Food Deserts
Diet and Health Outcomes

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Food Desert

- 1970s --First case studies of food deserts addressed difficulties faced by consumers accessing healthy foods in rural English villages with the closing of shops that sold local produce.
- Common 2008 perception --Food deserts are usually thought of as urban problem associated with poverty.

Food Desert

Rural - County in which all of residents are 10 or more miles from a supermarket. No mention of fast food restaurants or quality of food.

Urban – area with *little or no access* to foods needed to maintain a healthy diet, but often served by plenty of fast food restaurants.*

* Definition: Wikipedia

Rural Food Desert

Urban Food Desert

Types of Food Access Barriers

- Physical
- Financial
- Mental/Emotional or Food Knowledge

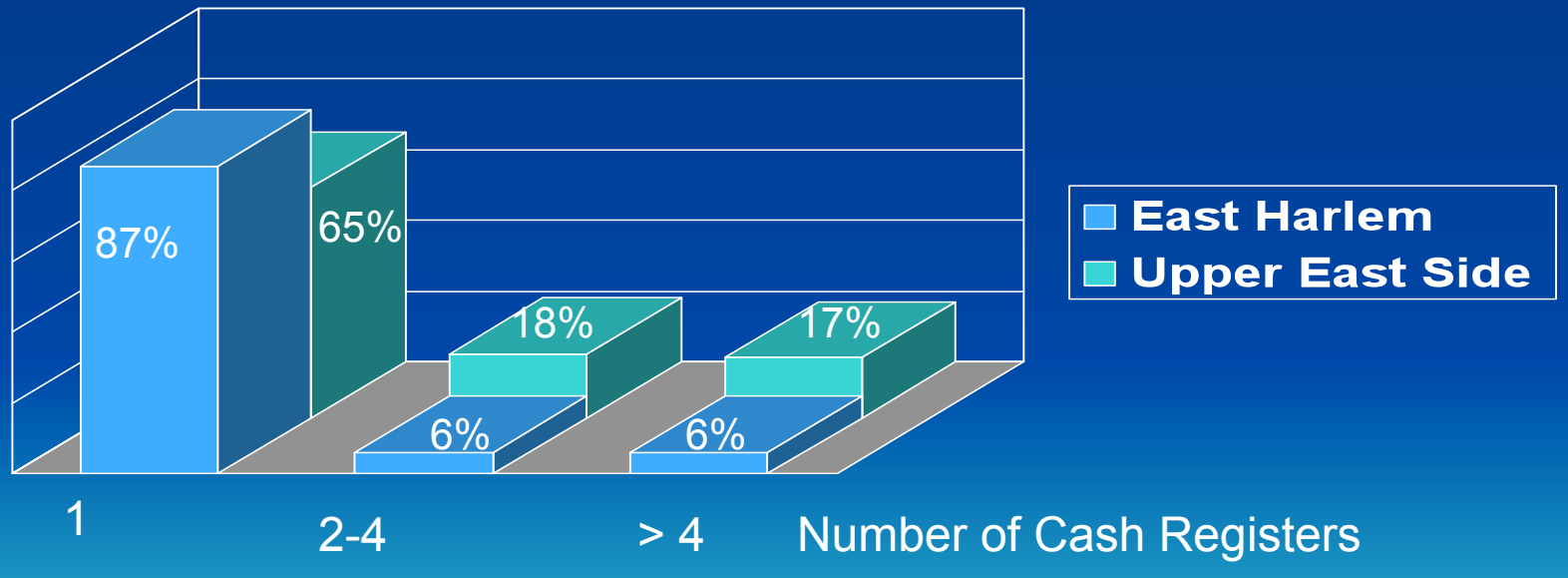
Physical Access Barriers

Does buying food involve?

- Hilly terrain or need to climb stairs
- Poor transportation/long distance
- Need to cross busy road
- Crime problems
- Poor parking or handicap access

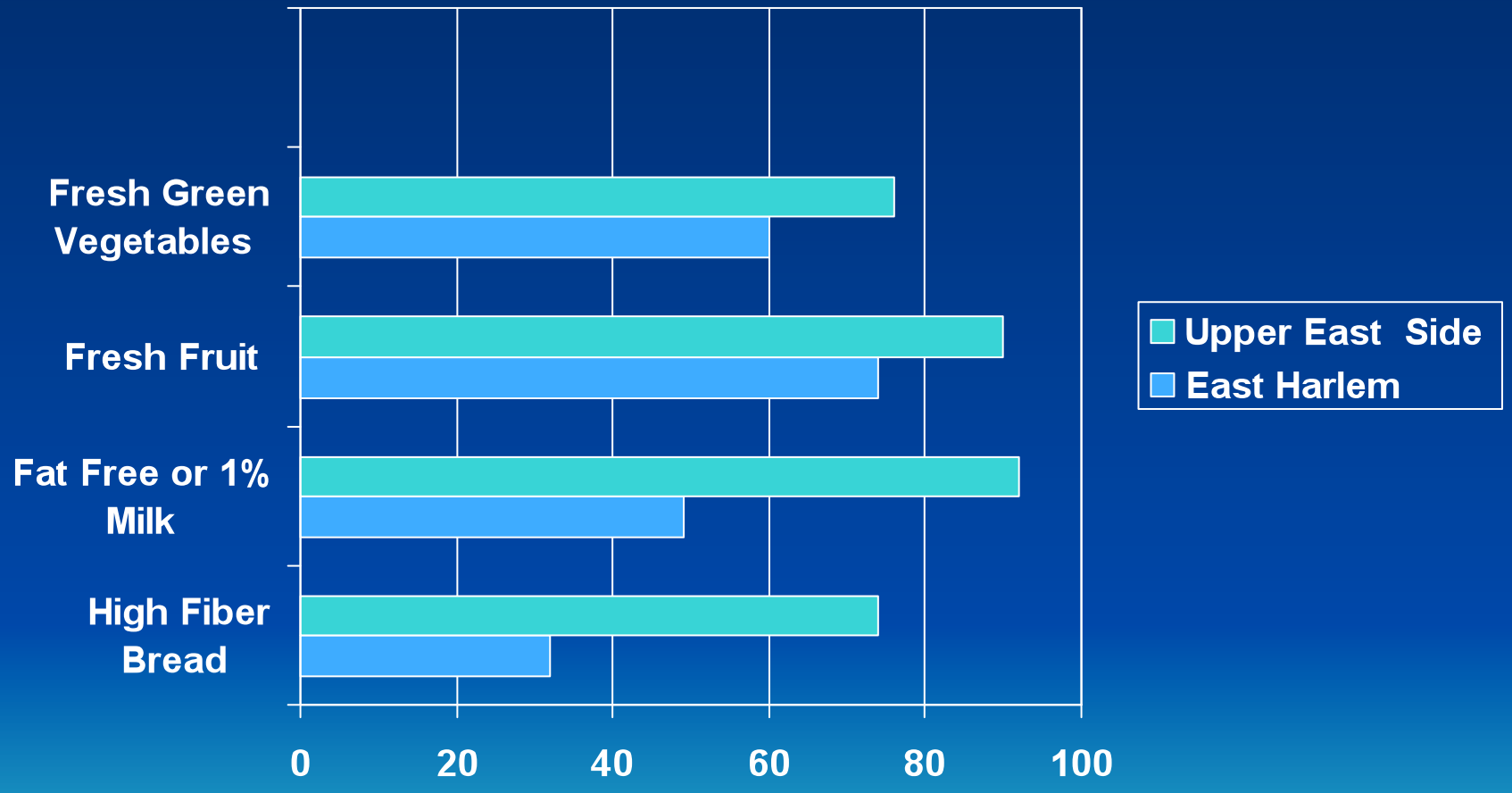
Availability of Food Markets

Number of Food Stores	East Harlem	Upper East Side
Food Stores Per 100,000 Residents	62	143



Horowitz et al Am J Pub Health 2004; 94:1549-1554

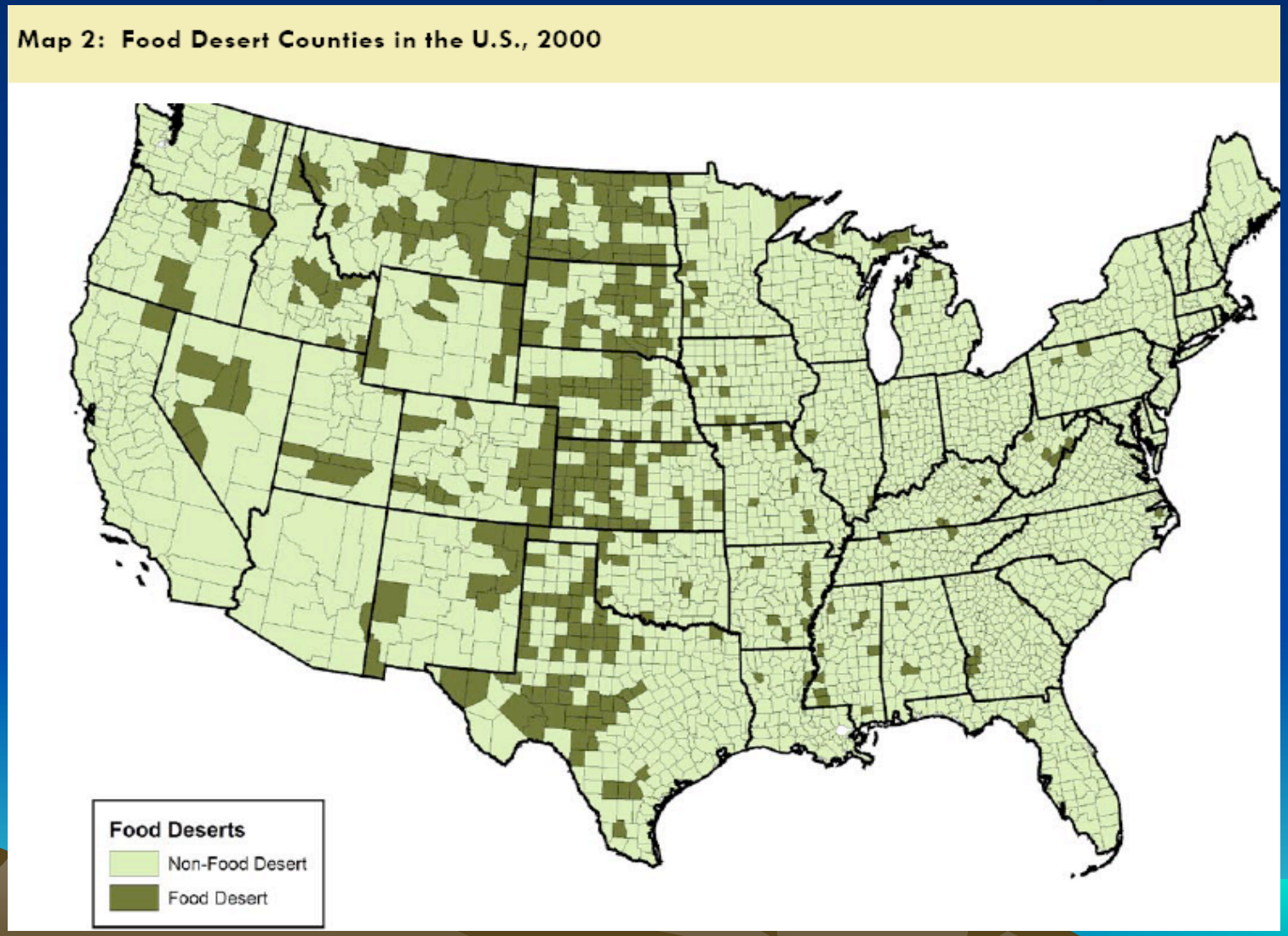
Barriers to Buying Healthy Foods
Percent of Stores Selling



Horowitz et al Am J Pub Health 2004; 94:1549-1554

Rural Food Desert

Counties: All Residents 10+ Miles from Supermarket



Morton & Blanchard Rural Realities 2007; 1:4

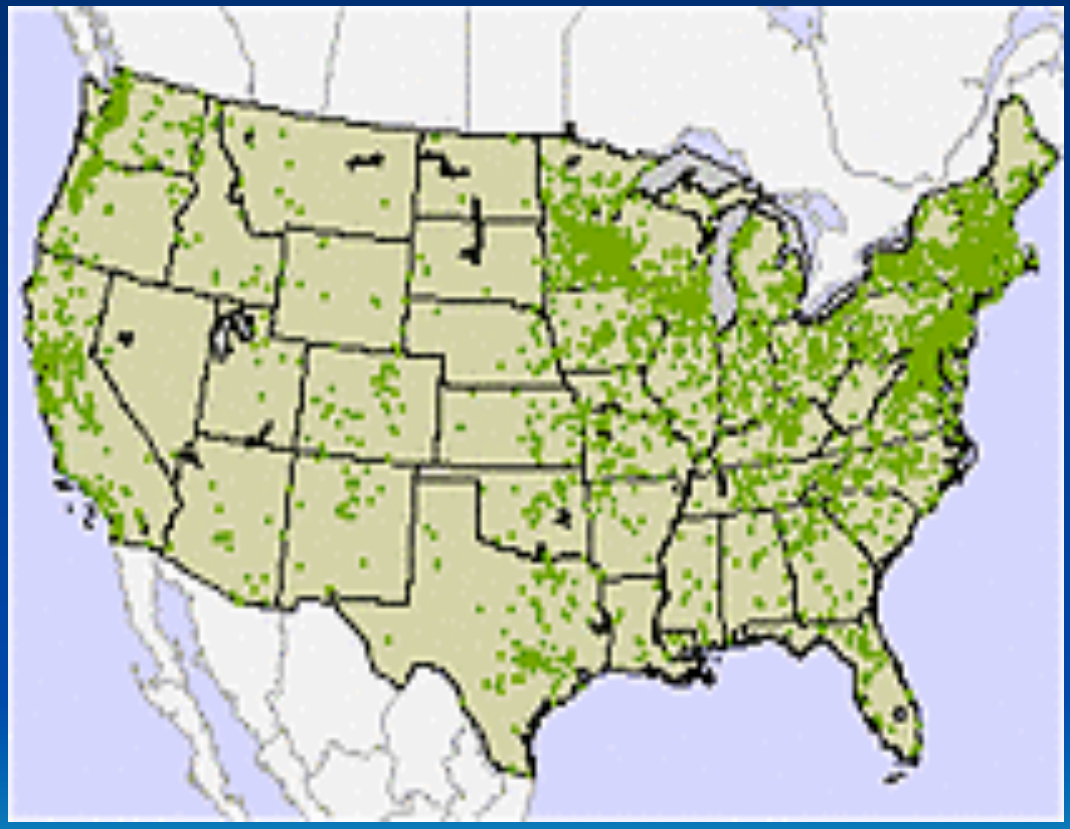
Physical Access -Rural

Table 3. Store amenities by store type for food stores in Orangeburg County, South Carolina, 2004

Variables	Supermarket (n=11)	Grocery store (n=8)	Convenience store (n=56)	Total food stores (n=75)
	← % →			
Off-street parking	100	100	98	99
Handicap parking	100	50	35	46
Ramp and curb cuts	82	50	51	55
Automatic door	100	50	2	22
Accepts food stamps	100	63	2	23

Liese et al J Amer Diet Assoc 2007;107:1916-1923

Location of Community Gardens

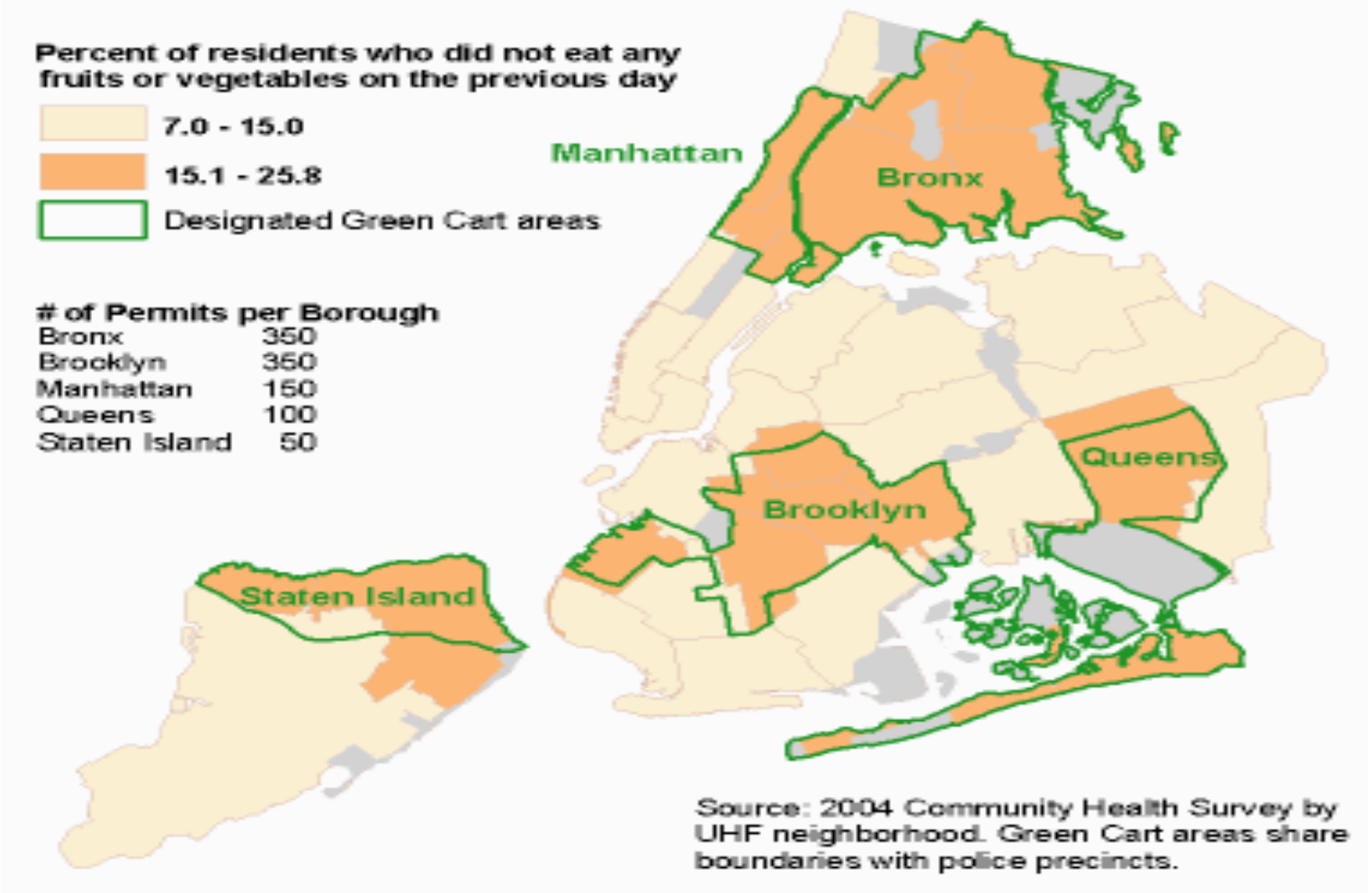


NYC Example: Community Supported Agriculture (CSA) Sites

NYC Example: Initiative to Get Fresh Produce to Low Income Neighborhoods

- Financial aid to venders
- Support from health centers and community agencies
- Not located near produce markets

Green Carts Will be Allowed Where There is Low Fruit and Vegetable Consumption



Financial Access Barriers

- Cost of food items –
  - How do healthful food compare to processed energy dense (sugary, high fat) foods?
  - What are the factors associated with the differential costs?
- Personal finances –
  - Do community residents have inadequate food storage space or poor cooking facilities?
  - What proportion of income or food stamps is needed to buy food?
  - How much does it cost to get to the market (actual amount and proportion of discretionary income)?

National Health and Nutrition Examination Survey (NHANES) Food Insecurity & Obesity (1999-2000 & 2001-2002)

	Women			**Men**		
	Odd Ratio obesity	**Mean BMI (kg/ m^2),**	**Mean waist (cm)**	**Odd Ratio obesity**	**Mean BMI (kg/ m^2),**	**Mean waist**
Food secure (Referent)	1	28.9	95.5	1	28.0	100.7
Mild food insecurity	**2.0 (*p*<0.001)**	**30.9 (*p*<0.001)**	**98.3 (*p*<0.001)**	0.9 (*p= NS)*	27.8 (*p* NS)	98.0 (*p* NS)
Severe food insecurity	1.0 (*p* NS)	28.9 (*p* NS)	95.5 (p =NS)	0.9 (*p* NS)	27.8 (*p* NS)	99.1 (*p =NS)*

Adjusted for age, race/ethnicity, parity (women only), income, educational attainment, occupational physical activity, and leisure-time physical activity.

Seligman et al. J Gen Intern Med 2007;22:1018-1023.

Financial Rural Access Price Comparisons

	Supermarket Mean (SD)	Grocery Store	Convenience Store
Apples/lb	$1.12 (.22)	$1.58 (51)	$2.07 (0)
Cucumber/ea	$.52 (.27)	$.37 (.08)	-
Orange/ea	$.53 (.26)	$.32(.27)	$.50 (0)
Tomato/lb	$2.39 (.82)	$1.80 .61)	$2.07 (0)

Liese et al J Amer Diet Assoc 2007;107:1916-1923

Mental/Emotional or Food Knowledge Barriers

- Do residents know the Dietary Guidelines/My Pyramid recommendations?
- Do residents have adequate cooking knowledge/ skills?
- Do depression and other emotional stressors interfere with heathy eating?
- Is eating a healthy diet considered unimportant?
- Is meat considered more important than fruits and vegetables?

Emotional Barriers- Fruit & Vegetable Intake Diverse Multi-Ethnic Sample -- Rural and Urban

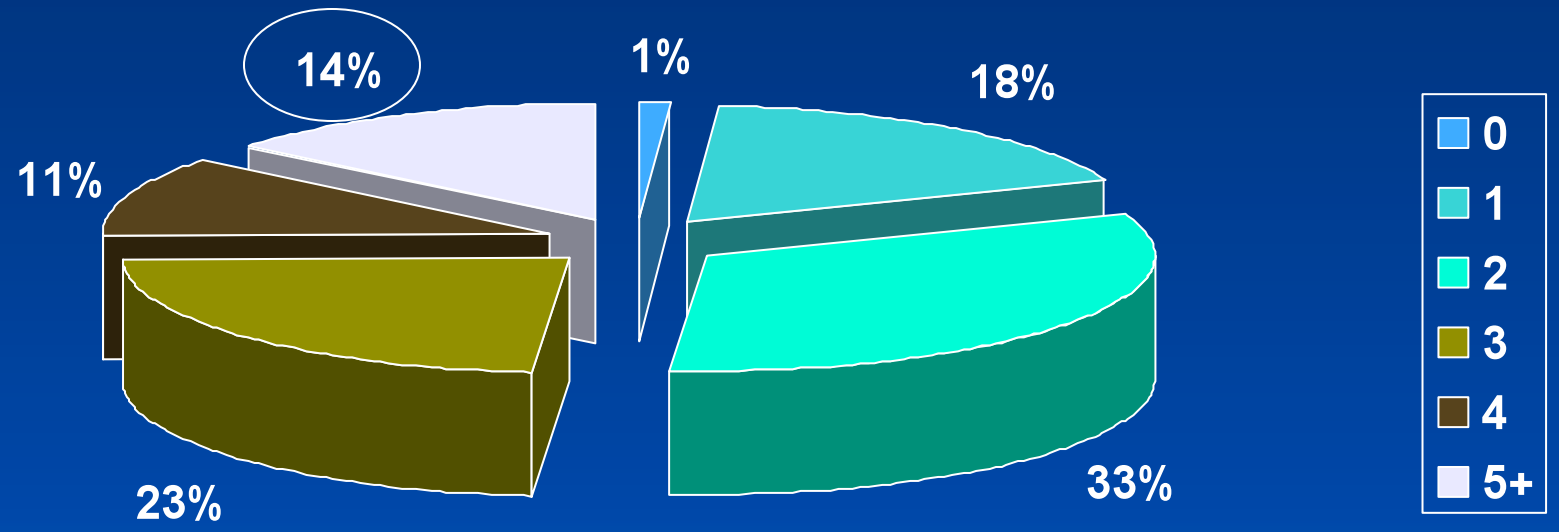
- Lack of Energy/Preparation Time – ***"I just don't have time"; "..who want to cook that late."***
- *Media Ads* ***-"You don't see fruits or vegetable in commercials."***
- Fear of Contamination – ***"You think you are eating something good, but your eating something that's killing you." " The fertilizer spray, the whole business, I don't trust it."***
- Decrease in Home Gardens –"…***Loved to plant and grow things…I don't have this luxury nowdays."***

Yeh et al. Health Promot Int 2008;23:42-51

Knowledge Barrier

South Bronx Survey Food Shoppers

Recommended Daily Servings of Fruits/Vegetables



Alberti P et al. Bronx District Public Health Office nyc.gov/health/dpoh

How are neighborhood deprivation, diet and health outcomes related?

NHANES III

Neighborhood Deprivation & Serum Cartenoids

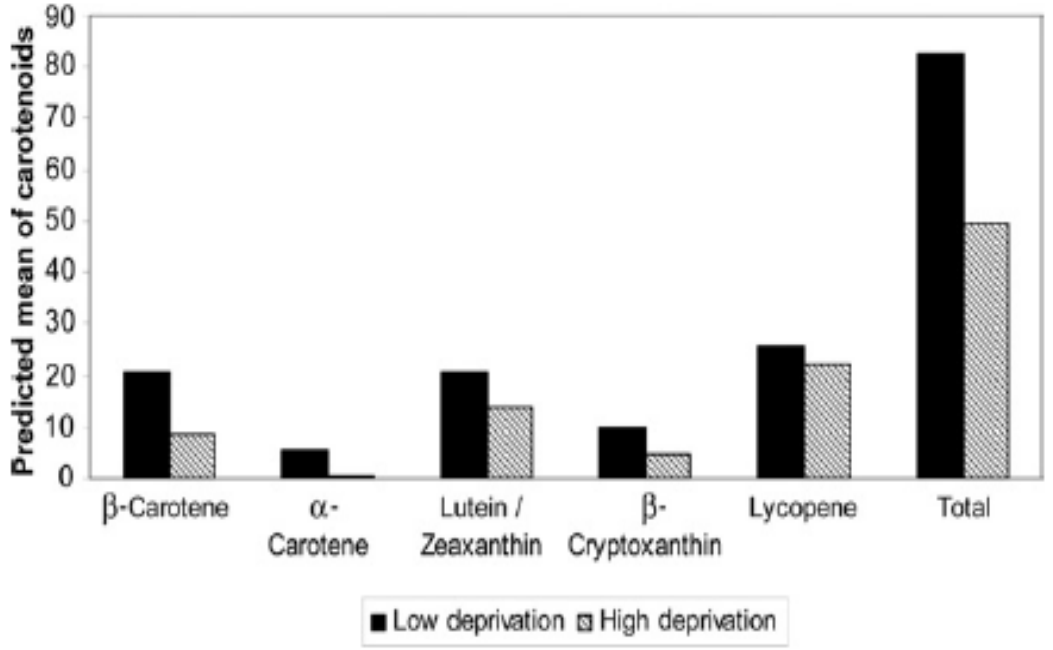


Figure. Adjusted mean level of carotenoids for low- and high-deprivation census tracts.

Stimpson et al J Am Diet Assoc 2007;107:1895-1902

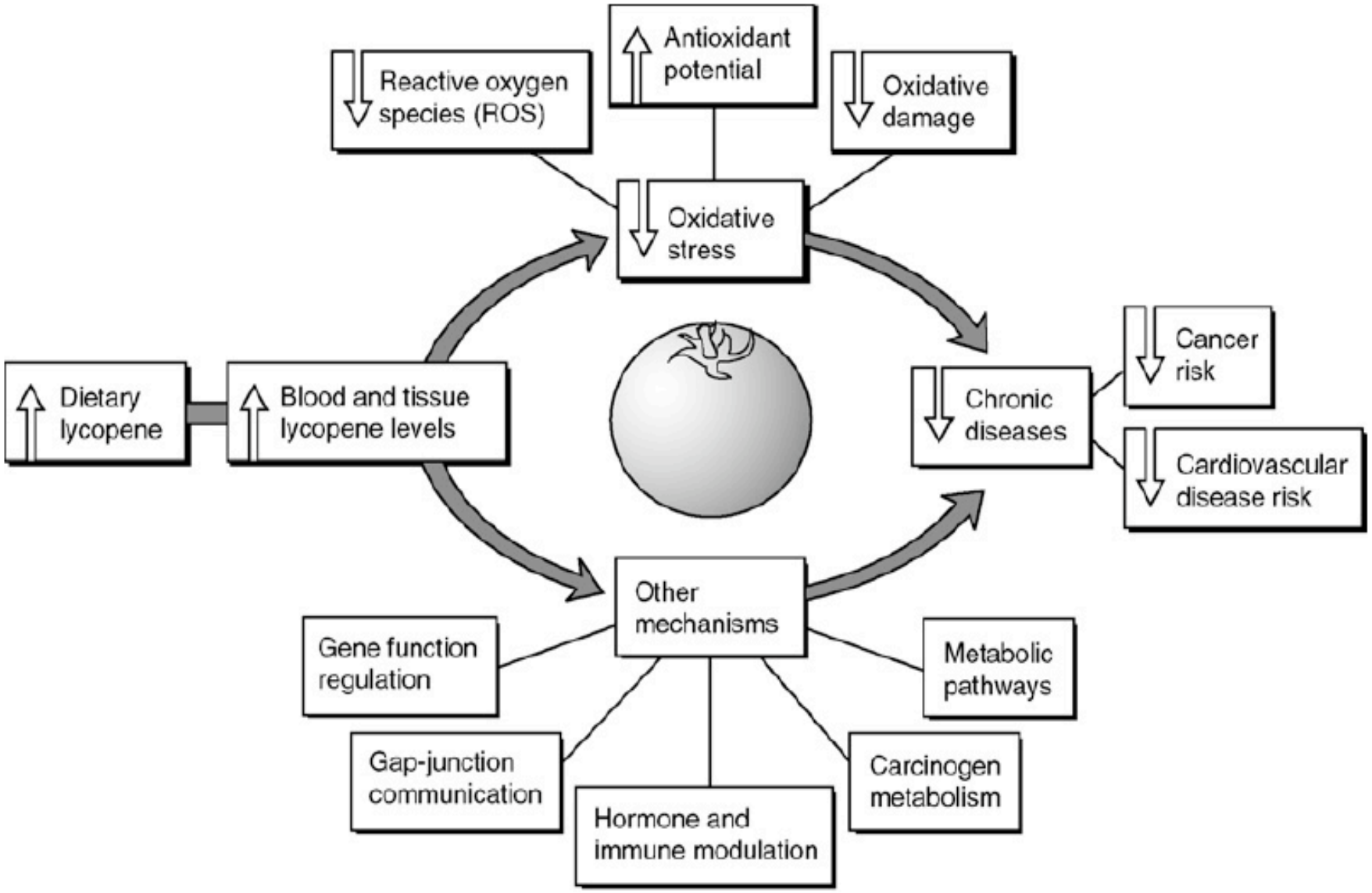


FIG. 6 Proposed mechanisms for the role of lycopene in chronic diseases. (Tomato lycopene and its role in human health and chronic diseases. Reprinted from CMAJ. 2000; **163**(6), pp. 739–744 by permission of 2000 CMA Media Inc.)

Health Outcomes

Hypertensive Patients

- BP Reductions
- SBP (-11.5 mm Hg)
- DBP (-7.1 mmHg)

Basis for 2005 Dietary Guidelines

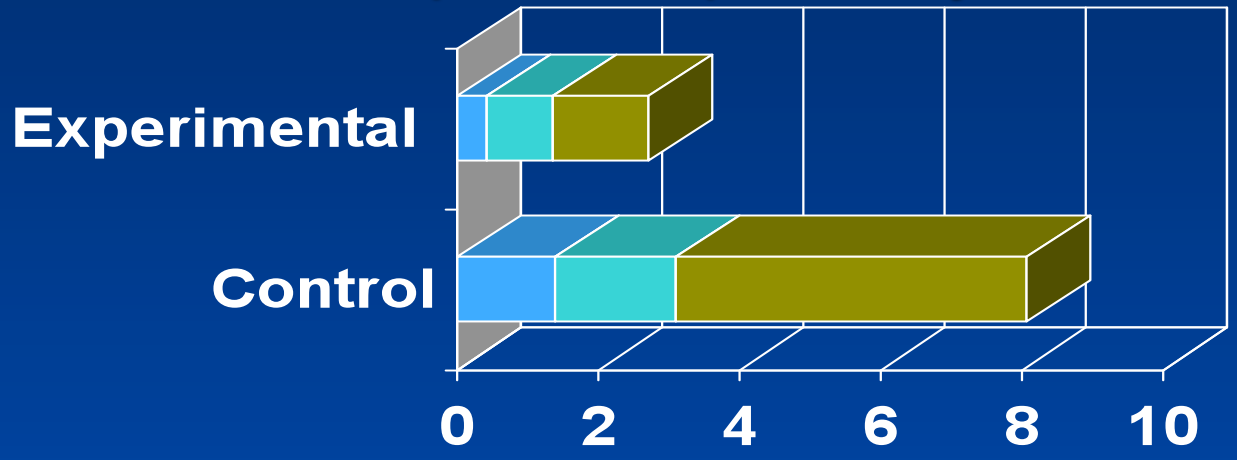
DASH Diet

Food Group	Daily Servings	1 Serving Equals	Example and Notes
Grains and Grain Products 	7-8	1 Slice Bread 1/2 Cup Dry Cereal 1/2 Cup Cooked Rice, Pasta, or Cereal	Whole-Wheat Breads, English Muffin, Pita Bread, Bagel, Cereal and Fiber, Grits, Oatmeal; Provide Energy and Fiber.
Vegetables 	4-5	1 Cup Raw Leafy Vegetables 1/2 Cup Cooked Vegetable 6 oz Vegetable Juice	Tomatoes, Potatoes, Carrots, Peas, Squash, Broccoli, Turnip Greens, Collards, Kale, Spinach, Artichokes, Beans, Sweet Potatoes; Source of Potassium, Magnesium, and Fiber.
Fruits 	4-5	8 oz Fruit Juice 1 Medium Fruit 1/4 Cup Dried Fruit 1/2 Cup Fresh, Frozen or Canned Fruit	Apricots, Bananas, Dates, Grapes, Oranges, Orange Juice, Mangoes, Melons, Peaches, Pineapples, Prunes, Raisins, Strawberries, Tangerine; Provide Potassium, Magnesium, and Fiber.
Low-Fat and Nonfat Dairy 	2-3	8 oz Milk 1 Cup Yogurt 1 1/2 oz Cheese	Skim or 1% Milk, Skim or Low-Fat, Buttermilk, Nonfat or Low-Fat Yogurt, Part Skim Mozzarella Cheese, Nonfat Cheese; Major Source of Calcium and Protein.
Meat, Poultry, Fish 	2 or Fewer	3 oz Cooked Meats, Poultry, or Fish	Select Only Lean; Trim Away Visible Fats; Broil, Roast, or Boil, Instead of Frying; Remove Skin From Poultry. Rich Sources of Protein and Magnesium.
Nuts 	1/2	1 1/2 oz or 1/3 Cup 2 tbs Seed 1/2 Cup Cooked Legumes	Almonds, Filberts, Mixed Nuts, Peanuts, Walnuts, Sunflower Seeds, Kidney Beans, Lentils; Provide Energy, Protein, and Fiber.

Health Outcomes

Lyon Heart Study 4-Year Endpoints

Rates per 100 patient years



	Control	Experimental
2nd Endpoints	4.96	1.35
Total Mortality	1.74	0.95
Cardiac Deaths	1.37	0.41

de Lorgeril M et al. Circulation 1999;99:779-785.

Evaluation Consideration

HEALTHY FOOD HEALTHY COMMUNITIES

A Decade of Community Food Projects in Action

March 2007

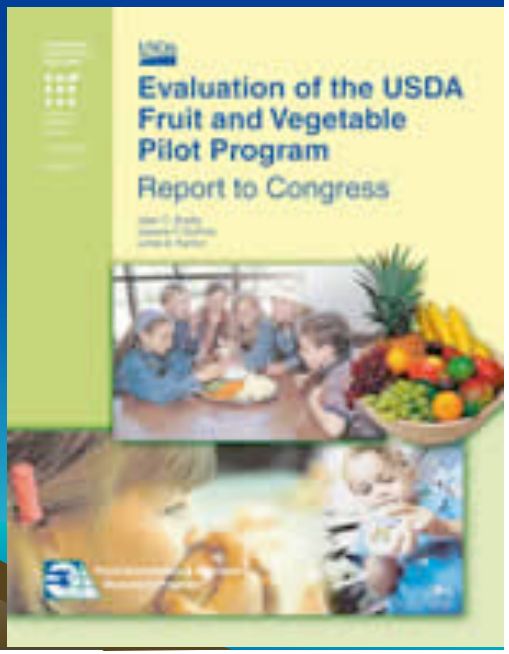
Section 25 of the Federal Agriculture Improvement and Reform Act 1996

Renewed 2002

240 Grants Peer-Reviewed

Opportunity to Measure impact of Free Fruit & Vegetables at School

- Pilot in 107 Schools (n=64,000 students)
- Determined acceptability of intervention to school staff, students and parents
- Assessment of fruits and vegetables served
- With 2007 Farm Bill Program Expansion --Measure intake
  - Self-report (YBRFSS or other)
  - Observations (in selected samples)



Socio-Ecological Model
Multi-Level Evaluation

Evaluation: RE-AIM-- Example

- ***Reach*** –What proportion of the target population participated in the intervention?
- ***Efficacy/Effectiveness*** – What is the success rate if implemented according to the plan?
- ***Adoption*** –What proportion of agencies or schools opted in? What were the barriers to signing on?
- ***Implementation*** –How much was the program changed in the real-world setting? Were the resources available to implement the program components?
- ***Maintenance*** –Is the program sustainable over time?

Evaluation Challenges

- Flexibility to test different approaches
  - Innovation
  - Tailored to target population
  - Study designs
- Measures (Food intake, other key indicators)
  - Rationale common measures
  - Measurement properties (reliability & validity)
- Goal– Develop evidence base to evaluate the impact of farm desert initiative in 2007 Farm Bill

Questions and Discussion