

Neighborhood Risks for Obesity and Diabetes

Amy Auchincloss, PhD MPH

Assistant Professor
Dept of Epidemiology
School of Public Health
Drexel University

1

Most people have sub-optimal dietary profiles

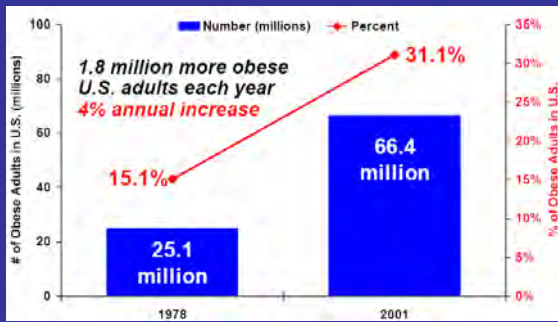
Weekly fast food consumption is high

Fruit and vegetable intake is low

<40% of US have "favorable" profile for healthy diet

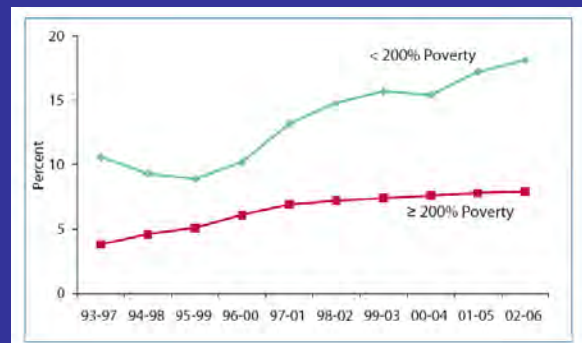
2

Obesity epidemic



3

Diabetes on the rise - especially among lower incomes -



What has happened?

More opportunities for unhealthy eating and being physically inactive.

Changes in our food and physical activity environments.

5

What has happened?

More opportunities for unhealthy eating and being physically inactive.

Changes in our food and physical activity environments.

Solution needs to include environmental and community change

6

What is the neighborhood contribution?



7

Neighborhood environment

Food environment

- Types of food stores
- Selection high quality fresh fruits & vegetables
- Availability of low fat foods

Physical activity environment

- Local sports clubs and other facilities
- Pleasant walking environment
- Easy to walk places (stores, services)
- See other people walking

8

Individual-level data

Multi-Ethnic Study of Atherosclerosis

- Aged 45-84; Baseline exam 2000-2002.
- 6 study sites over 6,000 participants
- Detailed measures of CVD, biologic markers, and behaviors.
- 4008 participants were in this study



Study Participants

Age (mean)		62 years
Female		53%
Family history of diabetes		8%
Family income, per-capita (mean)		\$28,000
Education (mean)		13 years
Race/ethnicity	Caucasian	43%
	Chinese	13%
	African American	23%
	Hispanic	21%
Body mass index, kg/m ² (mean, SD)		28.7 (5.4)
Obese (>= 30 kg/m ²) at baseline		34%
Diet index [range 0-4] (mean, SD)		2.26 (1.35)
Physical activity hrs/day [range 0-18] (mean, SD)		5.8 (7.3) ¹⁰

Homeostasis Model Assessment Index*		
HOMA-IR [glucose x insulin]/22.5 (mean, SD)	1.63 (1.44)	
Glucose level impaired at baseline (100-125 mg/dL)	14%	
Type 2 diabetes at baseline	11%	
Type 2 diabetes during 5 yr follow-up**	10%	

* Analysis using HOMA-IR excluded persons treated for diabetes (on oral hypoglycemic agents or insulin)

** Analyses of incident T2D excluded persons with baseline T2D

11

Steps in analysis

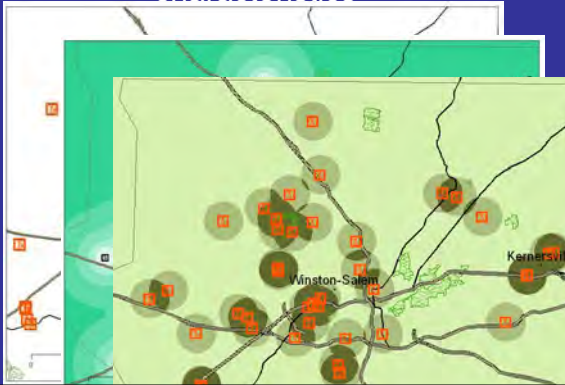
Characterize neighborhoods where participants live;

Assign neighborhood exposures to participants;

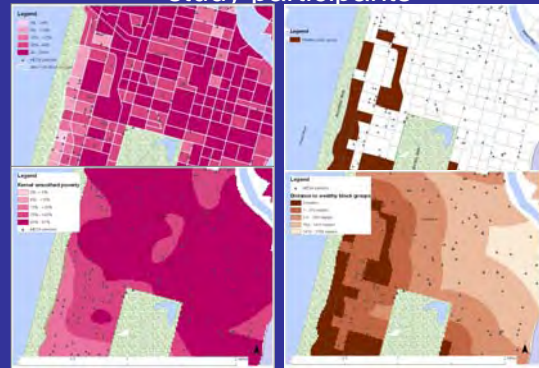
Test the epidemiologic hypotheses: the relationship between environmental exposures and insulin resistance and diabetes.

12

Measuring neighborhood characteristics



Assign neighborhood measures to study participants



Study Results

Neighborhood Determinants of Diet

Low availability of supermarkets → 32-55% less likely to have a good quality diet

For every std dev increase in neighborhood exposure to fast food....

→ Odds of eating fast food near home increased 18%

→ Odds of having healthy diet decreased 13%

Neighborhood Determinants of Obesity

Living in a healthy food environment and in a walkable environment was → protective of incident obesity at 5 year follow-up.

Healthy food environment showed a stronger protective association than walkability did.

No strong evidence of effect modification by

- Age, sex
- Study site
- Mobility patterns (automobile ownership, years lived in the neighborhood, relocation outside census tract [17% relocated])
- Activity space (distance from home usually shopped for food, distance from home usually exercised).

17

Neighborhood Determinants of Diabetes

Being far from a wealthy area was associated with increases in a precursor to diabetes (insulin resistance).

Physical activity resources and neighborhood healthy food resources... → protects against insulin resistance and type 2 diabetes.

Better neighborhood resources for physical activity and healthy foods, were associated with a 38% lower incidence of type 2 diabetes.

18

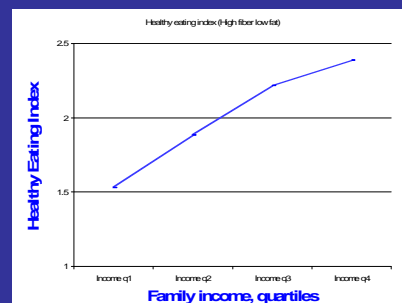
Neighborhood environments can contribute to health disparities



19

Income inequalities in diet

Higher income, better dietary profiles



20

Disparities in resources

- Fewer supermarkets in low-income areas
 - One-half as many as middle-income neighborhoods
 - More small corner stores
 - More liquor stores (1.5x)



21

Healthy Foods Availability Index (HFAI)
of two supermarkets

Location	Baltimore City		Baltimore County	
Racial Composition	97% Black		93% White	
Median HH Income	\$ 20,833		\$ 57,391	
	Avail.	Points	Avail.	Points
Skim milk	Yes	2	Yes	3
Fruits	17	2	59	4
Vegetables	38	3	74	4
Lean meat	No	2	Yes	3
Frozen foods	No	0	Yes	3
Low Na foods	No	0	Yes	2
100% whole wheat bread	Yes	2	Yes	4
Low sugar cereals	Yes	2	Yes	2
HFAI (0 to 27)	18		25	

Franco et al 2008

Structural interventions to increase physical activity and improve diet.

23

Structural interventions to increase physical activity and improve diet.

Facilitators for healthy eating

- Fresh food financing
- Fruit and vegetable markets
- Discounting healthy foods ("Healthy Bucks")
- Menu labeling
- Fresh FV for WIC certified stores

24

Structural interventions to increase physical activity and improve diet.

Barriers to unhealthy eating

- Zoning to block fast food restaurant
- Tax unhealthy foods
- Vending machines in schools

25

Thank you

26