

Fruit and Vegetable Programs

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Conference on Food and Farm Policy and Obesity
University of California, Davis
May 21, 2010

Presentation Outline

- History of dietary guidance re: fruit and vegetable consumption in the US
- Efforts to increase FV consumption among school children and in adults: nutrition education
- Evidence of the effect of economic incentives and targeted subsidies on FV consumption
- Recent policy shifts increasing FV inclusion in federal food assistance programs (WIC, reimbursed school meals, SNAP pilot)
- Beginning of a conceptual shift to disaggregating fruits from vegetables

History of Dietary Guidance on Fruit and Vegetable Consumption in the US

- First recommendation to consume at least 5 servings FV/day by USDA was issued in 1916. Subsequent recommendations varied between 3 and 5 servings
- Dietary Guidelines for Americans first published in 1980; revised q 5 years since; consistently urged increases in FV consumption
- Evidence on relationship of FV consumption and protection against cancer risk built in the 1980s; first “5-a-Day for Better Health” began in California, with a cancer prevention rationale, was adopted as a national program by the National Cancer Institute and the Produce for Better Health Foundation in 1991

History, continued

- 2002: USDA, CDC and NCI sign a memorandum of understanding to mutually enhance and support the 5-a-Day program
- 2005: CDC becomes the lead federal agency for the 5-a-Day program
- 2005: Dietary Guidelines change recommendations to the equivalent of 4-13 servings/day depending on energy need
- 2007: National program name changed to National Fruit and Vegetable Program, and new public health initiative “Fruits and Veggies – More Matters” launched to be consistent with Dietary Guidelines for Americans

Current F/V consumption in US

- General population education efforts by NCI and others since early 1980s
- Average consumption steady since 1989-91, at between 4.5 and 4.9 servings/day
- Lowest consumption among low-income population

History, to date.....

- Early 2000s - Demonstration projects in California and New York show acceptability of adding FV to WIC food package; small demonstration projects in NY and Maryland show modest increase in FV consumption with targeted nutrition education within WIC
- Farmers' market coupon experiments in NY and CN show high rates of utilization
- 2006-2008 Publication of site-randomized trial showing effectiveness of adding FV vouchers to WIC food packages
- 2006 Recommendations of Institute of Medicine committee for revisions to the WIC supplemental food packages
- October 2009 revisions to the WIC supplemental food packages, including FV, go into effect nationally

History, to date.....

- Late 2009: IOM committee publishes recommendations for revisions to nutrition and meal standards for school breakfast and lunch programs, increasing FV, separating fruits from veggies, and specifying type of vegetables for school lunch
- 2010: USDA issues request for proposals for pilot study of healthy incentive change to SNAP program, providing rebate to SNAP benefits for FV purchase

Nutrition Education

Children: Australian Fresh Kids Program increased fruit and water availability among primary school aged children over a two year period, based on lunch box audits. 25-50% increase in kids bringing fresh fruit to school and 1-60% in those bringing water bottles.

Laurence, Peterkin, Burns. Health Promotion Int'l 22: 218-226,2007

Adults: Review of 44 studies from mostly developed countries showed modest increases in consumption following education exposure, whether face-to-face, print, media, or community campaign.

Pomerleau et al., J Nutr 135: 2486-2495, 2005

Subsidies/Increased availability

- British School Fruit and Vegetable Scheme provides free piece of fruit or a vegetable to children aged 4-6 years, every school day. Piloted w/ lottery funds, now funded by Dept of Health. Initial slight increase in fruit consumption, followed by decrease following the general secular trend.

Schagen S. et al., 2005. Evaluation of the School Fruit and Vegetable Pilot Scheme. London: Big Lottery Fund

- Studies of manipulating prices in in schools and in vending machines in schools and workplaces showed increase purchase of healthier choices including FV

French S et al., AJPH 1997; 2001; and more recent

Research into effectiveness of adding FV targeted subsidy in food assistance programs The FAVES study

Co-investigators: Dena R. Herman, Eloise Jenks, Abdelmonem Afifi

Public Health Foundation Enterprises WIC Program, Los Angeles

Ralph's Food4Less

Culver City Farmers' Market

California Cancer Research Program, California Department of Health
Services, #00-00758K-20148;

USDA/ERS #43-3AEM-1-80038 through the University of California at Davis;
and

NIH through the UCLA Cancer Education and Career Development Program,
DCPCR, UCLA/Jonsson Comprehensive Cancer Center (#5R25 CA87949),
and

UCLA Clinical Nutrition Research Unit (#P01CA42710)

Why is the WIC program a logical leverage point?

- Reaches very large numbers of vulnerable individuals, at times when dietary habits are being formed
- Directly influences dietary quality for periods of months to years
- Program is designed purposely to provide supplements of the foods most needed to improve dietary quality

Study design

- Non-equivalent control group design – two intervention sites and one control
 - Intervention: \$10/week coupons good for purchase of fresh fruits and vegetables, at either a farmer's market or a supermarket site; continued for six months
 - Control condition: \$13/month coupons good for purchase of disposable diapers

- Participants followed for 14-month period (two-month run-in, six month intervention, six-month followup)

Site Selection Criteria

- Presence of a major supermarket and a certified year-round farmers' market within ½ mile of the WIC center
- Similar caseload and ethnic composition among the three sites
- Sufficiently separated geographically to minimize possibility of contamination

Study Sample: eligibility criteria

- Postpartum WIC participant (within first two months of delivery)
- At least 18 years of age
- English or Spanish-speaking

Study participants

- 602 enrolled
- Ethnic distribution: 86% Hispanic, 7% African American, 4% non-Hispanic white, 3% Asian American and 0.2% Native American
- 454 (75%) completed all data collection
 - Of those who did not, 90% were because of moving away

Data Collection

- Two-month baseline period
- Interviews including quantitative 24-hour recalls of food intake using multiple pass method, at baseline, start of intervention, two, four, and six months later, and six months after end of intervention
- Two additional interviews for intervention groups to query purchases in previous week
- Data included measured height and weight, household and demographic variables, program participation, pregnancy outcomes, food security status, fruit and vegetable consumption practices

Study Sample Characteristics

	Age (yrs) mean \pm SD (min-max)	Education (yrs) mean \pm SD (min-max)	Income (US\$) mean \pm SD (min-max)	Family size (persons) mean \pm SD (min-max)
Farmers Market	27.5 \pm 5.8 (17 - 43)	9.4 \pm 3.4 (0 - 16)	1,180 \pm 603 (0 - 3,204)	3.7 \pm 1.2 (2 - 8)
Supermarket	27.5 \pm 5.9 (17 - 43)	9.9 \pm 3.0 (0 - 16)	1,292 \pm 680 (0 - 3,120)	4.0 \pm 1.3 (2 - 11)
Control	27.0 \pm 5.9 (17 - 43)	9.4 \pm 3.2 (0 - 17)	1,228 \pm 673 (0 - 3,640)	4.1 \pm 1.3 (2 - 9)

BMI, Pregnancy Weight Gain and EI:BMR Ratio at Baseline

	BMI (kg/m ²) mean \pm SD (min-max)	Pregnancy Wt. Gain (lb) mean \pm SD (min-max)	EI:BMR Ratio mean \pm SD (min-max)
Farmers Market	27.9 \pm 4.9 (18.9 – 48.2)	29.2 \pm 12.4 (0 – 70)	1.73 \pm .68 (.23 – 4.35)
Supermarket	27.9 \pm 5.1 (16.9 – 54.1)	28.6 \pm 11.7 (20.0 – 65.0)	1.64 \pm .63 (.24 – 4.24)
Control	28.0 \pm 5.1 (16.2 – 45.7)	29.3 \pm 11.0 (0 – 64)	1.39 \pm .57 (.29 – 3.94)

Research Question 1:

Will participants use their supplements (vouchers) to purchase fruits and vegetables?

Redemption rates of fruit and vegetable vouchers at the two intervention sites

	Vouchers Issued (\$)	Vouchers Redeemed (\$)	Percent (%) Redeemed
Farmers Market	44,960	40,786	90.7
Supermarket (Food4Less)	44,000	38,495	87.5

Reasons for non-redemption

- Still plan to use the vouchers
- Too busy
- Lost or stolen
- No storage or refrigerator
- Too much to spend at once (3%); still have fruits and vegetables (2%)

Will participants purchase a wide variety of fruits and vegetables with their supplements (vouchers)?

27 and 26 different kinds of fruit, and 34 and 33 different vegetables were purchased in the farmers market and supermarket site respectively

J Am Dietetic Association, 106: 740-744, 2006

Fruits Most Frequently Purchased by Treatment *

Farmers Market

Apples
Oranges
Peaches
Grapes
Strawberries
Watermelon
Cantaloupes
Pears
Bananas
Plums
Nectarines
Grapefruits

Supermarket

Banana
Apples
Oranges
Grapes
Pears
Watermelons
Peaches
Strawberries
Cantaloupes
Papayas
Melons
Pineapples

* List includes fruits purchased with coupons during the intervention period.

Vegetables Most Frequently Purchased by Treatment *

Farmers Market

Tomatoes
Lettuce
Broccoli
Potatoes
Green beans
Corn
Squash
Spinach
Zucchini
Onions
Cauliflower
Cucumbers

Supermarket

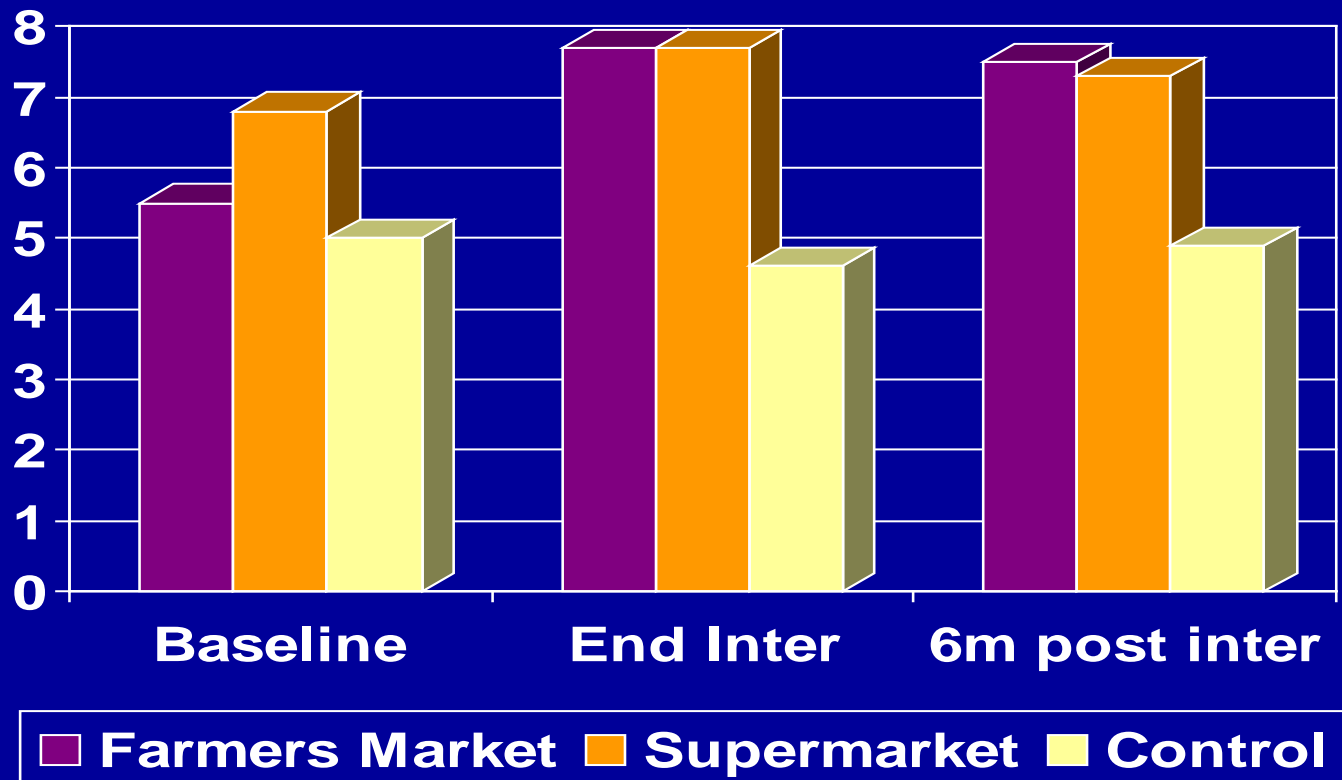
Carrots
Tomatoes
Lettuce
Broccoli
Potatoes
Squash
Spinach
Zucchini
Cauliflower
Cabbages
Cucumbers
Green beans

* List includes vegetables purchased with coupons during the intervention period.

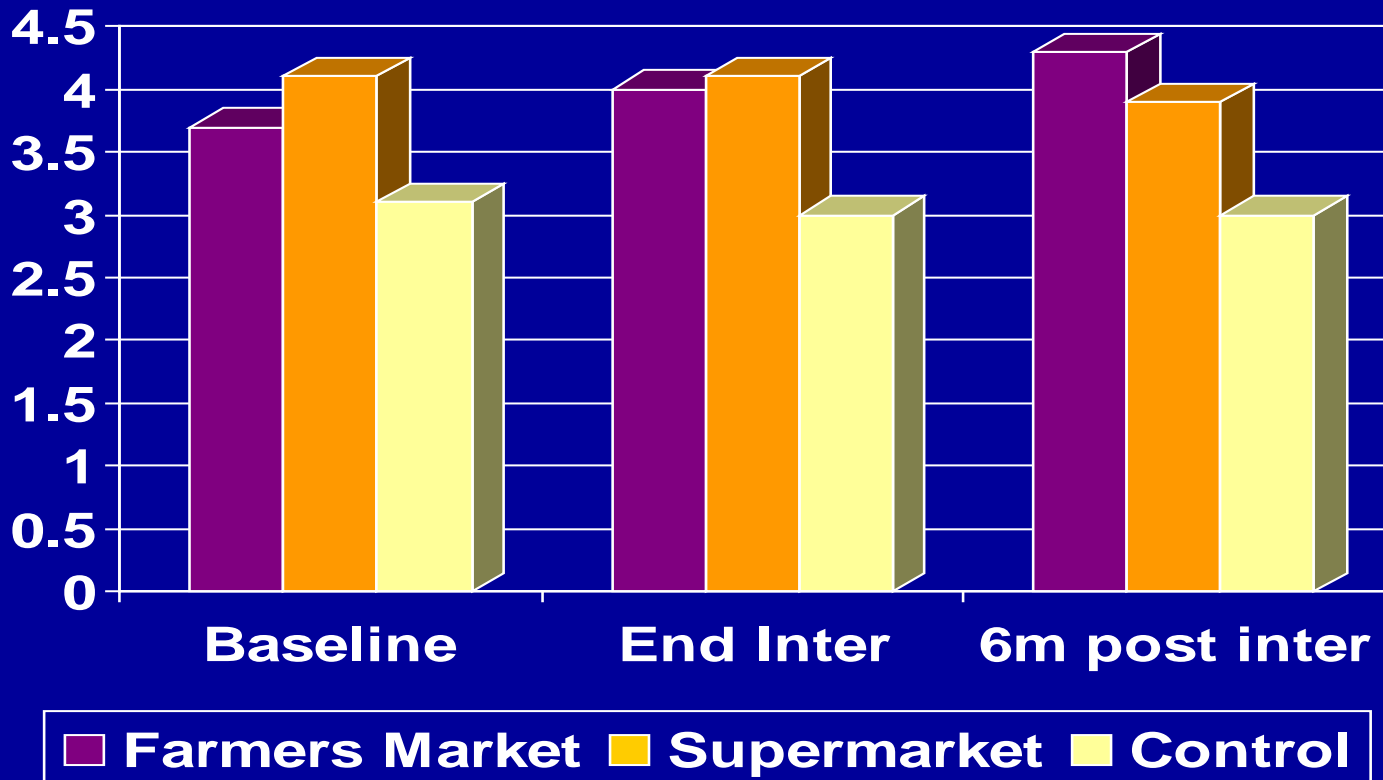
Research question #2: Will participants increase their FV consumption, and will any increase last after withdrawal of the subsidy?

Am J Public Health 98: 98-105, 2008

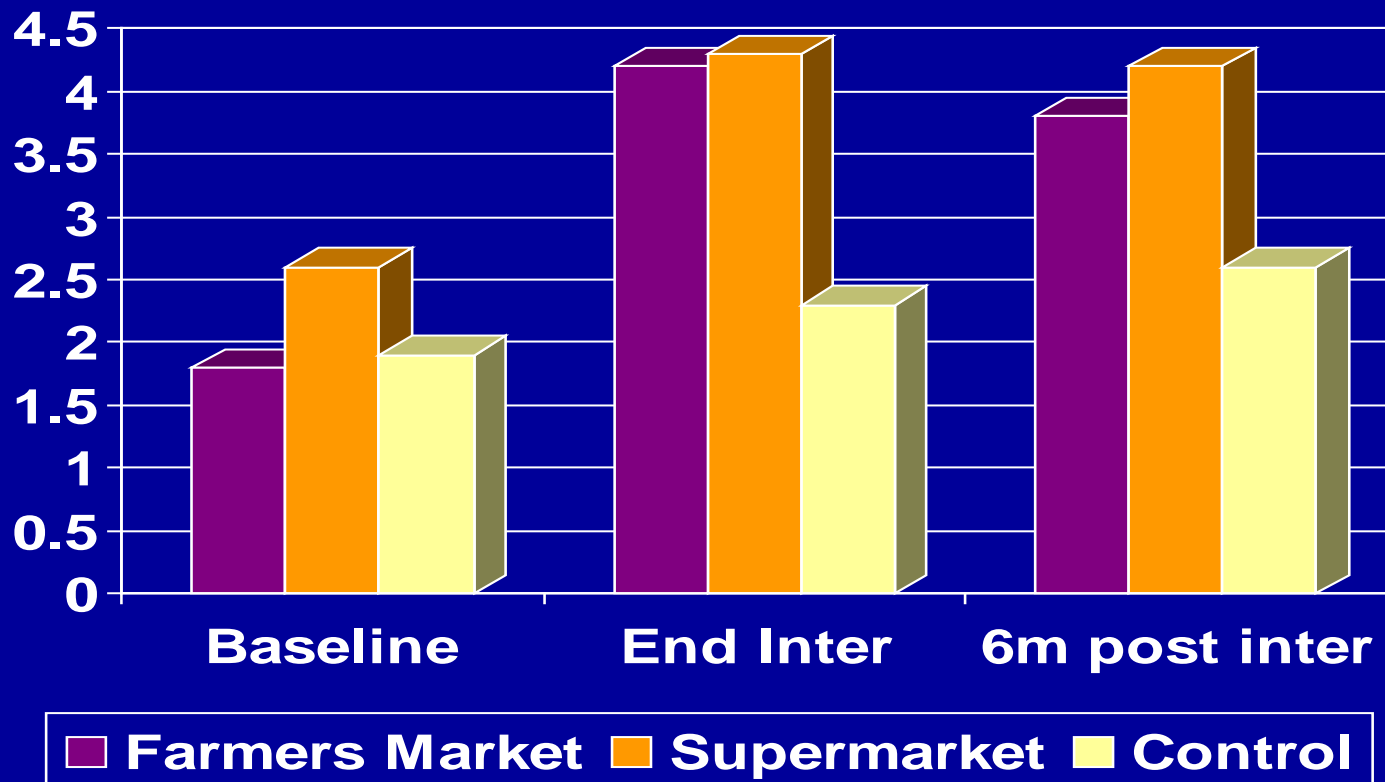
Average Consumption of Fruits and Vegetables at Baseline, End of Intervention and 6 months Post-Intervention by Treatment



Average Consumption of Fruits at Baseline, End of Intervention and 6 months Post-Intervention by Treatment



Average Consumption of Vegetables at Baseline, End of Intervention and 6 months Post-Intervention by Treatment



Factors Associated with Sustaining Fruit and Vegetable (FV) Intake 6 months Post Intervention*

	Coefficient	Std. Error	p-value	95% CI
FV intake **	.32	.07	<.0001	.19 - .45
Energy intake	-.0002	.00	.51	-.001-.000
Age	.03	.05	.55	-.07-.12
Income	.0004	.00	.26	.000-.001
Spanish language	2.04	.88	.02	.30-3.78
Latino	.29	1.48	.84	-2.6-3.2
Family size	-.02	.25	.93	-.51-.47
Years in U.S.	.008	.05	.86	-.09-.10
Medicaid ***	.62	.46	.17	-.28-1.53
Years on WIC	-.02	.09	.87	-.20-.17
Infant feeding method	.06	.61	.92	-1.13-1.25
BMI	-.02	.06	.62	-.14-.08
Food secure	.43	.53	.41	-.61-1.47
Treatment – Farm. Market	2.26	.60	<.0001	1.07-3.44
Treatment – Supermarket	1.63	.63	.01	.39-2.86

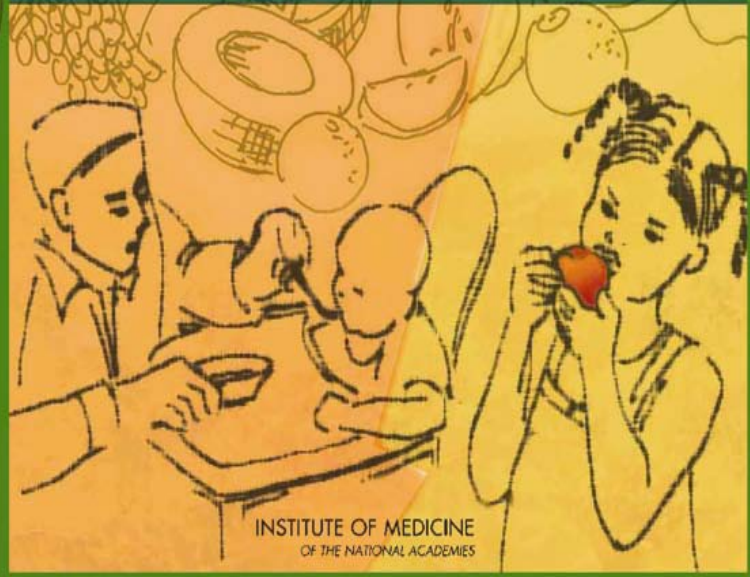
Conclusions

- Vouchers for fresh F/V purchase were valued and almost fully utilized, at a level much higher than would be possible within the program on an ongoing basis
- Participants chose a wide variety of fruits and vegetables in both intervention settings
- Participants' dietary intakes showed an increase from about 2.5 servings/1000 kcal to about 4.0 servings/1000 kcal, accounted for primarily by vegetables other than potatoes and beans, and sustained for six months following withdrawal of the intervention



WIC FOOD PACKAGES

TIME FOR A CHANGE



INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Currently under consideration....changes to nutrient and menu standards for school meals



Recommended FV changes to school meals

(Institute of Medicine, 2009; currently under review at USDA)

- More fruit at breakfast
- More fruit at lunch
- Fruits and vegetables not interchangeable
- More vegetables at lunch
 - Specified weekly amounts of dark green, orange, legumes and limit on starchy vegetables

Another thought about fruits and vegetables – maybe they are not one category!

- The chronic disease epidemiology and most of the dietary recommendations so far have lumped them together.
- Our qualitative work in California with low-income, first-generation immigrant Asian families throughout the state showed that in all groups F/V are not perceived as one domain.
 - » Harrison et al., *Cancer* 104: 2962-8, 2005.
- Nutrient contributions tend to be somewhat different, even if more similar than to other food groups – a plant-based diet is desirable, but within it there is plenty of room for fine-tuning.

- Thank you!