

Environmental Interventions for Chronic Disease Prevention: The Healthy Stores projects

Joel Gittelsohn, PhD
Center for Human Nutrition
Department of International Health
Johns Hopkins Bloomberg School of Public Health
January 24, 2012

Topics

- Impact of the food environment
- Approaches for changing the food environment
- Baltimore Healthy Stores and other urban environmental interventions
- Multi-institutional trials

Food Environment and Obesity

- Food availability associated with diet and youth BMI (French 2001)
- Reduced access to supermarkets is associated with higher BMI and chronic disease rates (Morland 2006; Bodor JN 2010)
- Distance of 1.76 miles or greater from home to grocery store was a predictor of increased BMI (Inagami et al 2006)
- More small stores and prepared food sources are associated with higher BMI and chronic disease rates (Bodor JN 2010 Maddock, 2004)

Food Environment and Obesity

- Small stores and carryouts sell mostly energy-dense foods and few foods for a healthy diet (Bodor JN 2010; Lee 2010)
- Prices of healthy foods in small stores are higher than in supermarkets (Franco 2009; Morland 2002)
- In low-income communities, food affordability is a strong predictor of diet and BMI among youth (French 2001)

Ways to Change the Food Environment (1)

- Changing access to foods within retail food stores & prepared food sources by:
 - Decreasing availability of less healthy foods
 - Increasing availability of healthy foods in small stores
 - Changing the physical location of foods (e.g., store layout)
 - Store renovations (e.g., adding FV coolers)
 - Manipulating price

Ways to Change the Food Environment (2)

- Changing access to foods within neighborhoods by:
 - Building new supermarkets
 - Developing farmer's markets
 - Improving transportation
- Changing setting for provision of information (e.g., POP promotions)

Ways to Change the Food Environment (3)

- Policy
 - Setting store standards/requirements
 - Menu labeling
 - Rezoning
 - Taxes (E.g., SSB tax)
- Work in multiple settings/ institutions at the same time
 - Integrating interventions in food stores, restaurants, schools, worksites, etc.



Ways to Change the Food Environment (4)

- Other approaches:
 - Improving food networks (distributors, producers, retailers)
 - Improving local production (producers)
 - Increasing nutrient content of foods (manufacturers)
 - Changing packaging of foods (manufacturers)



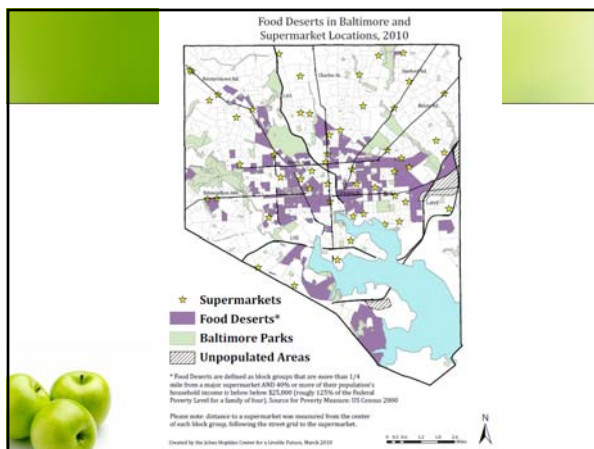
Healthy Store Programs




Baltimore Healthy Stores Goals



- To increase availability and access to healthy foods for residents of Baltimore City.
- To promote these foods at the point of purchase
- To work in collaboration with community agencies, the city of Baltimore, and local food sources.



Key Issues from Interviews

- From Store Customers: *"I would love to buy/eat healthy foods but they are..."*
 - Too expensive
 - Not available in the stores I shop in
 - Are of poor quality in the stores I shop in
- From Store Owners/Managers: *"I would love to stock healthy foods but ..."*
 - No one buys them
 - The last time I stocked (xxxxx) it just sat on the shelves

Healthy Foods Availability, n=176 Baltimore stores (Franco et al 2008)

Type of food stores (n=176)	Healthy Food Availability Index, mean (range 0-27)	Skim Milk, %	Fruit, % 1-25 ≥ 26	Vegetables, % 1-25 ≥ 26	Whole Wheat Bread, %
Supermarkets (16)	19.0	100	25 69	13 81	100
Grocery/corner Stores (107)	4.4	25	43 3	57 3	8
"Behind the glass" stores (20)	2.0	0	0 0	0 0	0
Convenience stores (33)	3.8	36	33 0	21 0	24

Baltimore Healthy Stores round 1

- East Baltimore: intervention area
- West Baltimore: comparison area
- Store sample
 - 2 supermarkets/area
 - 6-7 small stores/area
- Consumer sample
 - ~87 respondents/area



Baltimore Healthy Stores Phases

- Phase 0: Teasers/Recruitment
- Phase 1: Healthy Eating for your Kids
- Phase 2: Cooking at Home
- Phase 3: Healthy Snacks
- Phase 4: Carry Out Foods
- Phase 5: Low Calorie Drinks



Increasing supply: Corner stores stock healthier foods



- 1-3 new foods per store per phase
- Start with "low-hanging fruit"
- Incentives
 - Stocking guidelines
 - Promotional materials to create demand
 - Incentive card to wholesaler
 - Provide small supply (on occasion)




Posters

Fruit and veggies are fine...
...to snack-on anytime!

Have a **SNACK ATTACK** without the **FAT!**




Other Materials

- Educational Display
- Flyer
- Coupon

Quench Your Thirst with Water

HOW MANY CALORIES ARE YOU DRINKING?

Baltimore Healthy Stores



Interactive Sessions



Materials and training for Korean store owners

- Nutrition Education Booklet (Korean)
- Cultural Guidelines (Korean)



BHS Evaluation Plan

Instrument	Pre-	Mid-	Post-	Follow-Up
Process Evaluation				
Store process evaluation			X	
Store owner process evaluation			X	
Cooking demo, taste test evaluation	X			
Cooking demo, taste test customer evaluation	X			
Weekly interventionist progress report	X			
Store impact and feasibility				
Store impact questionnaire	X		X	X
Bi-weekly food sales (corner)	X	X	X	X
In-depth interviews		X	X	
Customer Impact and feasibility				
Customer Impact questionnaire	X		X	
Food Frequency Questionnaire	X		X	
Customer feasibility interviews	X		X	

Impact on Stocking and Sales

	Stocking Score (range 0-10)			Sales Score (range 0-10)		
	Intervention	Comparison	Significance	Intervention	Comparison	Significance
Baseline	5.9 ± 2.0	6.8 ± 1.6	NS	4.4 ± 1.8	5 ± 1.5	NS
Post-phase	8.3 ± 1.0	6 ± 1.8	0.004	7.1 ± 2.0	5.8 ± 1.8	0.05
Post-intervention	7 ± 2.0	5.5 ± 1.5	0.009	6.4 ± 1.8	4.7 ± 1.5	0.003

Song et al, *Public Health Nutrition*, 2009

- ### Consumer Results
- N=85 respondents measured pre and post
 - After adjustment for baseline value, age, sex and SES:
 - Significant impact on food preparation methods and frequency of purchase of promoted foods
 - Positive trend for healthy food intentions
- Gittelsohn et al, *Health Education and Behavior*, 2009

- ### Will small food store interventions work in different settings?
- Systematic review, Preventing Chronic Disease, in press
 - 16 trials that met criteria
 - Focus on small food stores
 - Had impact data
 - Findings
 - Significant effects for increased availability of healthy foods and improved sales of healthy foods
 - Significant effects for improved consumer knowledge and dietary behaviors

Center of Excellence for Training and Research Translation

- CDC supported center at UNC
- BHS listed as a Research-Tested Intervention
- Materials and training provided to city and state Health Departments through UNC obesity prevention course

Baltimore Healthy Carryouts

625 carryouts in Baltimore City

- Phase 1: Menu labeling and signage
- Phase 2: Introducing healthier sides & healthier beverages
- Phase 3: Introducing healthy combo meal & reduced prices for healthier options



Phase 2: Healthy sides and healthy beverages

- Currently available healthy sides & beverages
 - Collards, salads, fruit cups, soups, water, diet soda, 100% fruit juice
- New healthy sides introduced
 - Yogurt, fresh fruits, other cooked greens (turnip greens, kale), green beans, smoothies
- Provide healthier sides to intervention carryouts to help initial stocking

Phase 2 Poster: "Healthy Sides"

- Phase 2 posters were distributed to the intervention carry outs to promote the purchasing of healthier side dishes such as soup, collard greens, salad, fresh fruit and water.

Promotional posters

Using consistent colors "orange and purple"

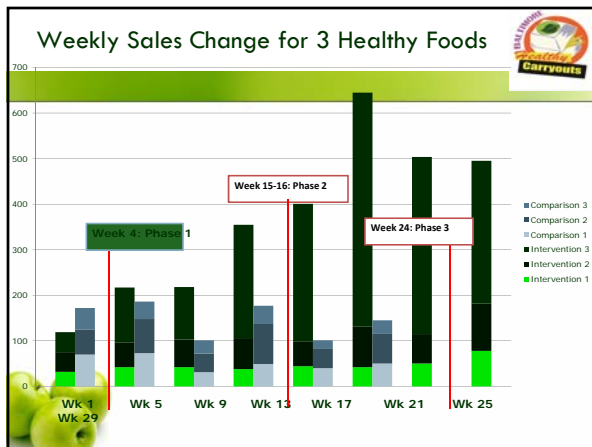
Phase 3. Healthy combo meal & Price manipulation

- Improving food preparation methods
 - Provide a indoor grill to implement grilled chicken tenders
 - Provide low-fat mayonnaise
- Healthy Monday promotion with price reduction
 - Formative research to understand what is an acceptable range to reduce prices
 - Owners agreed to reduce up to \$1 per healthy entrée without compensation

Cooking preparation methods

Most carryouts only have deep-fryers and a microwave to cook foods. We purchased a grill to provide a non-fat cooking method.


BHC Evaluation of Carryouts




Will prepared food source interventions work in other settings?

- Systematic review, in preparation
- 11 trials that met criteria
 - Focus on prepared food sources
 - In community settings
 - Had impact data
- Findings
 - Feasibility and sustainability were high
 - Increased sales of healthy foods for most trials
 - Measures at the consumer level were generally lacking, but in some cases showed improved awareness and frequency of purchase of promoted foods.


Baltimore Healthy Eating Zones: Aims




- To develop, implement and evaluate an environmental program for low-income AA children by creating "healthy eating zones".
- To determine if the program:
 - significantly improves children's food-related psychosocial factors and food/beverage purchasing behaviors.
 - leads to significant improvements in young AA children's food environment, including the increased availability of affordable healthy foods.
 - leads to significant changes in food consumption.



BHEZ Intervention Components



- Creation of "healthy eating zones" in and around 12+ Baltimore City recreation centers
- Worked with corner stores and carryouts
- Increasing availability of healthy food options
- Point of purchase signage
- Interactive sessions
- Use of peer educators
- Cooking classes for kids in recreation



Youth materials developed by Kids On The Hill






Interactive activities in food stores




Interactive activities in recreation centers





Evaluation Plan



- Pre-post evaluation
 - 242 youth-caregiver dyads (half intervention, half comparison)
 - Psychosocial factors
 - Food purchasing
 - Quantitative food frequency
 - Recreation center staff (n=12)
 - Changes to food availability in rec center, stores and carryouts
 - Store environmental checklists
- Process evaluation



Early Results: Impact on Obesity




	By Direct Exposure				By Intervention		
	Low	Med	High	Sig.	Comparison	Intervention	Sig.
Changes in obesity							
BMI Percentile (entire sample)	-1.74	1.44	-2.91	0.34	0.22	-1.88	0.33
BMI Percentile (Baseline BMI >85)	-1.2	-2.85	-2.7	0.1	-0.78	-3.15	0.051
BMI Percentile (Baseline BMI >85, Girls only)	-1.1	N/A	-3.1	0.016	-0.13	-3.16	0.03

Summary of Healthy Stores Environmental Interventions: Results of Completed Trials

Program	Population	Reduced Significant Impacts Observed			
		Consumer psychosocial	Consumer behavior	Consumer diet/BMI	Store
Marshall Islands Healthy Stores	Pacific Islander adults		Healthy food purchasing	N/A	N/A
Apache Healthy Stores	American Indian adults	Knowledge	Healthy food purchasing	Increased healthy foods, decreased unhealthy foods	Increased stocking and sales
Zhiwaa-penewin Akinomagwin	First Nations adults	Knowledge	Healthy food purchasing	? Diet / no impact BMI	N/A
Healthy Foods Hawaii (PI: R Novotny)	Pacific Islander adults and children	Caregiver knowledge	Healthy food purchasing frequency trend	Increased water, Total HEI score and HEI grain score / No impact BMI	N/A
Navajo Healthy Stores	American Indian adults	Intentions	Purchasing labeled foods	? Diet / Reduced BMI %	No impact
Baltimore Healthy Stores	African American adults	Intentions	Healthy cooking methods, purchasing labeled foods	? Diet / N/A	Increased stocking and sales
Baltimore Healthy Eating Zones	African American youth	Intentions, self-efficacy	No impact	? Diet / Reduced BMI % overall youth	?

Report under review by Baltimore Planning and Health Departments



Developing Criteria for Healthy Cornerstores in Baltimore City: A Report of the Baltimore Cornerstore Criteria Development Study

Prepared by:
 Carol Robinson, PhD
 Program Manager, BPH
 Department of Health, Behavior, and Society
 Johns Hopkins University
 Bloomberg School of Public Health
 615 North Wolfe Street
 Baltimore, MD 21205
 Prepared for:
 The Johns Hopkins Center for a Healthy Future

- ### Dissemination and Expansion
- Baltimore City Food Policy initiatives
 - Healthy Carryout initiative with public markets
 - Multilevel Obesity Prevention Study (MOPS)
 - Food PAC, Wholesalers, corner stores, carryouts, recreation centers



- ### What is OPREVENT?
- OPREVENT stands for Obesity Prevention Research and Evaluation of InterVention Effectiveness in NaTive North Americans
 - OPREVENT is a program that combines communications, family, food store and worksite components for obesity and diabetes prevention for American Indian communities

OPREVENT Program Rationale

- It is better to:
 - ✓ **Engage community members** in program planning and implementation
 - ✓ **Work in multiple places** to reinforce healthy messages and increase exposure
 - ✓ **Change environment** to increase access to food and physical activity
 - ✓ Reach people at the **point of decision**
 - ✓ **Plan for sustainability** from the beginning

Who are the partners in the program?

- Five American Indian (AI) Communities
 - Schools and Families
 - Stores
 - Worksites
 - Wellness Centers
 - Diabetes Prevention Programs
- Johns Hopkins School of Public Health and local collaborators
- USDA University Extension

Ohkay Owingeh Pueblo

Alamo Navajo Chapter

To'Hajiilee Navajo Chapter

Keweenaw Bay Indian Community

Hannahville Indian Community

OPREVENT will have 4 programs

- **Family program** for families of children in grades 2-6
- **Store program** to increase availability of healthy foods and point of purchase promotion, including interactive sessions
- **Worksite program** to increase physical activity
- **Communications program** with events and media for reinforcement

Family Program

- Centered around 2nd – 6th grade health curriculum
- Main Focus
 - Healthy eating
 - Physical activity
 - Daaybways stories
 - Exercise breaks and physical activity
- Family packs to take the messages home
- Encouraging no chips and sugar-sweetened drink policies in schools



Store Component

- Promote stocking and purchase of healthier foods
- Interactive sessions with giveaways, taste tests
 - e.g. drain and rinse ground meat to make healthier hamburger soup
- Shelf labels
 - lower in fat, lower in sugar, higher in fiber healthy food choice
- Flyers, posters, educational displays, recipes



Worksite Program

- Format will depend on types of worksites that wish to be involved
- Emphasis on increasing physical activity
- Pedometer challenges one option



The "Big Idea"

- Reinforcing programs that happen at the same time
- Example.
 - Children learn about healthy snacks (family program)
 - Children encourage parents to purchase healthy snacks
 - Adults see signs for healthy snacks in stores and taste test during interactive sessions (store program)
 - Adult workers hear about healthy snacks on the job (worksite program)



OPREVENT Evaluation

- Process indicators
 - Schools, stores, worksites, health services
- Impact
 - Adult psychosocial factors, diet (FFQ), physical activity, BMI



Conclusions

- Healthy stores approach to changing the food environment appears to work in many settings
- Importance of addressing both supply and demand
- Need to work in multiple institutions, to achieve high exposure
- Importance of thinking beyond the initial trials – our job does not end there




Acknowledgements

- Collaborators
 - Jean Anliker, U Mass
 - Sara Bleich, JHSPH
 - Benjamin Caballero, JHSPH
 - Sally Davis, UNM
 - Elsie DeRoose, GNWT
 - Kevin Frick, JHSPH
 - Miyong Kim, JHSON
 - Anne Klassen, JHSPH
 - Robert Lawrence, JHSPH
 - Rachel Novotny, U Hawaii
 - Anne Palmer, JHSPH
- Rajiv Rimal, JHSPH
- Cindy Roache, GN
- Sangita Sharma, UA
- Ellen Silbergeld, JHSPH
- Allan Steckler, UNC
- Pamela Surkan, JHSPH



Acknowledgements

- Community Partners
 - Bashas supermarkets
 - Red Mesa Stores
 - Diabetes Prevention Programs
 - Kids on the Hill
 - Government of Nunavut, NWT
 - Tribal Governments
 - Special Diabetes Programs
- Former & Ongoing Students/Staff
 - Preetly Gadhoke
 - Atila Goheer
 - Lara Ho
 - Sharla Jennings
 - Stephen Kodish
 - Seung Hee Lee
 - Matthew Lee
 - David Lessens
 - Jessica Noel
 - Ogban Omoronia
 - Stephanie Oppenheimer
 - Marta Pardiña
 - Sohyun Park
 - Wendy Pavlovich
 - Irit Rasooly
 - Hannah Reddick
 - Amanda Rosecrans
 - Megan Rowan
 - Hee-Jung Song
 - Amber Summers
 - Melanie Thurber
 - Muge Qi
 - Amy Vastine
- Students and Staff
 - Jennifer Anderson
 - Chrisa Arcan
 - Mirielle Begay
 - Xia Cao
 - Lenis Chen
 - Karina Christiansen
 - Sarah Curran
 - Justine Dang
 - Lauren Dennisuk
 - Becky Ethelbah
 - Jill Faucette



Funders

- Center for a Livable Future, Johns Hopkins University
- USDA/Food Assistance Nutrition Research Program
- USDA/National Research Institute/Nutrition and Obesity Program
- Robert Wood Johnson Foundation Healthy Eating Research program
- American Diabetes Association
- Stulman Foundation
- Isador and Gladys Foundation
- Urban Health Institute
- Diabetes Research and Training Center, Johns Hopkins University and University of Maryland
- National Institutes for Health




Thank you!

www.healthystores.org