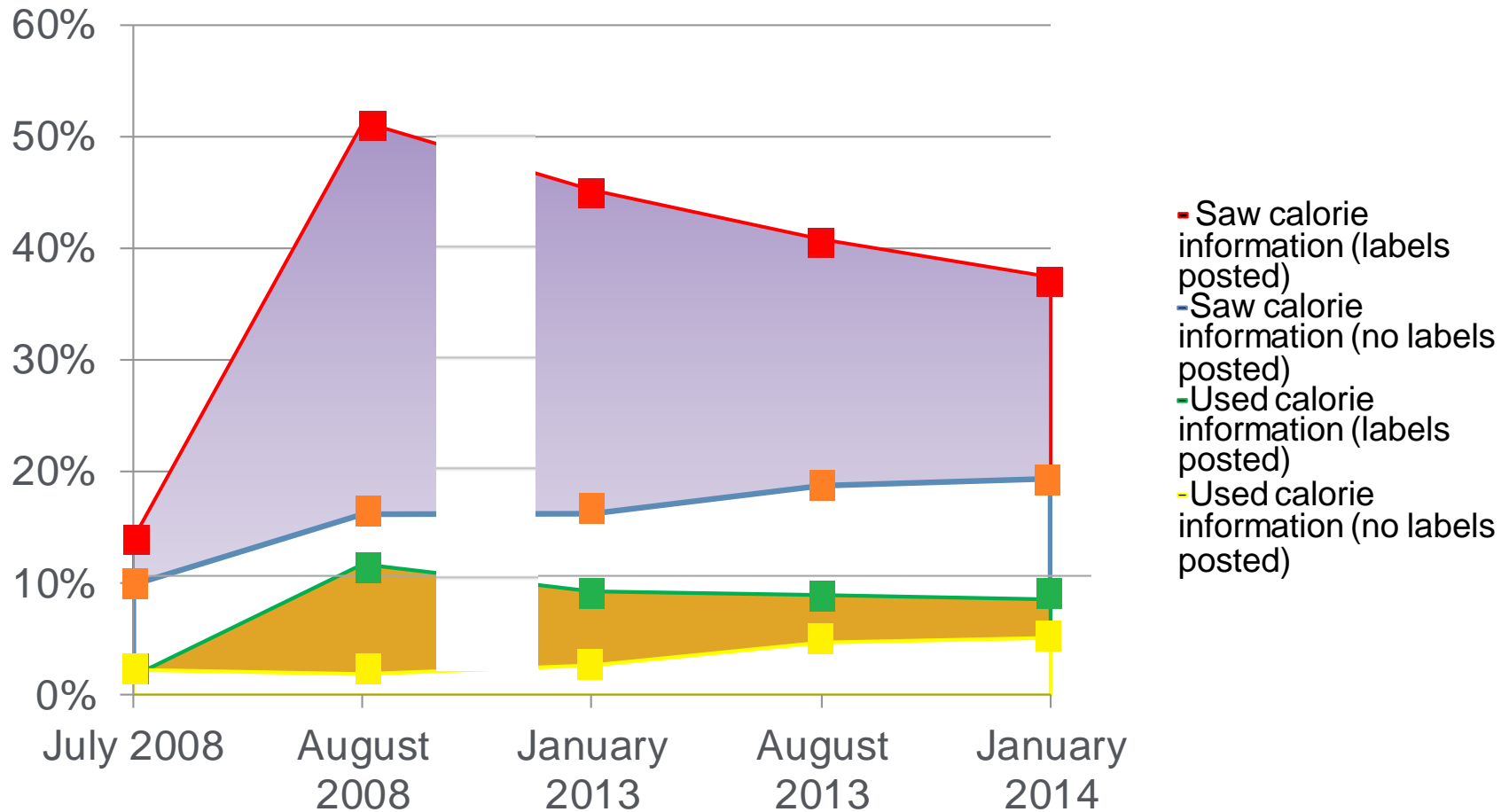
mighty kids MEAL™

CHOOSE • APPLE DIPPERS OR SMALL FRIES
• MILK, APPLE JUICE OR SOFT DRINK

HAMBURGER	 350-650	2.99			
CHEESEBURGER	 400-700	3.29	DBL. CHEESEBGR.	 540-840	4.19
4 McNUGGETS®	 290-590	3.49	6 McNUGGETS®	 380-680	4.19

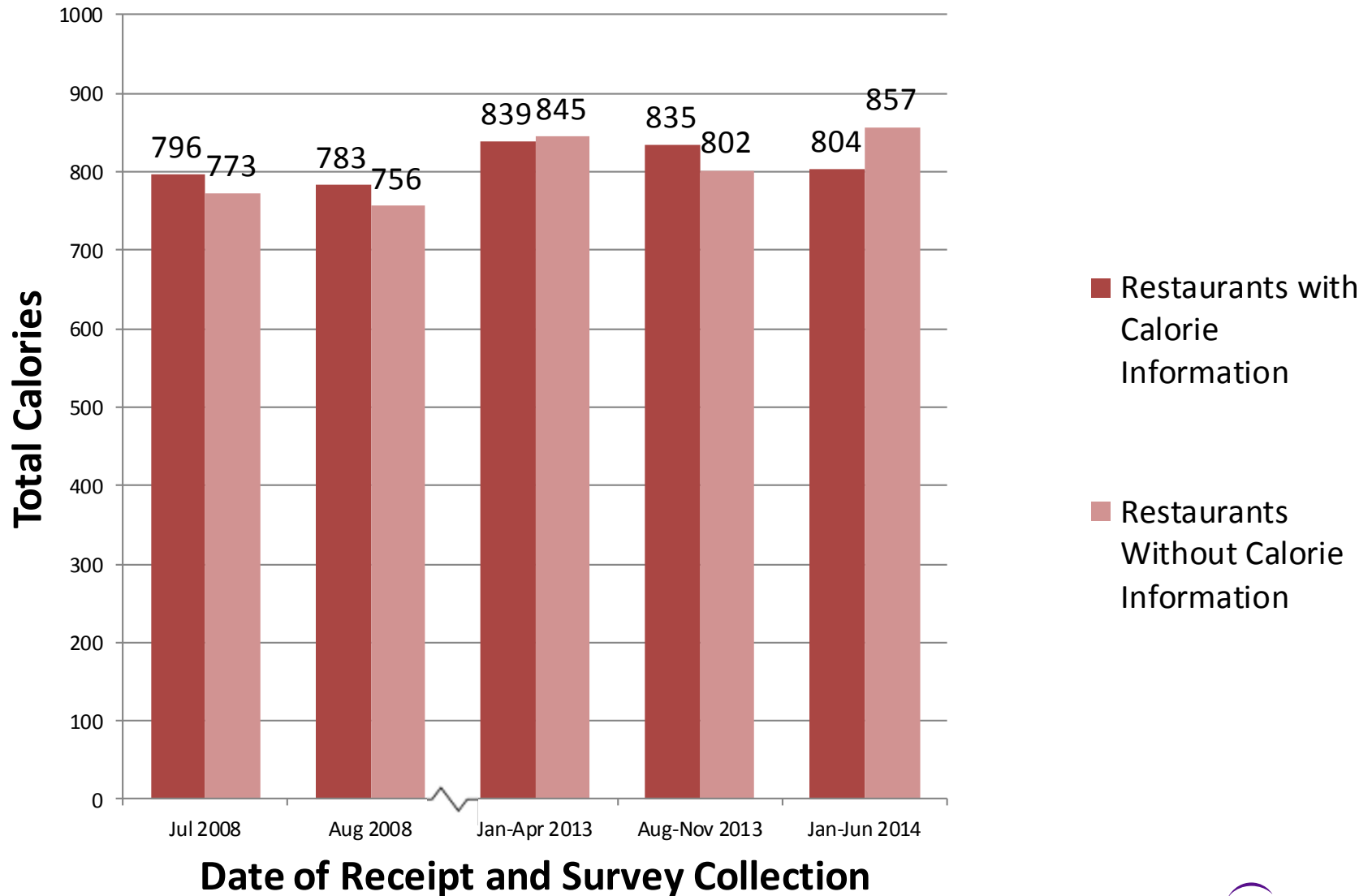
ADDITIONAL CHARGE MAY APPLY.

Change in consumers seeing and using labeling



Source: Cantor et al., 2015

Change in consumers seeing and using labeling



The Nanny

You only thought you lived in the land of the free.



Bye Bye Venti

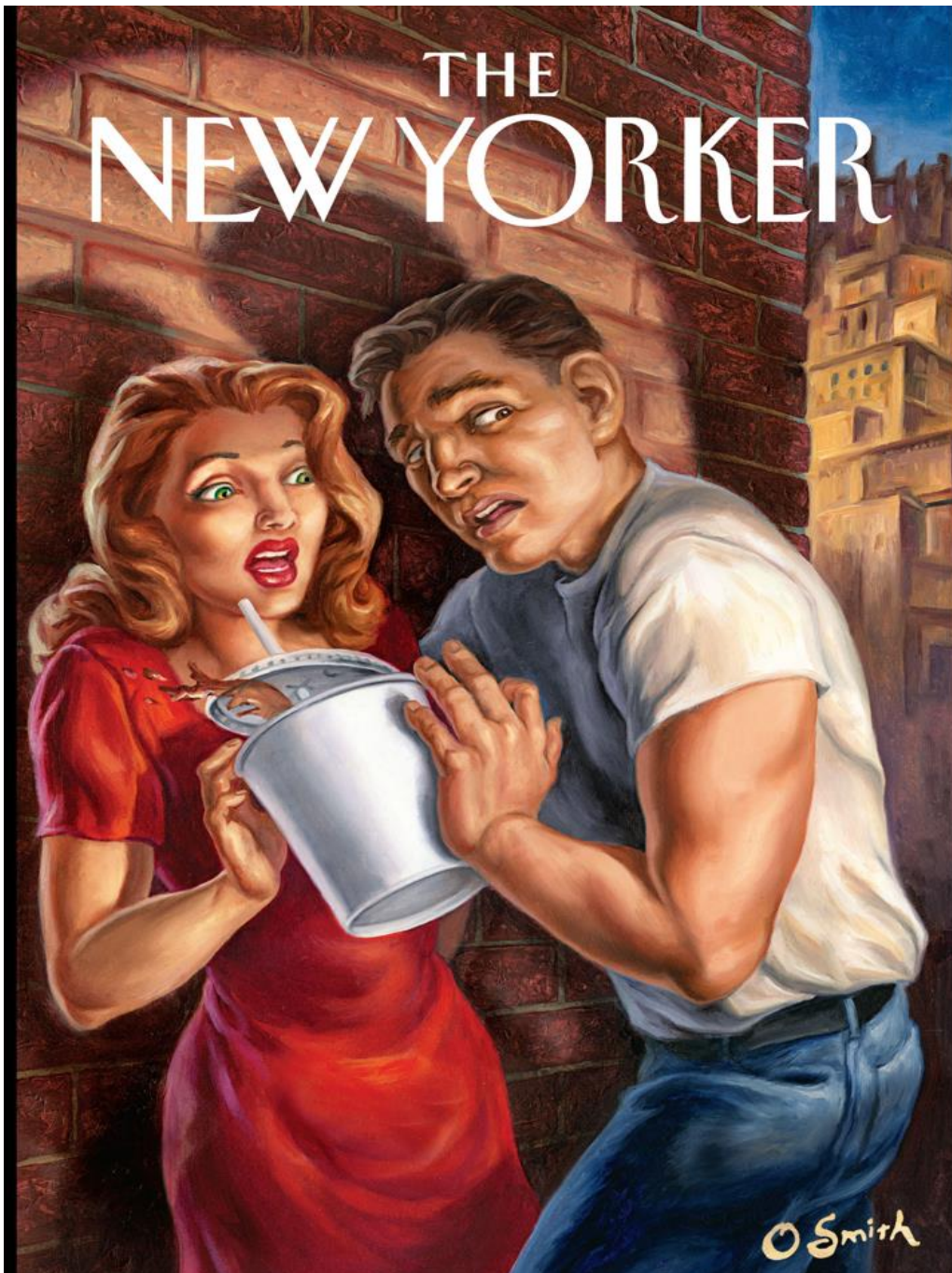
Nanny Bloomberg has taken his strange obsession with what you eat one step further. He now wants to make it illegal to serve "sugary drinks" bigger than 16 oz. What's next? Limits on the width of a pizza slice, size of a hamburger or amount of cream cheese on your bagel?



New Yorkers need a Mayor, not a Nanny.

Find out more at ConsumerFreedom.com

THE NEW YORKER



New NYC regulations change what we can serve you.

What **IS** changing



You will have to add your own sugar to:

- Large & X-Large hot beverages
- Medium & Large iced beverages



You will have to add your own flavor swirl to:

- Large & X-Large hot beverages
- Medium & Large iced beverages

What's **NOT** changing



Enjoy a Hot or Iced Latte however you want it.



Enjoy an unsweetened flavor shot in any beverage.



Enjoy your favorite beverage unsweetened, or with sugar substitute and/or dairy product.

Beverage Size Changes



Hot Chocolate and Dunkaccino®

Available in Small & Medium only



Frozen Beverages

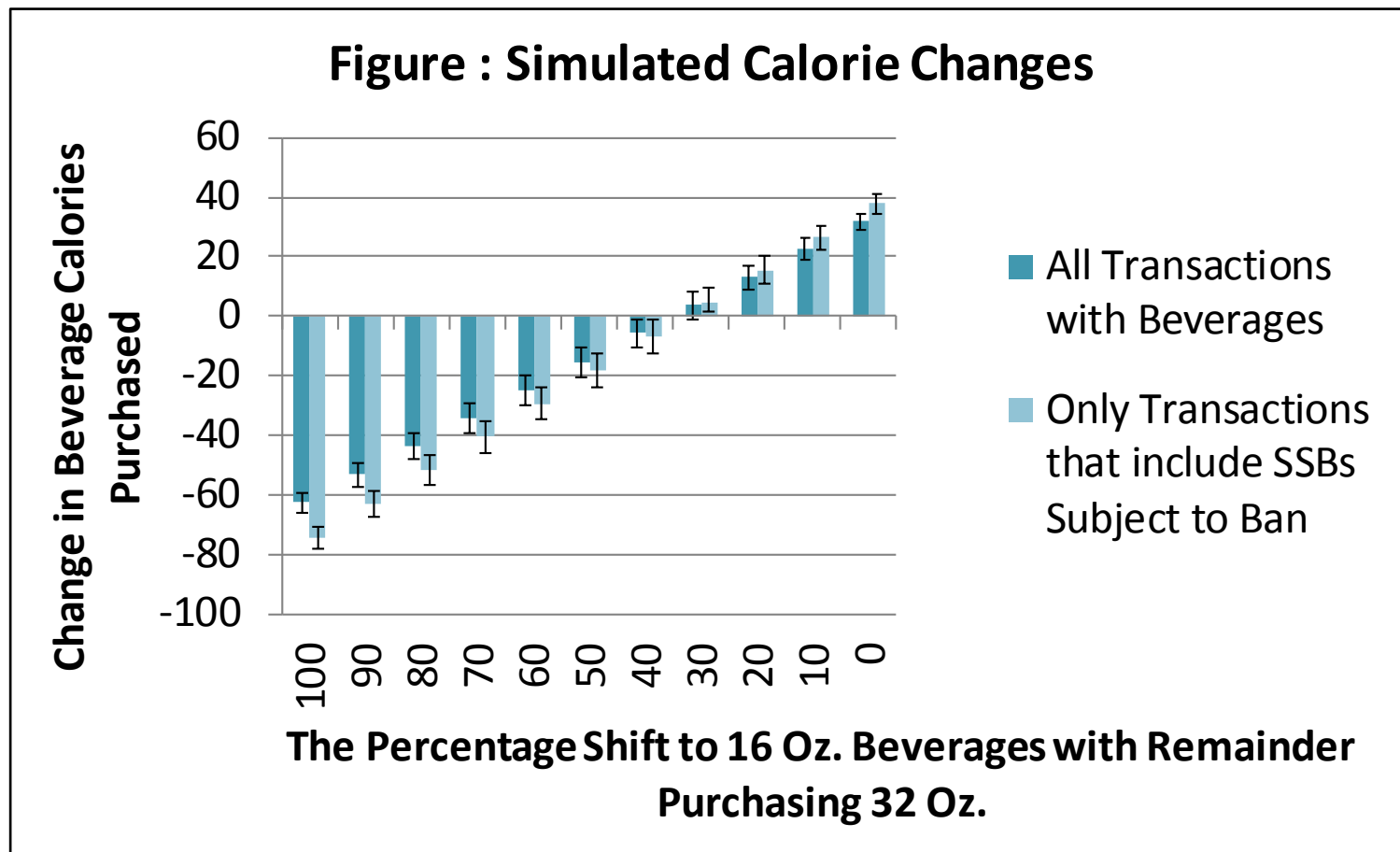
Available in RESIZED Small & Medium only



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NYC SSB Portion Limit Evaluation

The NEW ENGLAND JOURNAL of MEDICINE



NYC Public School Water Jets



Water jets background

- In 2009 the NYC DOE launched an intervention to increase access to drinking water by placing “water jets” in school cafeterias.
- By 2016 they were available in approximately 55% of public schools.¹ Goal is for all schools to eventually have them.
- We collaborated with NYC DOHMH and CDC to assess impact of water jets with a subset of 9 intervention and 10 comparison schools during the 2010-2011 academic year.

Study 1: Influence of water jets on water consumption

- **Impact on Water Drinking**
 - 3-fold increase in observed water taking, from ~10/100 students to ~34/100 students
- **Impact on Milk Drinking**
 - Small decrease (~8 fewer events per 100 students) in observed milk taking which was not significant at follow-up
- **Long-term Follow-up**
 - Results were sustained during second round of post period observations, the following school year

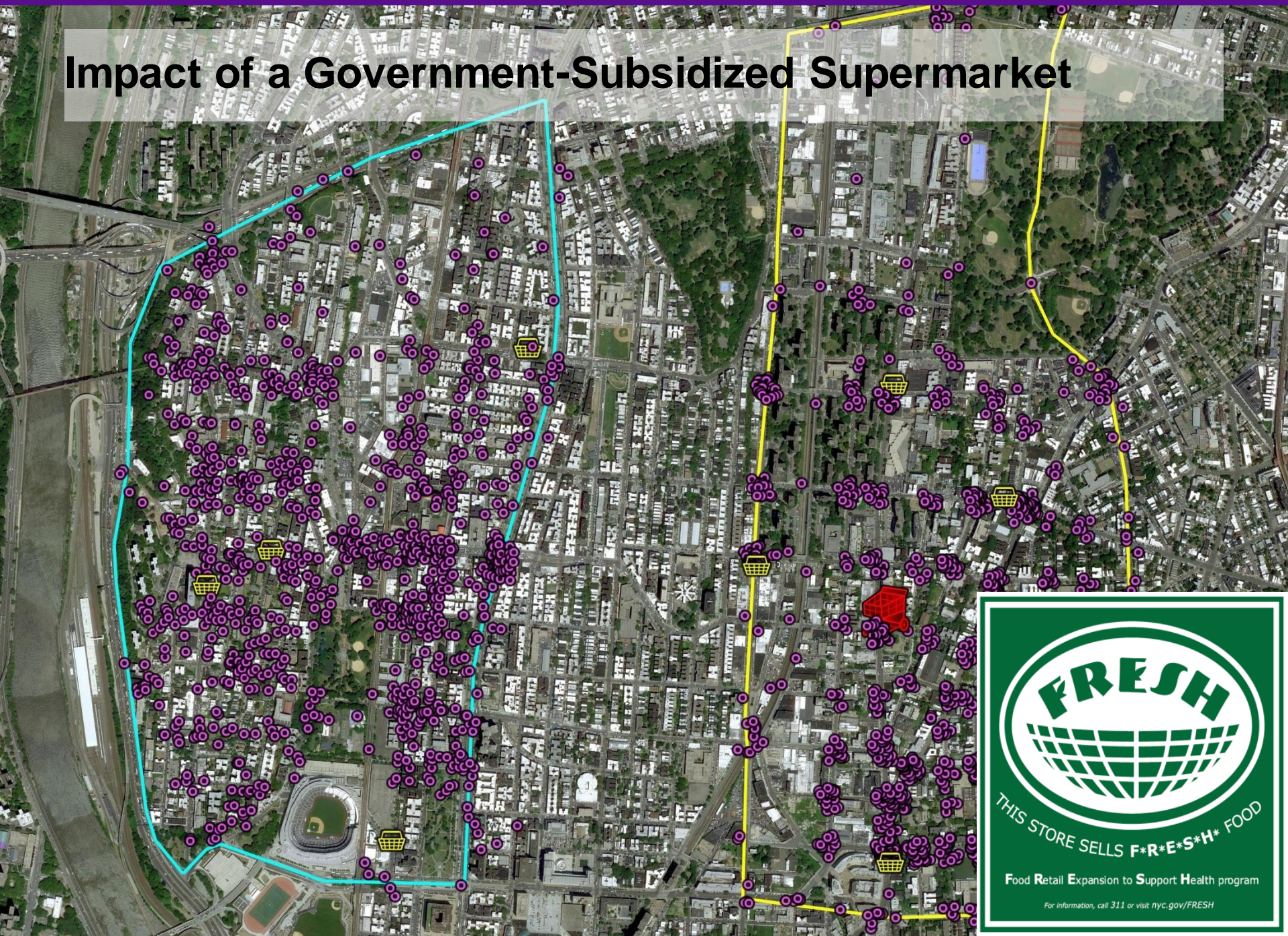


Study 2: Impact of water jets on BMI

- Used large administrative dataset, New York FITNESSGRAM (height, weight collected annually from all NYC public school children)
- Small, significant decrease in BMI and likelihood of being overweight/obese

Outcome (Boys)	School-Level Fixed Effects	Student-Level Fixed Effects
Overweight		
β (95% CI)	-0.9 pp	-1.2 pp
<i>P</i> value	.003	.001
Obese		
β (95% CI)	-0.5 pp	-0.5 pp
<i>P</i> value	.02	.08

Impact of a Government-Subsidized Supermarket



Research site



- Associated Supermarket in the Morrisania section of the Bronx
- 17,000 sq. feet
- Received both financial and zoning incentives
- Ground floor of a new low-income housing complex
- We matched the neighborhood with comparison area also in the Bronx: Highbridge





Did the individuals in the community notice the store?

Noticed a new store in the neighborhood – Parent Sample

Morrisania (%)					Highbridge (%)						
Pre	Post 1	Post 2	Diff 1	Diff 2	Pre	Post 1	Post 2	Diff 1	Diff 2	Impact 1	Impact 2
21	38	35	17 ***	16 ***	15	21	11	6 **	-3	11 **	17 **

Noticed a new store in the neighborhood - Adult Sample

Morrisania (%)					Highbridge (%)						
Pre	Post 1	Post 2	Diff 1	Diff 2	Pre	Post 1	Post 2	Diff 1	Diff 2	Impact 1	Impact 2
19	33	36	14 ***	18 ***	15	15	11	0	-4 **	14 ***	22 ***

Logit, * <.1, ** <.05, *** <.01

But, no change in....

- Servings of fruit and vegetables consumed....
- Servings of “unhealthy” snack food consumed...
- At least for the community as a WHOLE...

Food access and childhood obesity

- Food access: generally defined as availability of healthy v. unhealthy food
- This is a prominent aspect of the food environment
- Disparities in food access may have a significant impact on obesity.
- Policy or place-based approaches could be used to alter access

Policies that have attempted to address food access

- Restricting access – generally to food considered unhealthy
 - Los Angeles CA 'fast food ban'
 - Restricting “competitive foods” in schools
- Increasing access – generally to food considered healthy
 - Incentives for supermarkets in “food deserts”
 - Mobile produce carts in “food deserts”
 - Improving access to healthy foods in corner stores

Detailed data on children

- **NYC Public School System**
- **Height and Weight – FITNESSGRAM**
 - Started in 2005 – 06 school year
 - Height and weight of (almost) all kids
 - Measured every year
- **Administrative student-level data**
 - Race/ethnicity
 - Poverty status
 - Geocoded students' home addresses provided by parents every year
- **2013 n=803,114**

Detailed data on food environment

- **NYC Department of Health and Mental Hygiene Restaurant Grading Data:** Locations of all restaurants, inspected at least yearly.
- **NYS Department of Agriculture and Markets, Licensing and Inspection Data:** Locations of all other food outlets, inspected approximately yearly.

Food outlet variables:

1. **Basic food outlet (for all outlets) used to calculate the proportion of all food outlets (60.1% of all food outlets).**
2. **Basic food outlet (for all outlets) used to calculate the proportion of all food outlets (60.1% of all food outlets).**



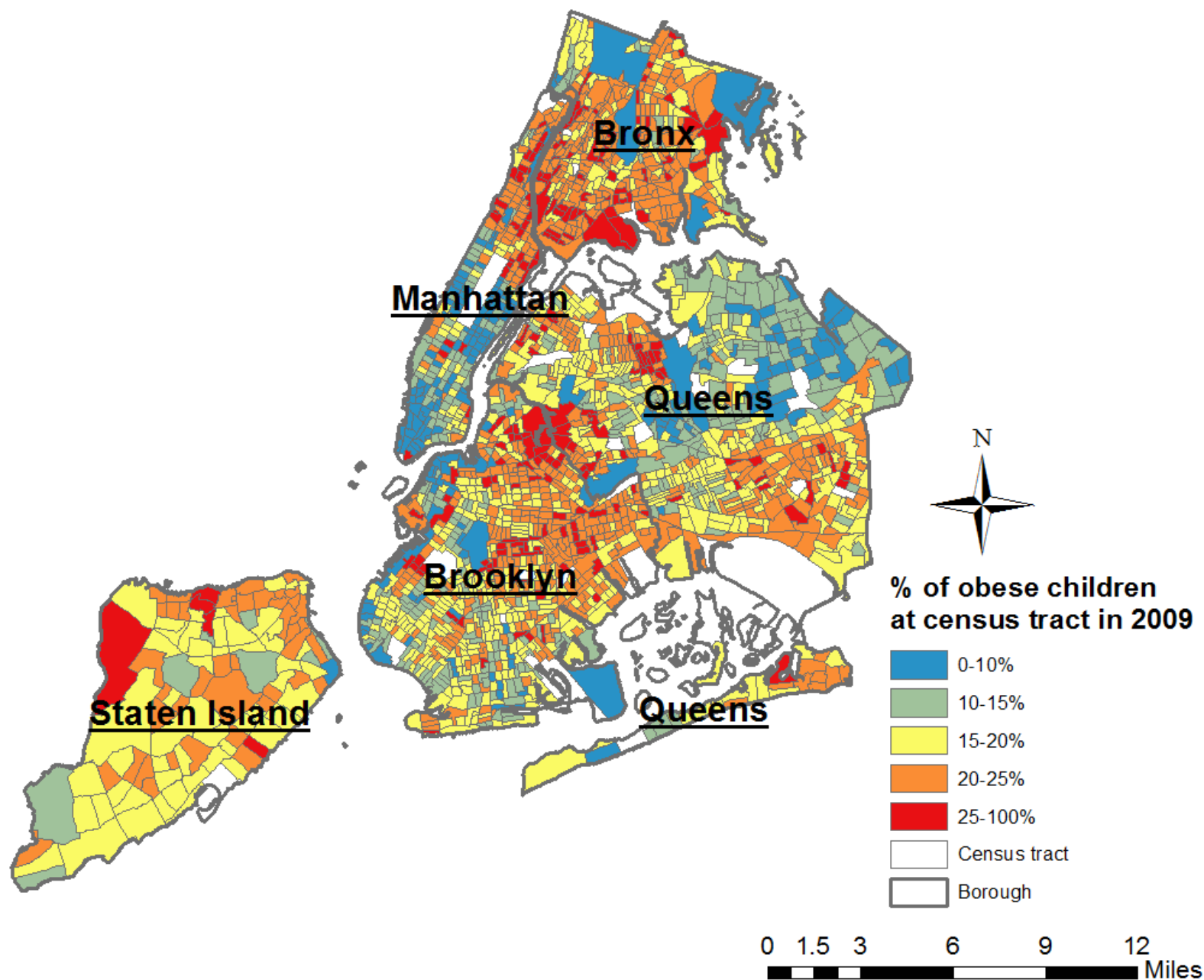
Analyses that moves beyond broad geographies and correlations

For each food outlet type, constructed two food proximity measures from each student's home and school:

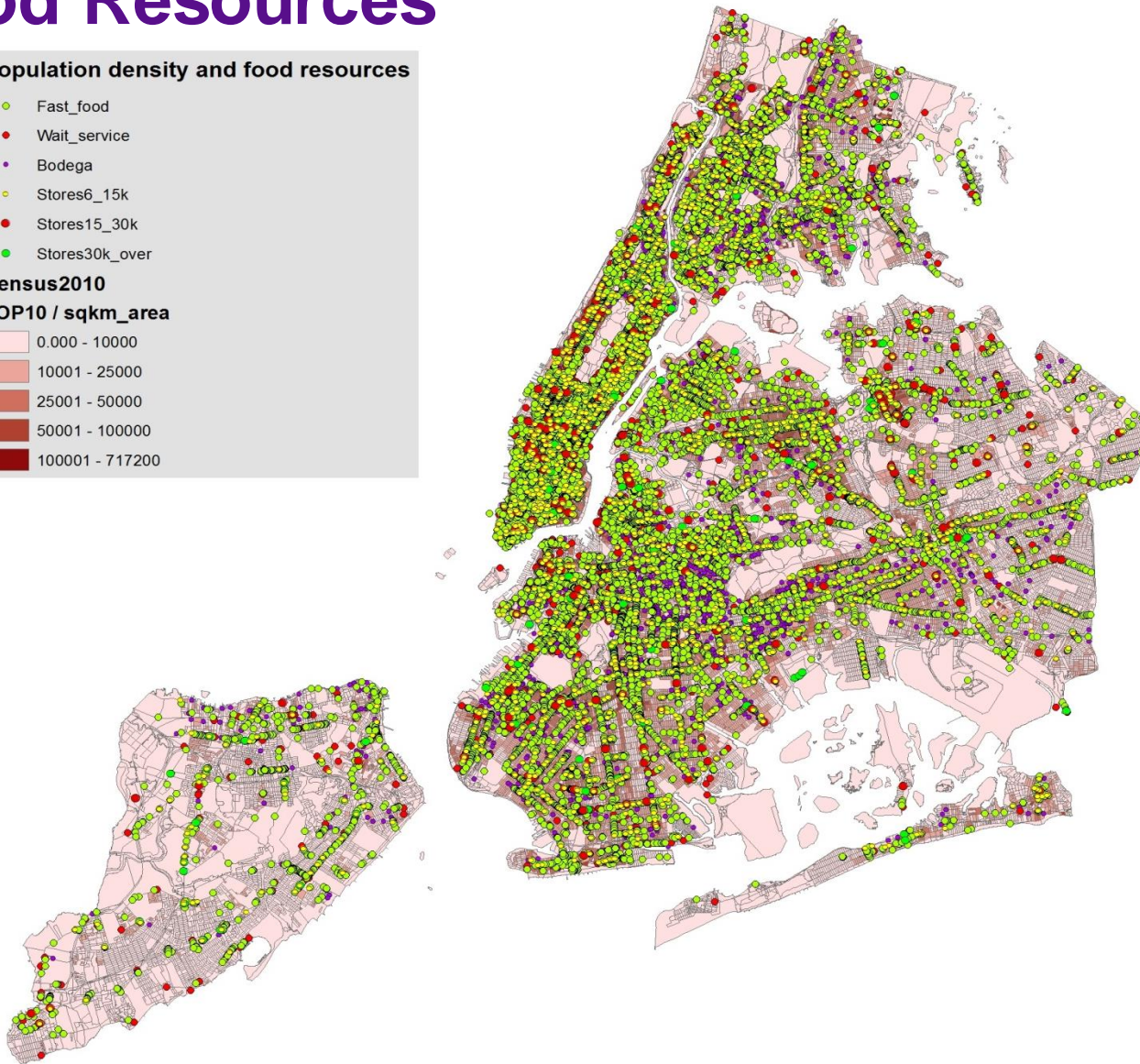
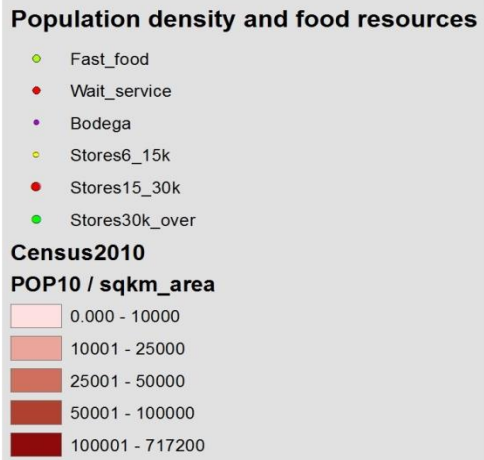
1. Distance to the nearest food outlet.
2. Count of the number of food outlets within a 0.25-miles buffer (about 5 blocks).

And then:

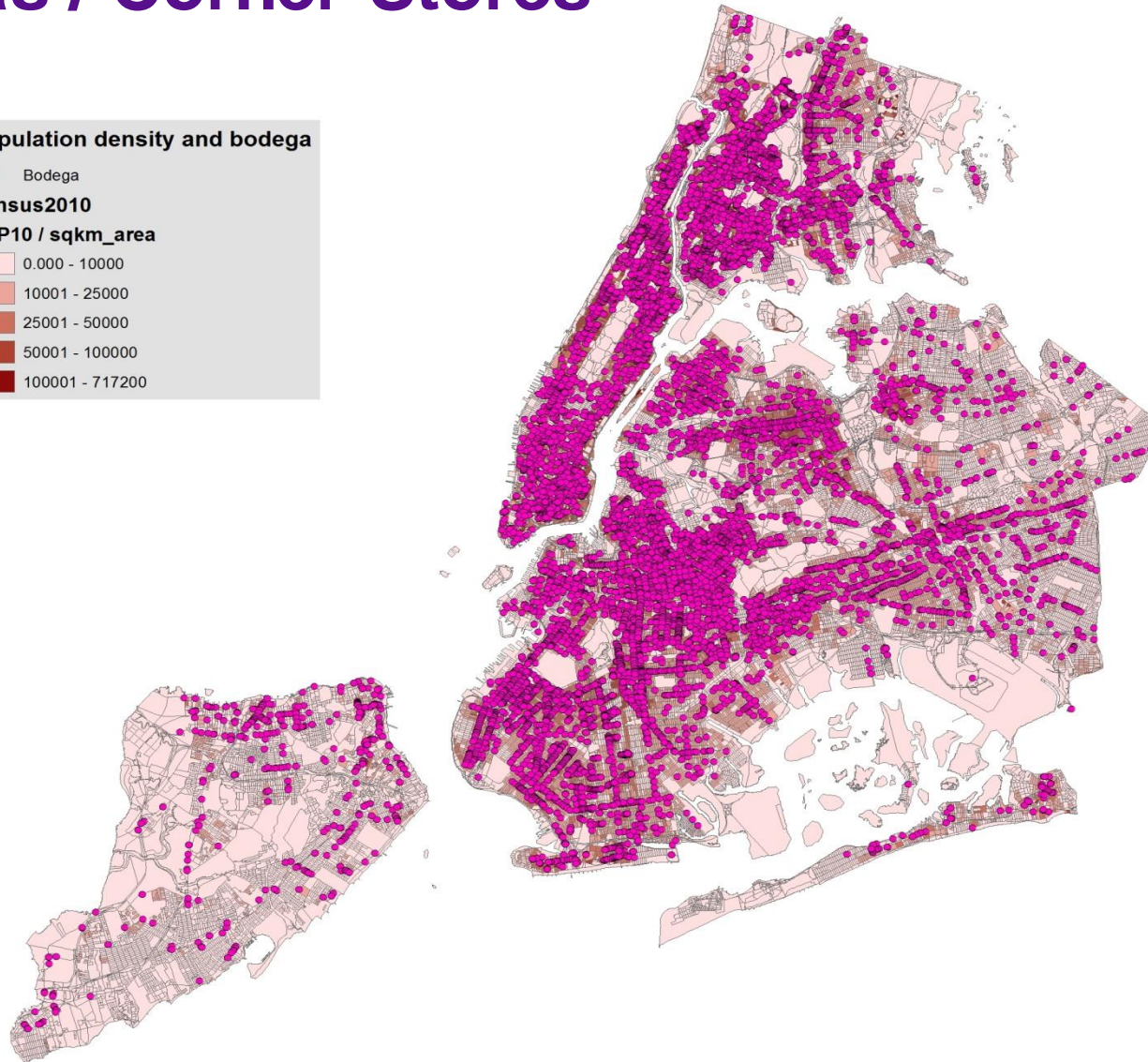
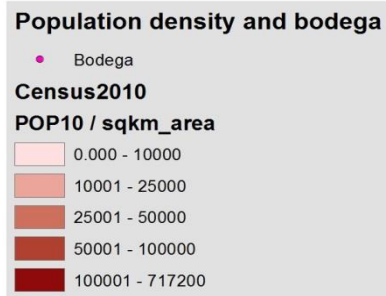
- Role of food environment in childhood obesity outcomes, using census tract fixed effects.
- This means we are only comparing children within the same census tract



All Food Resources



Bodegas / Corner Stores



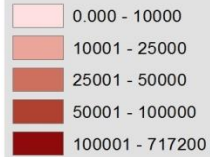
Fast Food Restaurants

Population density and fast-food restaurants

● Fast_food

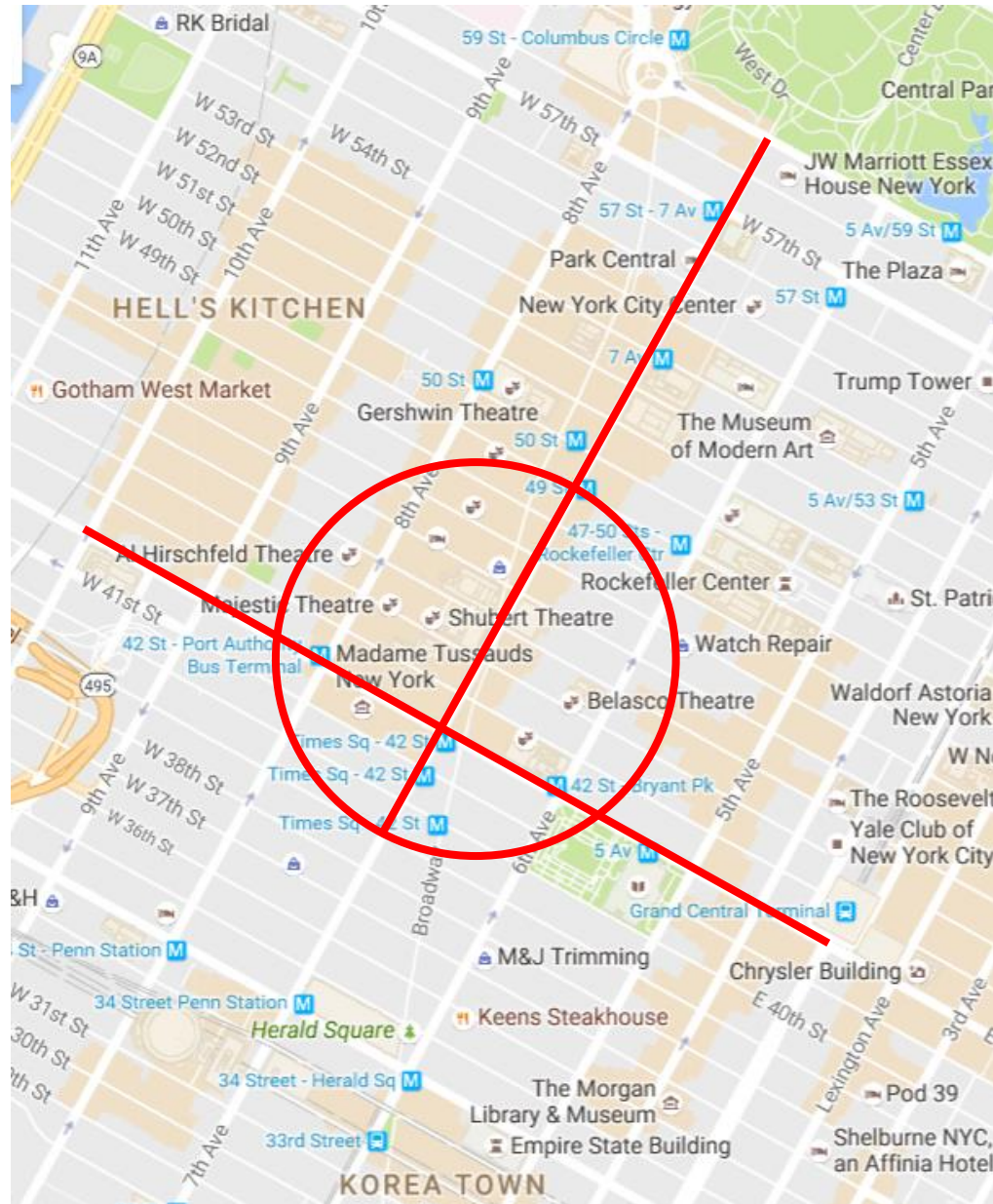
Census2010

POP10 / sqkm_area



Interpreting distance

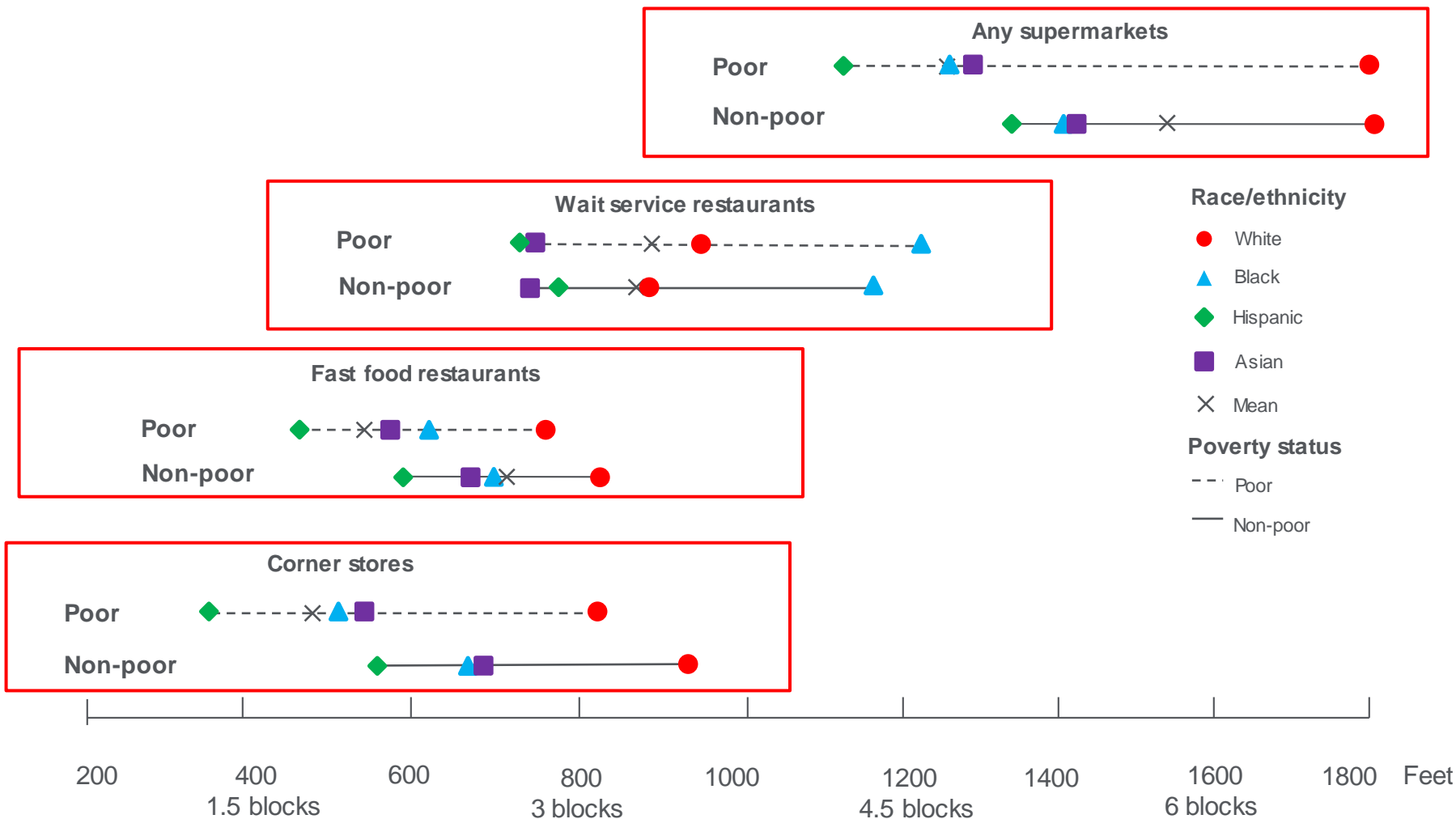
- 1 mile =
 - 20 North/South blocks
 - 264 feet per north/south block
 - 7 East/West blocks
 - 750 feet per east/west block
-
- About 5 north/south blocks in .25 miles



Students' socio-demographic characteristics, 2013

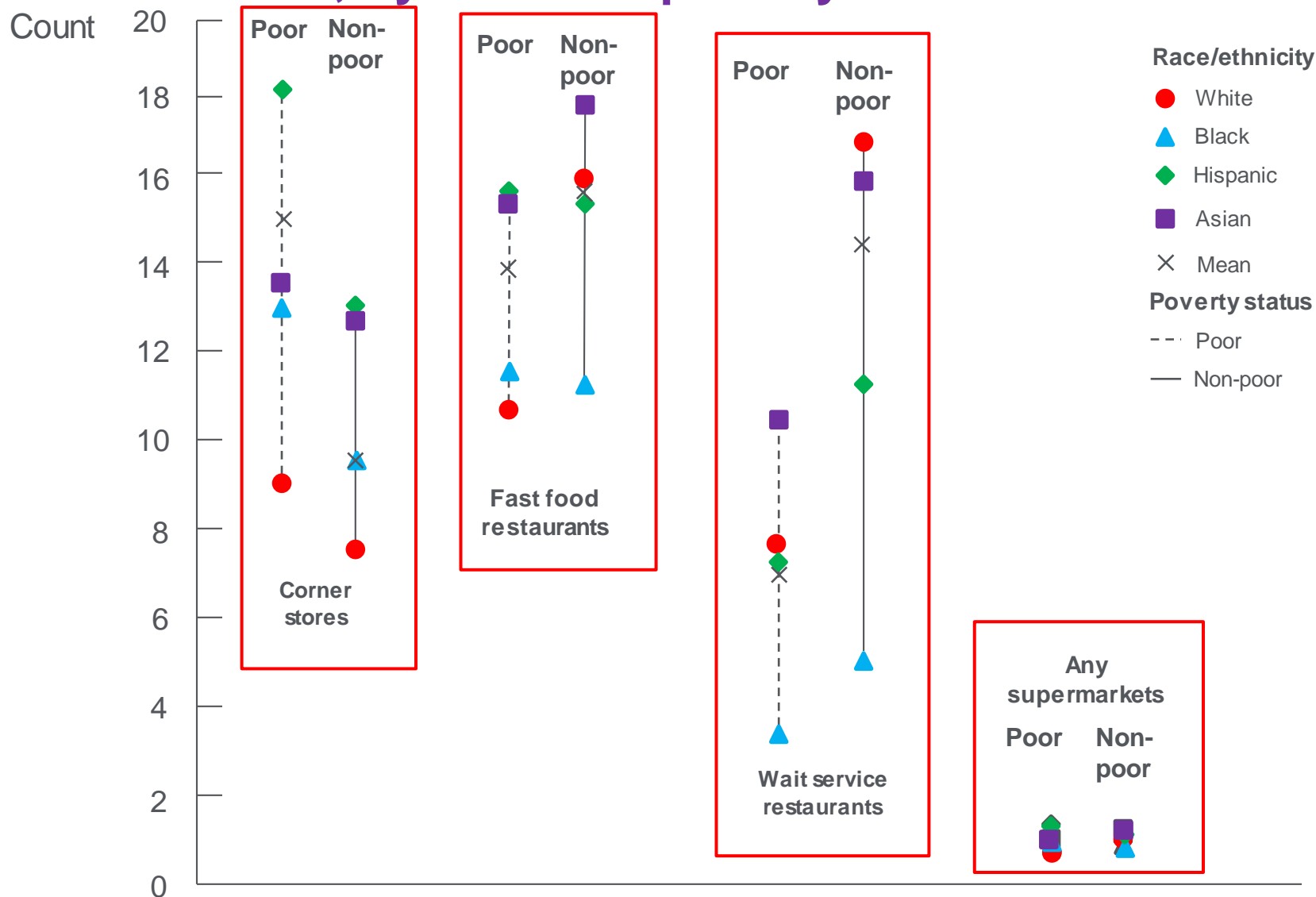
		Race/ethnicity				Poverty status	
	Total N=803,114	White n=126,961	Black n=211,949	Hispanic n=324,199	Asian n=140,005	Poor Ever n=677,562	Never Poor n=125,552
Female, %	49	48	50	49	48	49	49
Poor Ever, %	84	54	92	93	80	100	0
Foreign born, %	16	12	11	14	30	17	11
Special education, %	16	14	18	19	6	17	11
English at home, %	57	70	92	40	30	54	72
Below proficient score on NYSESLAT ^a , %	14	7	3	22	20	16	8
Grade, mean (SD)	5.75 (3.70)	5.42 (3.69)	6.12 (3.67)	5.60 (3.67)	5.83(3.73)	6.03 (3.67)	4.30 (3.55)
Age, mean (SD)	11.48 (3.82)	11.05 (3.75)	11.92 (3.81)	11.37 (3.82)	11.50 (3.86)	11.78 (3.79)	9.89 (3.61)
Weight-status, %							
Obese (BMI≥95 %tile)	20	14	21	24	12	21	14
Overweight (BMI≥85 %tile)	38	31	38	44	28	39	29
Borough, %							
Manhattan	11	14	8	14	9	10	19
Bronx	22	5	23	35	6	24	9
Queens	32	34	45	22	31	32	29
Brooklyn	28	24	20	26	51	28	30
Staten Island	7	22	3	4	4	5	14

Mean nearest distance in feet to food facilities from home, by race and poverty interactions in 2013



Note: we conducted t-tests for multiple comparisons based on Bonferroni correction. The majority of comparisons were statistically significant except for never poor Black vs. never poor Hispanic for any supermarkets, never poor Asian for corner stores, never poor Hispanic vs. ever poor Asian for fast food restaurants, never poor Asian vs. ever poor Hispanic for wait service restaurants, ever poor Asians, and ever poor Hispanic vs. ever poor Asian for wait service restaurants.

Mean count within 5 blocks (.25 miles) of food facilities from home, by race and poverty interactions in 2013



Note: We conducted t-tests for multiple comparisons based on Bonferroni correction. The majority of comparisons were statistically significant ($p < 0.05$) except for non-poor white vs poor White (any supermarkets); non-poor Black vs non-poor Asian (any supermarket); non-poor Hispanic vs poor Asian (fast food); and non-poor Asian vs poor Hispanic (wait service) and poor Asian (wait service).

Conclusions on location data

- Enormous access to both unhealthy and healthy food.
 - Black, Hispanic, and Asian students have generally greater access to both healthy and unhealthy
- Detailed and nuanced data can change the story a bit
- Lead to potentially different policy solutions

Access and childhood BMI

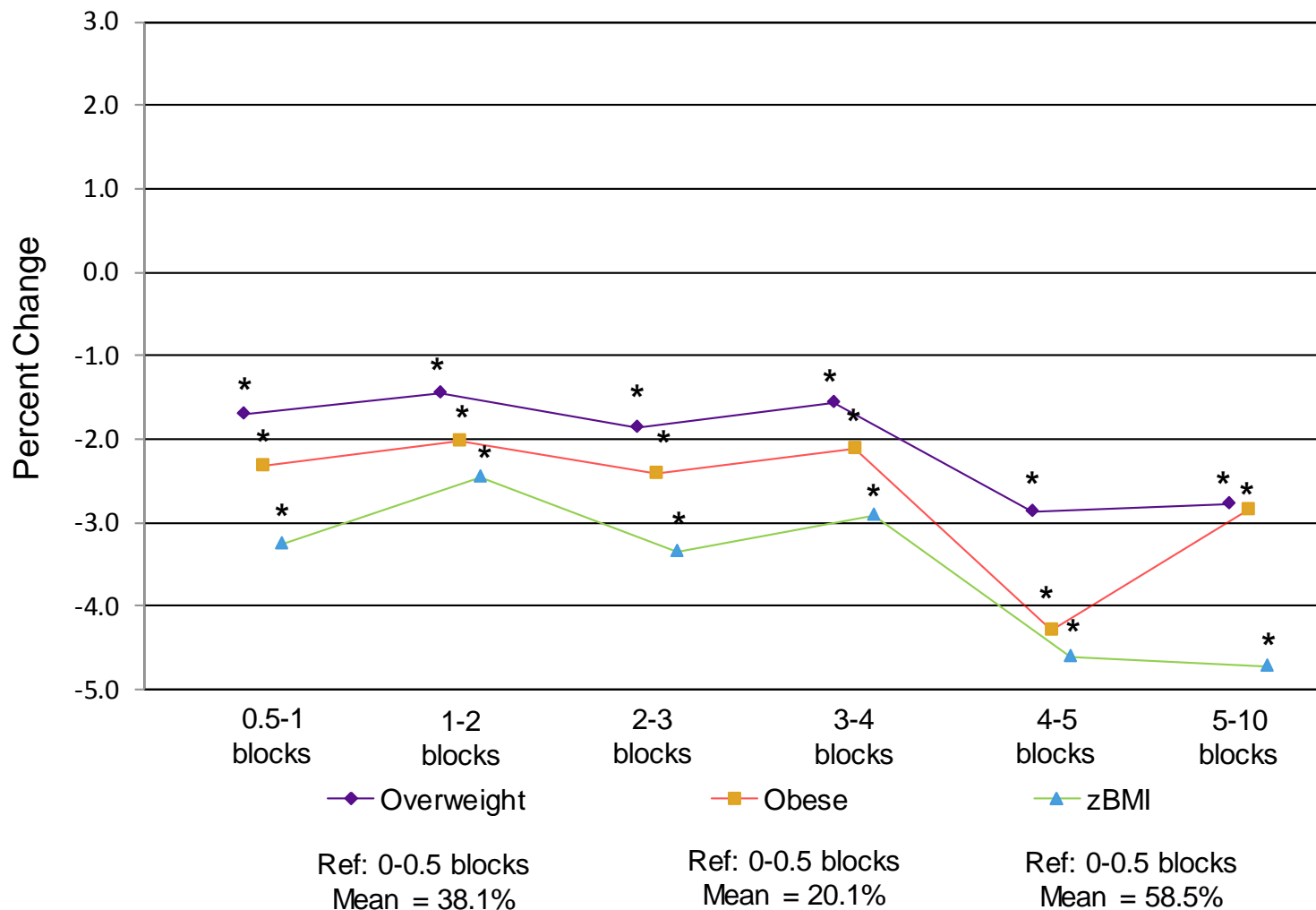
- Initial focus: Access to nearest food location
- Primary strategy: Very small area fixed effects
 - Census Tract: Average 3,770 individuals (2010 US Census)
 - Average of 360 students per tract
- Focus on very small differences in distance to nearest food outlet

Nearest distance to fast food outlet		
Blocks	%	# of students
< 0.5 blocks	9.8%	74,590
0.5-1 blocks	14.5%	111,056
1-2 blocks	33.8%	257,745
2-3 blocks	19.2%	146,852
3-4 blocks	10.5%	80,311
4-5 blocks	5.5%	42,125
5-10 blocks	6.6%	50,853

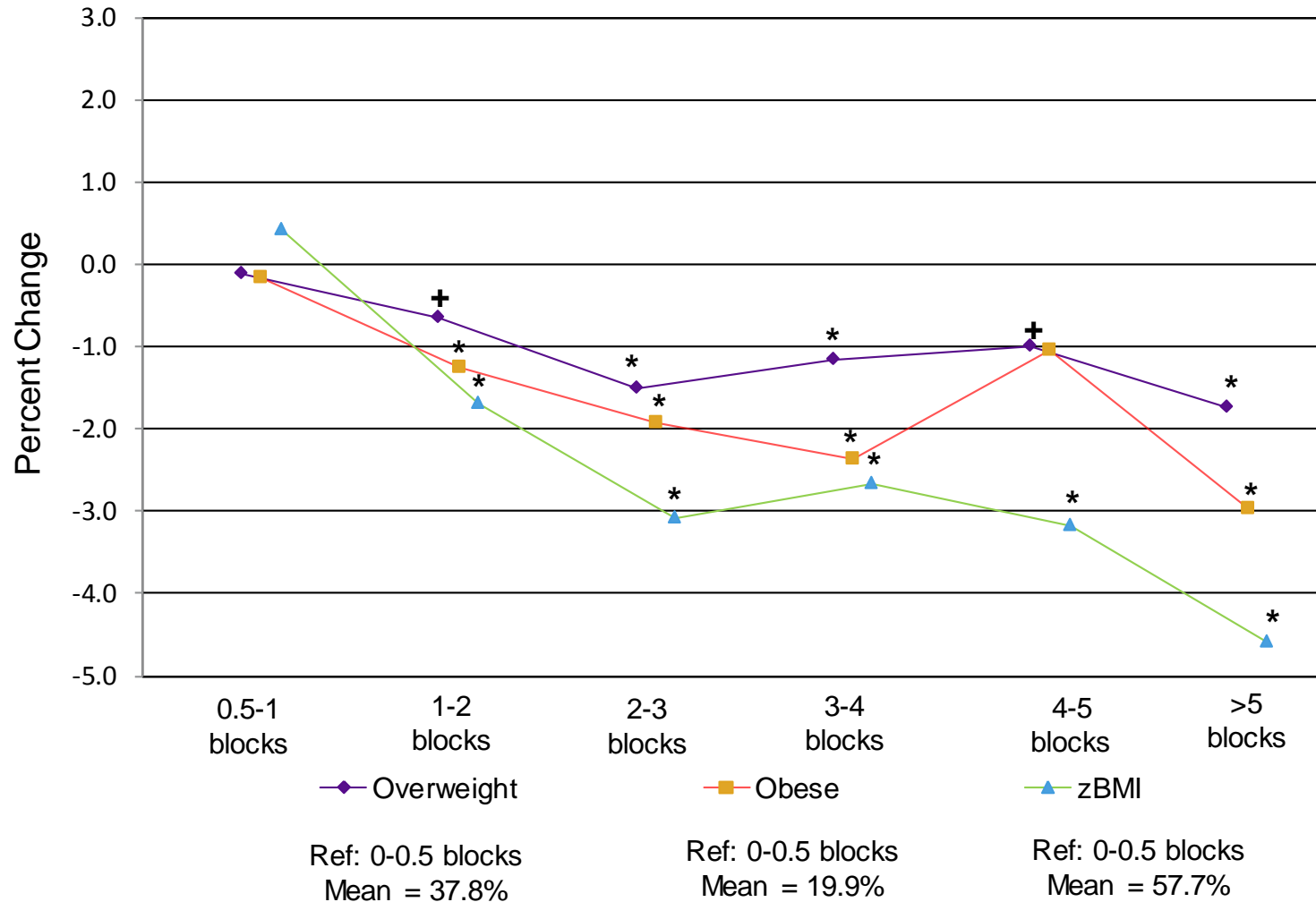
Access and childhood BMI

- Obesity, Overweight and zBMI
- Control variables include: **census tract fixed effects**, year fixed effects, student characteristics, housing characteristics, and other food outlet controls.
 - Student characteristics: age, gender, poverty status, foreign born, special education, and LEP.
 - Residential housing controls: indicators for housing type (1 family residences, 2-4 family residence, 5+ family residences, condos, mixed used buildings, other residential buildings, non-residential buildings) and a public housing indicator.
 - Other food outlet controls: Each model controls for all food types

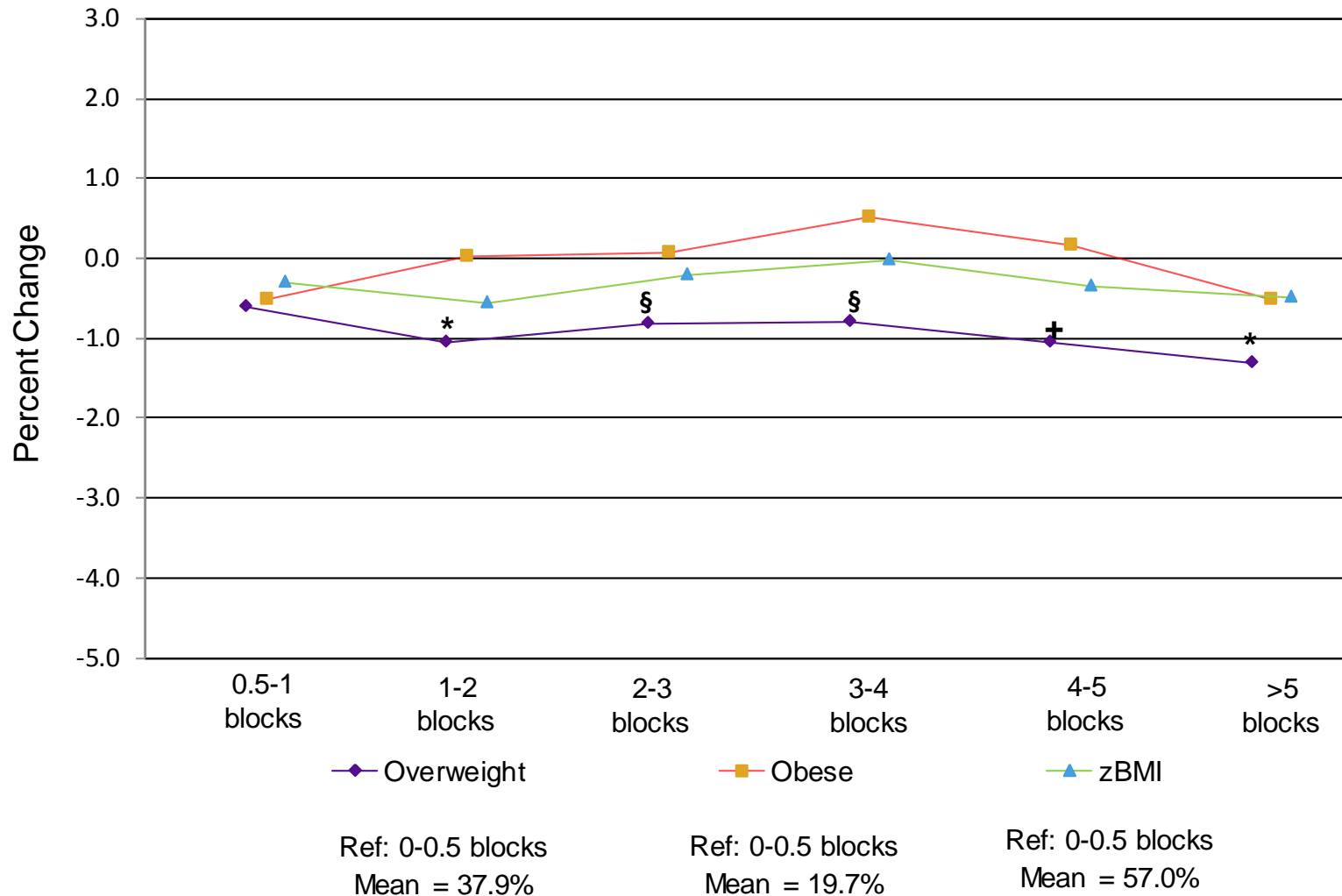
Distance from home to nearest fast food (as compared to 0.5 blocks)



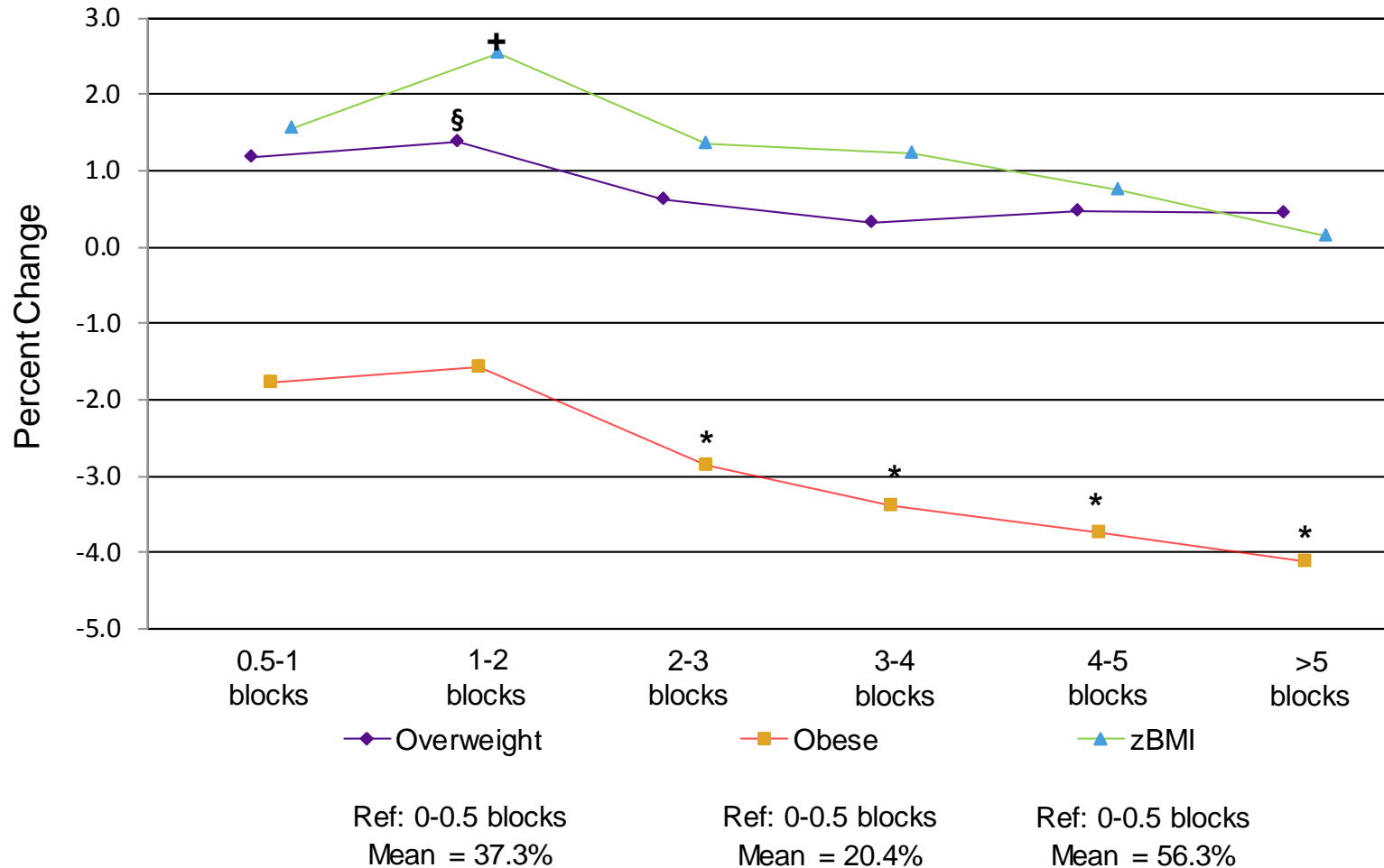
Distance from home to nearest corner store (as compared to 0.5 blocks)



Distance from home to nearest wait service (as compared to 0.5 blocks)



Distance from home to nearest supermarket (as compared to 0.5 blocks)



Strengths

- Food measures for both healthy and unhealthy food outlets
- Food access identified around both home and school
- Individual-level location data
- Some ways to deal with endogeneity

Limitations

- Only NYC data from public school students
- Lack of data on mobile food carts and sidewalk stands
- No consensus in the literature on the most meaningful buffer to use around home and school
- Used straight line versus network distance to characterize food access
- We don't know quality of food resources, prices
- Still not “randomized”

Implications

- Distance to nearest fast-food restaurants and corner stores were consistently and inversely associated with childhood obesity.
- Efforts to create a healthy food environment in close proximity to home could have a beneficial impact on a child's weight status.

Summary

- Urban, administrative data from a variety of sources can be useful in understanding health impacts
- A number of public policies are emerging to impact obesity at a population level
 - Some are promising, but we don't fully know their impact
 - None of them alone will be enough
- Still need some core work on what is driving the increase in obesity and more rigorous evaluation of policy and other approaches to alter its trajectory

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