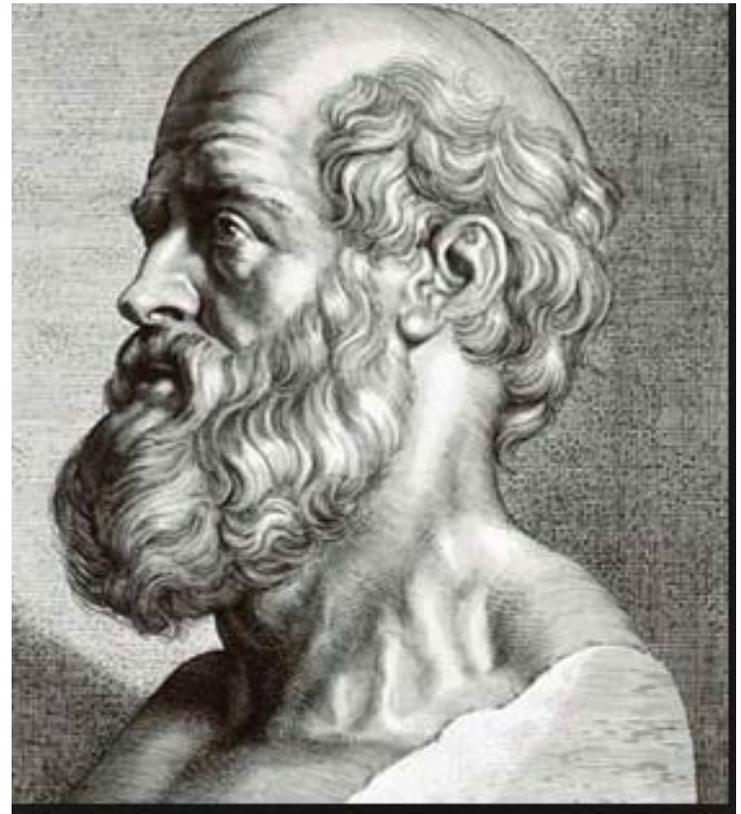


Let Thy Food Be Thy Medicine and Thy Medicine Be Thy Food: Enlivening Hippocrates in Cancer Prevention Research

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Cancer Prevention and Control Program Colloquium Series
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Hippocrates (~460BC-370BC)

- Father of Western Medicine
- Medical Revolutionary
 - Natural causes of disease (e.g., environment, diet, living habits) vs. punishment from gods
- Hippocratic Oath
- Food as medicine philosophy

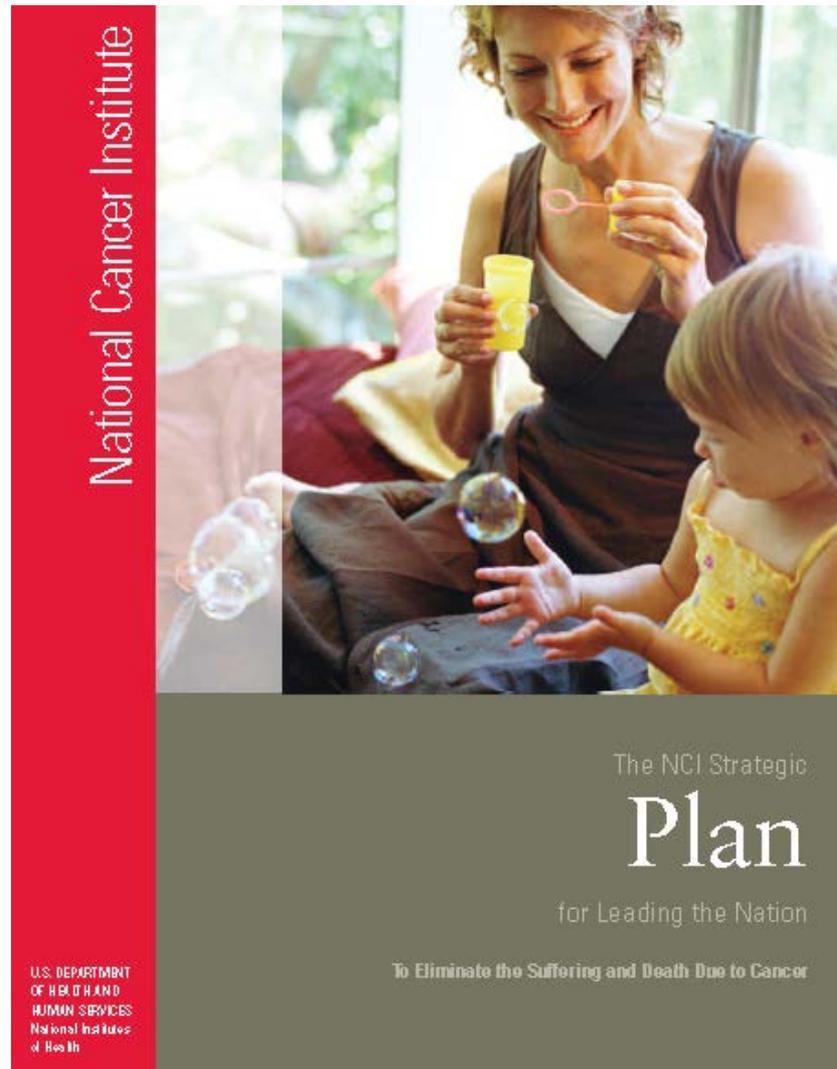


Food is medicine



- Fruit and vegetable consumption associated with decreased risk of certain cancers (stomach, esophagus, lung, oral cavity and pharynx, endometrium, pancreas, and colon) (e.g., Block, Patterson, & Subar, 1992; Steinmetz & Potter, 1996; Vainio & Weiderpass, 2006)
- Diet rich in fruits and vegetables associated with lower c-reactive protein (CRP) (i.e., reduced vascular inflammation) (e.g., Gao et al, 2004; Walzl et al, 2005; Esmailzadeh et al, 2006; Cavichia et al, 2009)
 - Reducing inflammation may prevent or treat chronic diseases such as cancer

“Diet is an integral part of cancer prevention and treatment.” (p. 20)



The cover of the National Cancer Institute Strategic Plan report features a photograph of a woman and a young child sitting together and blowing bubbles. The woman is holding a yellow cup and a pink bubble wand, while the child is reaching out towards the bubbles. The background is a bright, sunlit room with a window.

National Cancer Institute

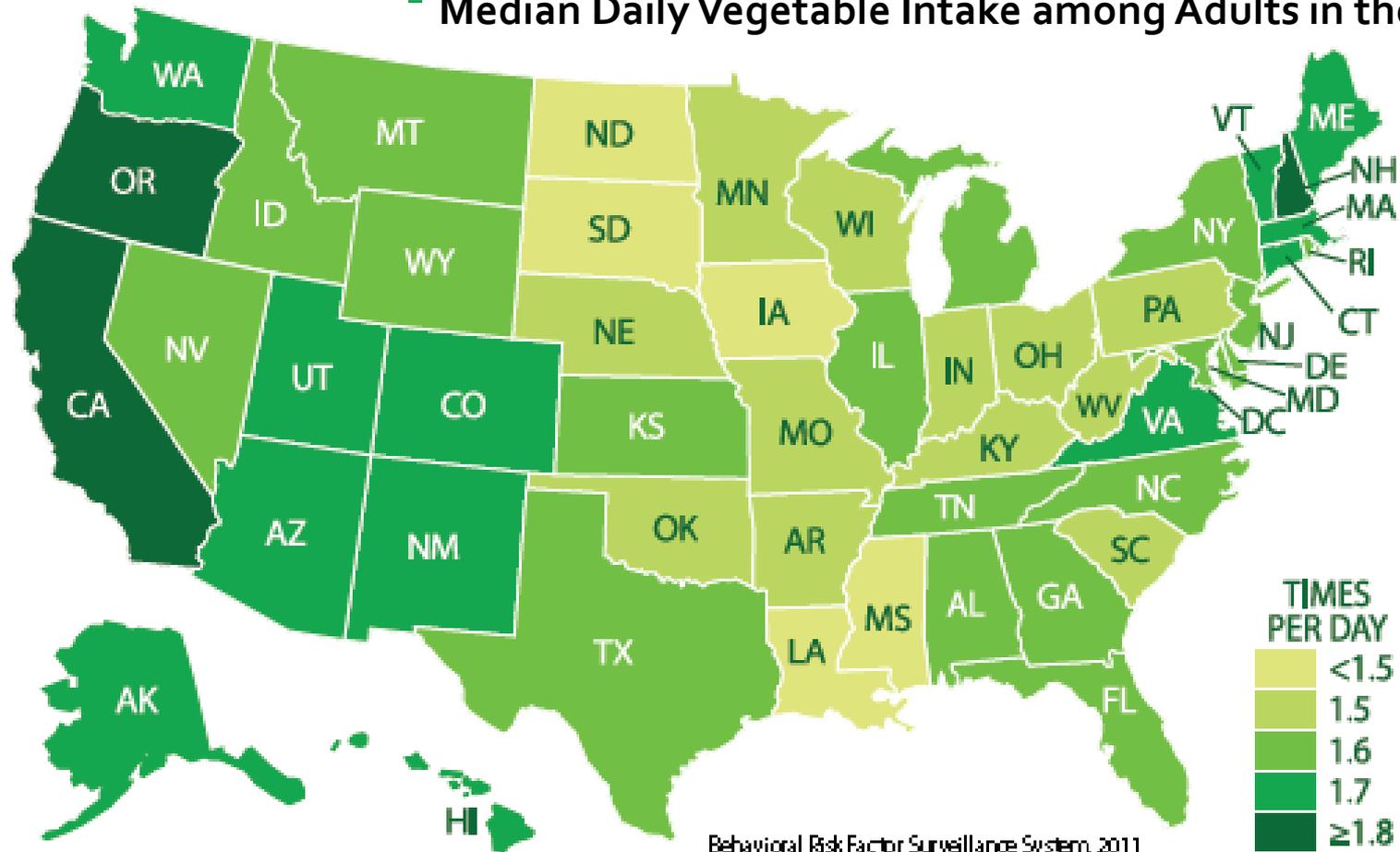
The NCI Strategic
Plan
for Leading the Nation

To Eliminate the Suffering and Death Due to Cancer

U.S. DEPARTMENT
OF HEALTH AND
HUMAN SERVICES
National Institutes
of Health

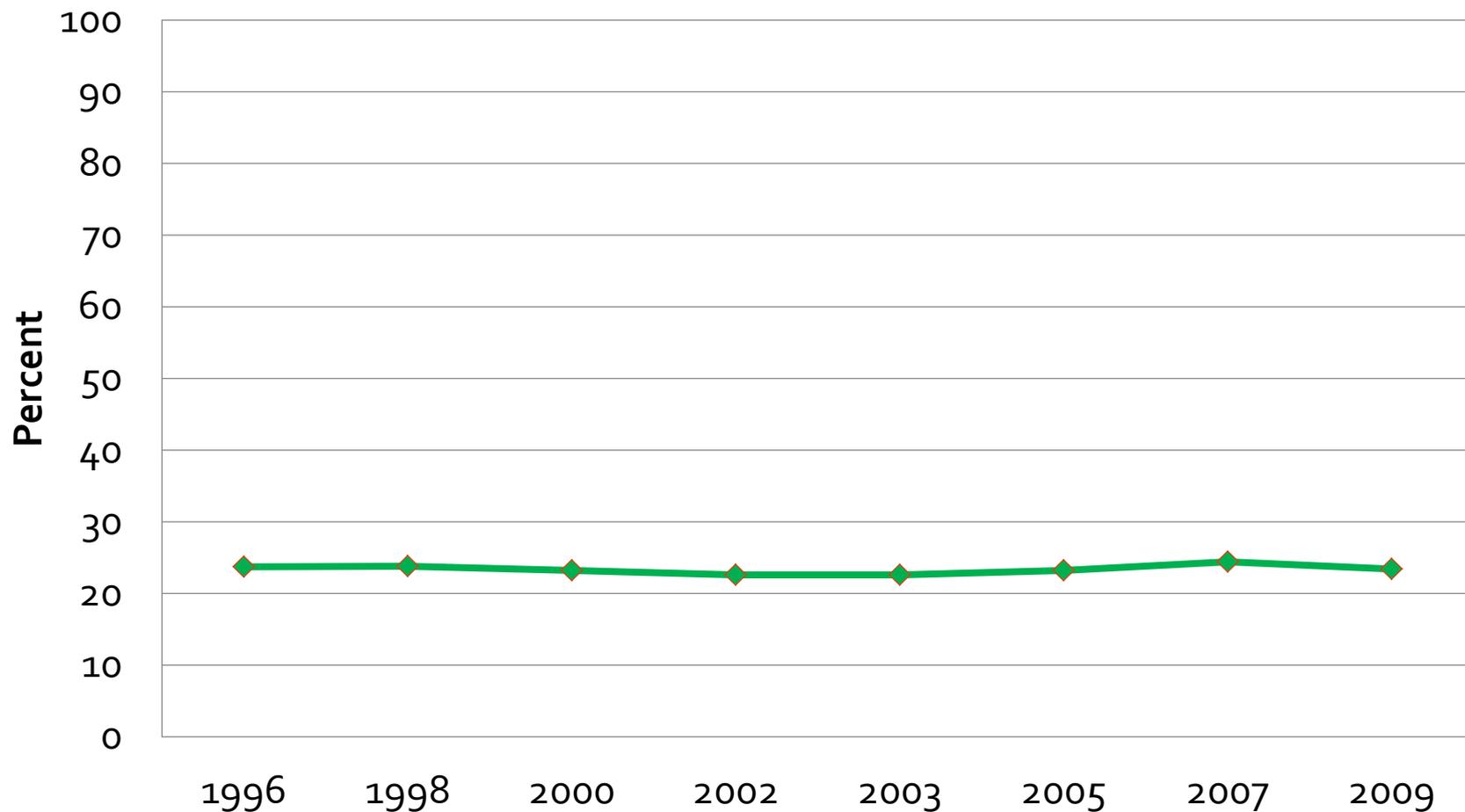
Few Americans Consume Diet Rich in Fruits and Vegetables

✓ Median Daily Vegetable Intake among Adults in the U.S.



South Carolina:
1.0 fruits/day; 1.5 vegetables/day

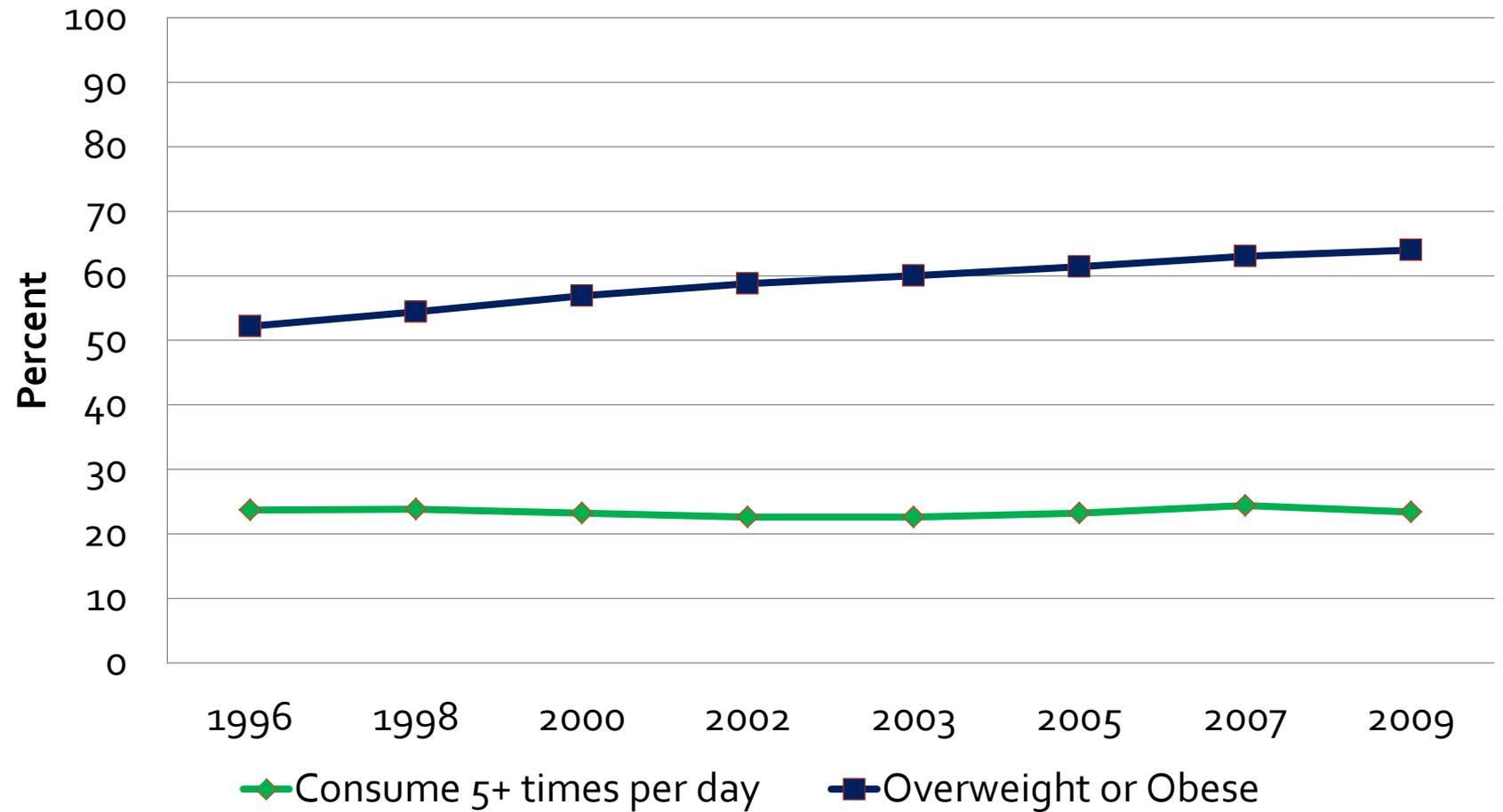
Percentage of U.S. Adults Consuming 5+ Fruits and Vegetables per Day



Source: CDC BRFSS

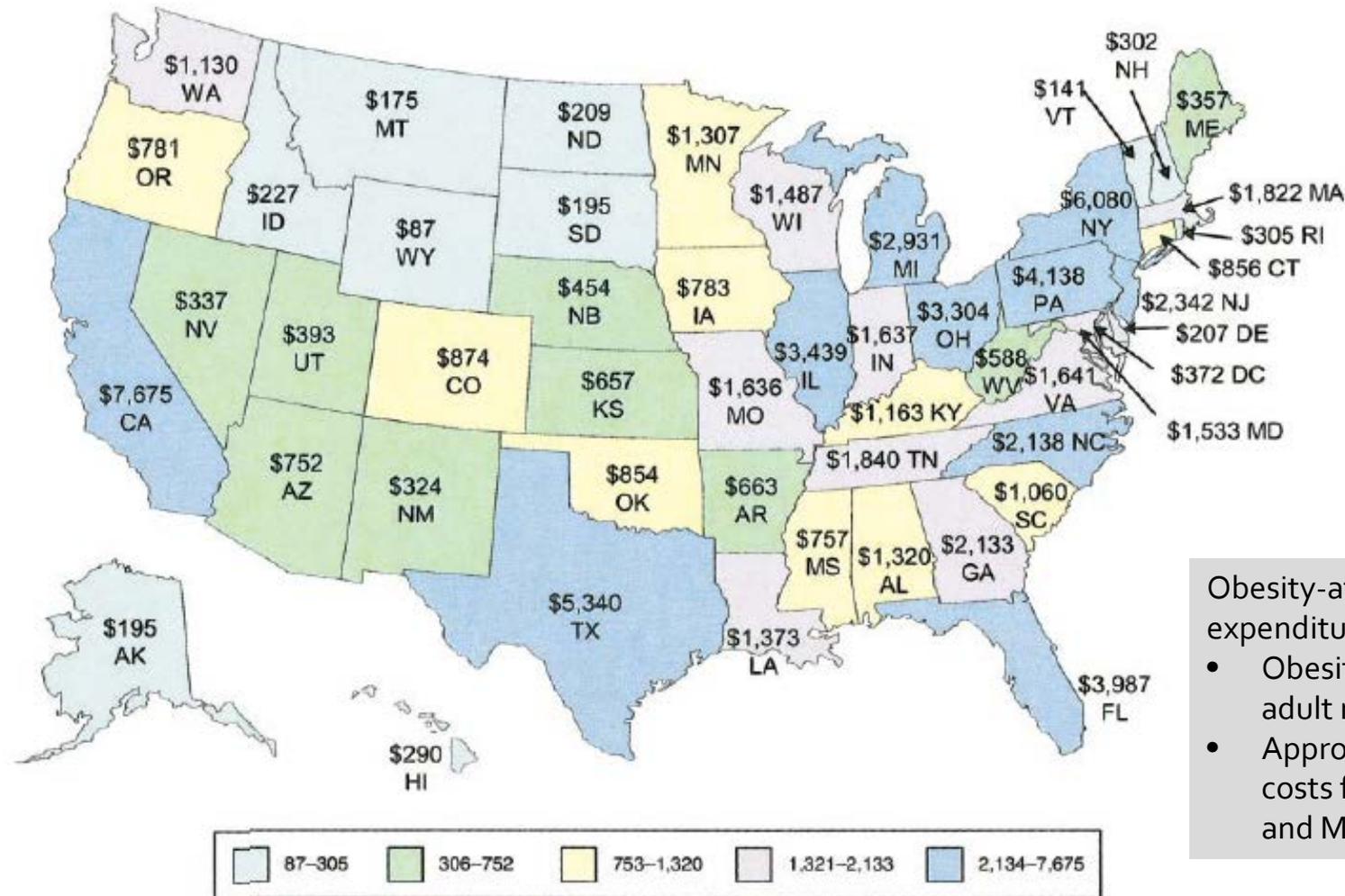


Fruit and Vegetable Intake and Overweight/Obesity Trends Among Adults in U.S.



Source: CDC BRFSS

Obesity is Costly



Obesity-attributed medical expenditures = ~\$75 billion

- Obesity is related to ~6% of adult medical expenditures
- Approximately 50% of these costs financed by Medicare and Medicaid

Figure 1: Estimated adult obesity-attributable medical expenditures (2003 dollars in millions).

Source: Finkelstein et al., 2012

Let thy food (system) be our medicine

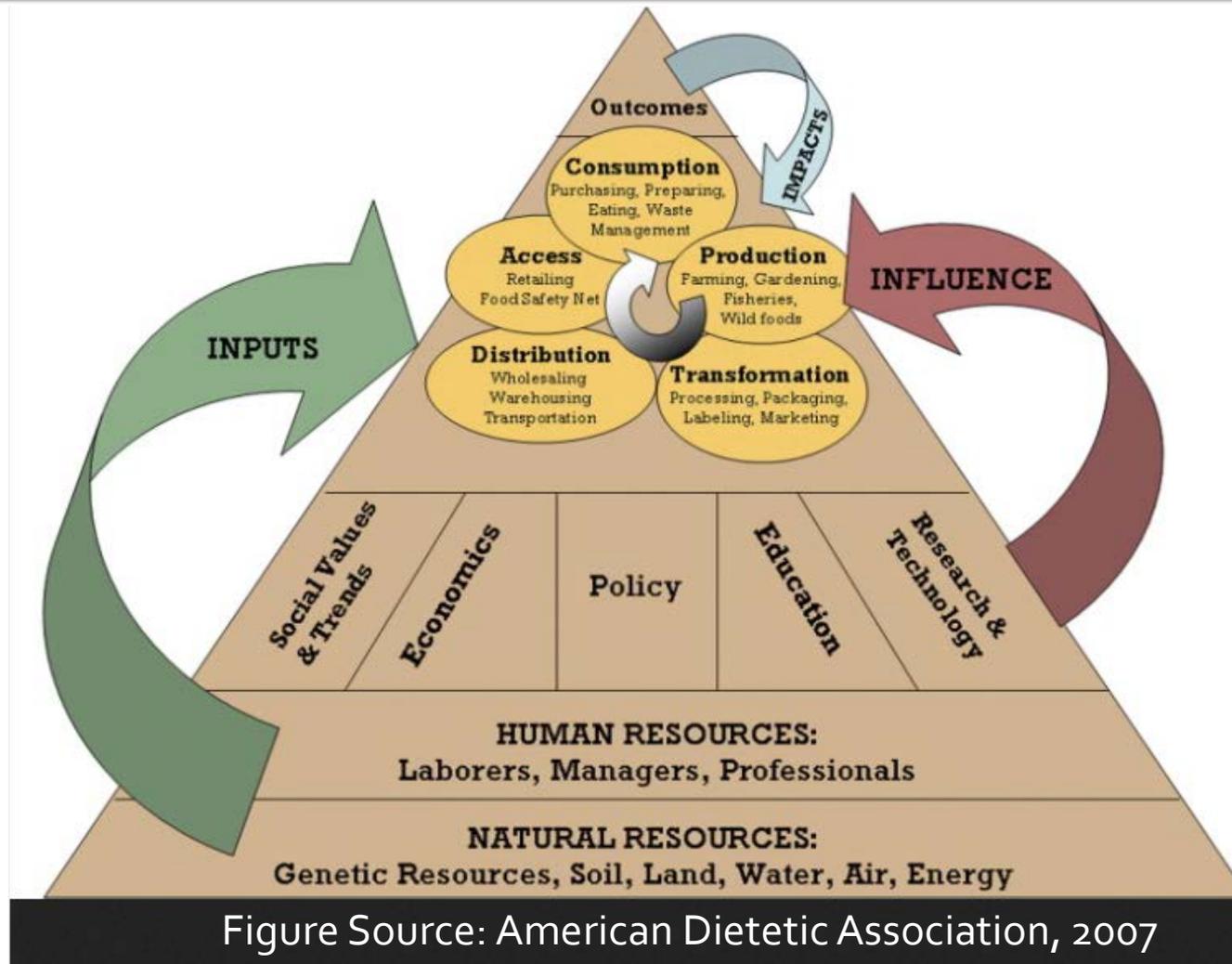
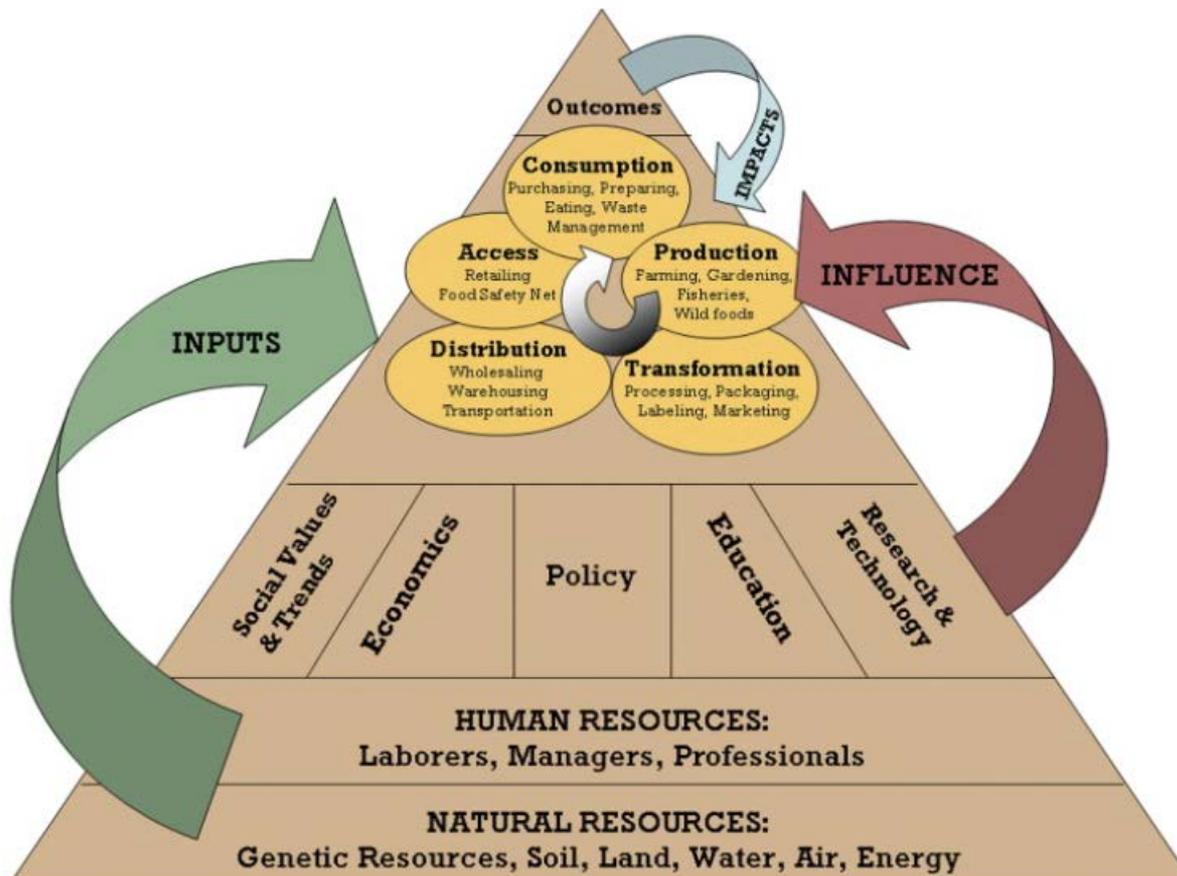


Figure Source: American Dietetic Association, 2007

Let thy food (system) be our medicine



POHNPEI BANANAS (UHT KAN EN POHNPEI): CAROTENOID-RICH VARIETIES



Grow and eat orange- and yellow-fleshed varieties for your health to help protect against diabetes, heart disease, certain cancers, vitamin A deficiency, and anemia.

Padok oh sakan soangen uht kan me cangoahng pwehn sewese omwi roson: soumwahu en suke, soumwahu en mohngohng, cancers, seuitar en vitamin A, oh seuitar en nta.

UHT - 20 micrograms is a single and can sufficient of vitamin A. UHT is a natural source of vitamin A. It can be obtained from vitamin A (UHT) in the body. UHT is a natural source of vitamin A. It can be obtained from vitamin A (UHT) in the body.



Figure Source: American Dietetic Association, 2007

Let thy food (system) be our medicine

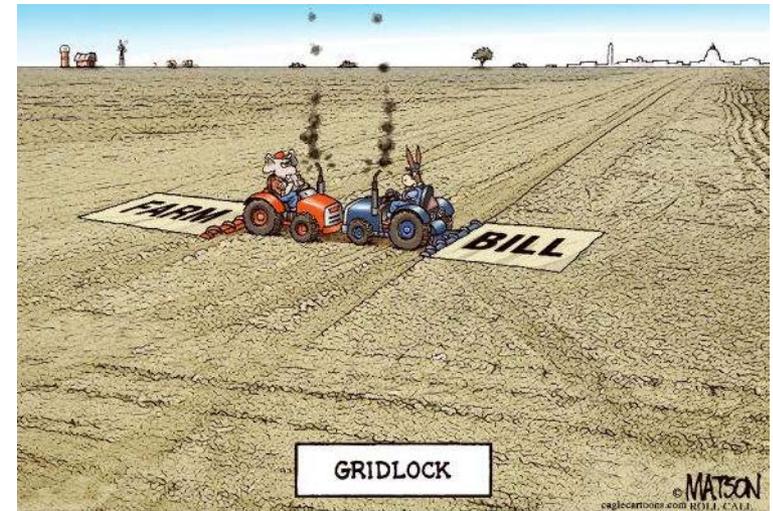
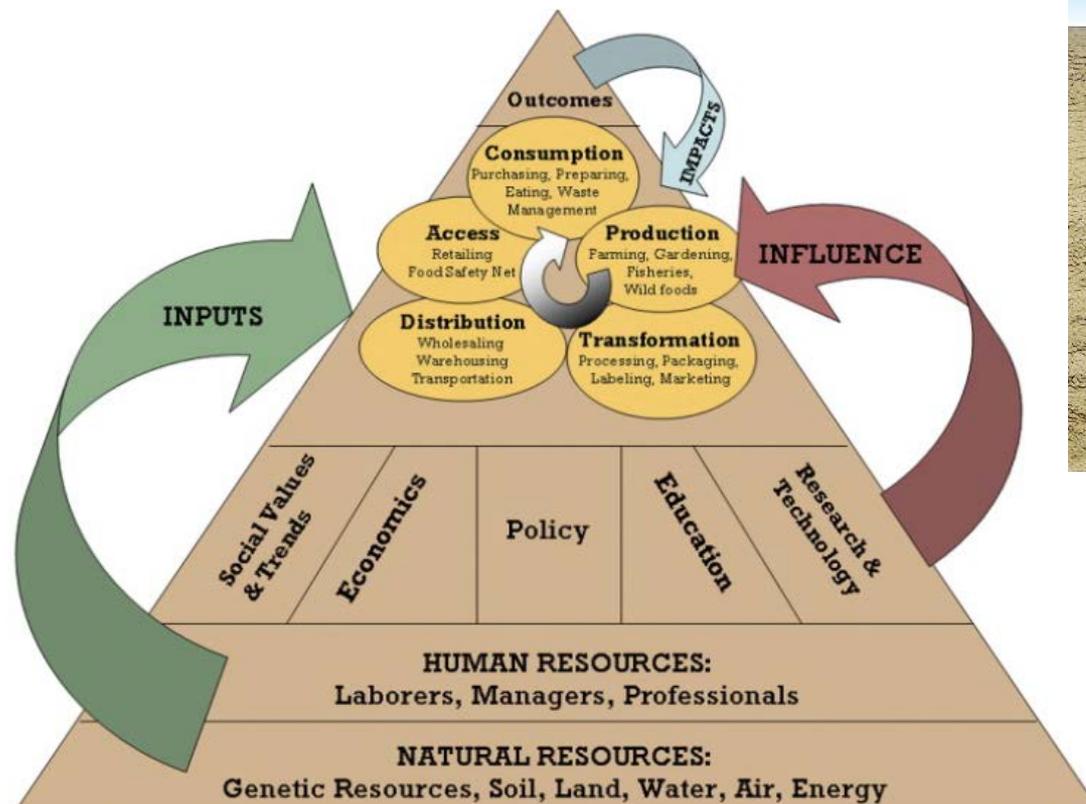


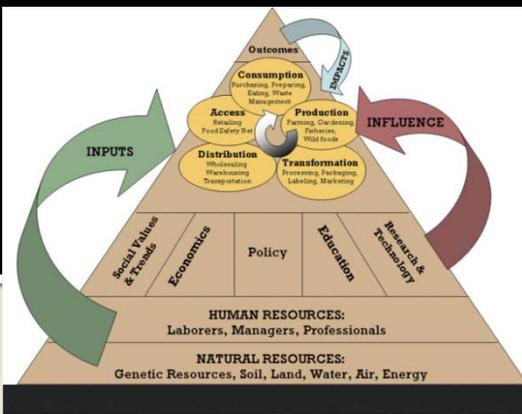
Figure Source: American Dietetic Association, 2007

Public Health Goal to Bridge the Gap Between Fruit and Vegetable Consumption Recommendations and Intake

Increase the Availability of Affordable Healthier Food Retail in Communities

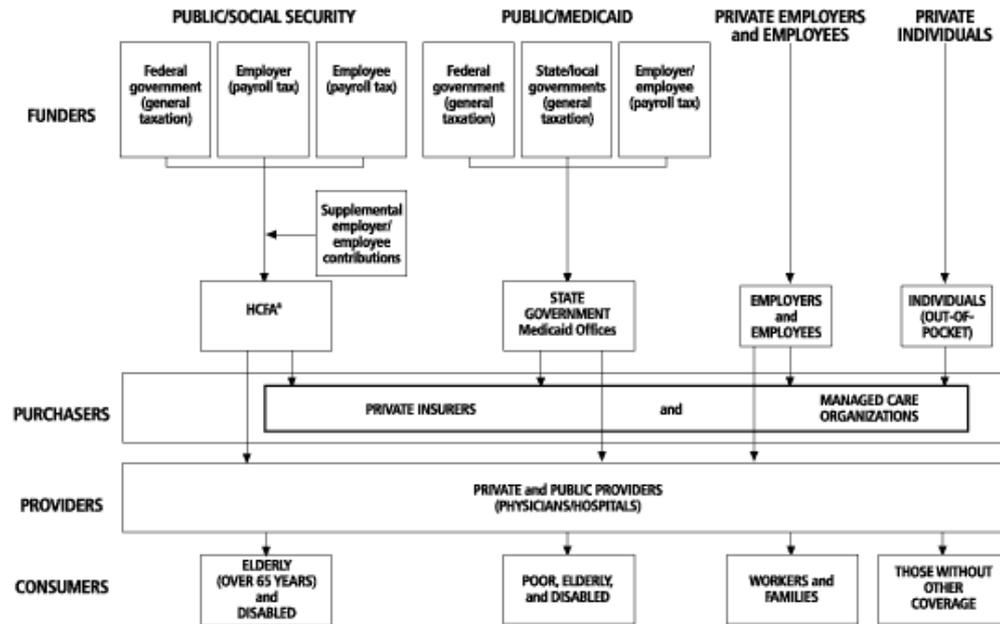
Supported by CDC (2009); Institute of Medicine (2009, 2011); Prevention Institute (2008)

State	Median Fruit and Vegetable Servings/Day among Adults	State-level healthier food policy council	% Census tracts with 1+ healthier food retailer within ½ mile of tract	# farmers' markets/ 100,000 residents	% of Farmers' Markets Accepting SNAP
U.S. National	2.7	10	64.8	2.5	21.0
South Carolina	2.5	No	66.4	2.7	13.6



How can we integrate a **food systems** framework into a **health care delivery** system framework to reduce cancer trends and disparities?

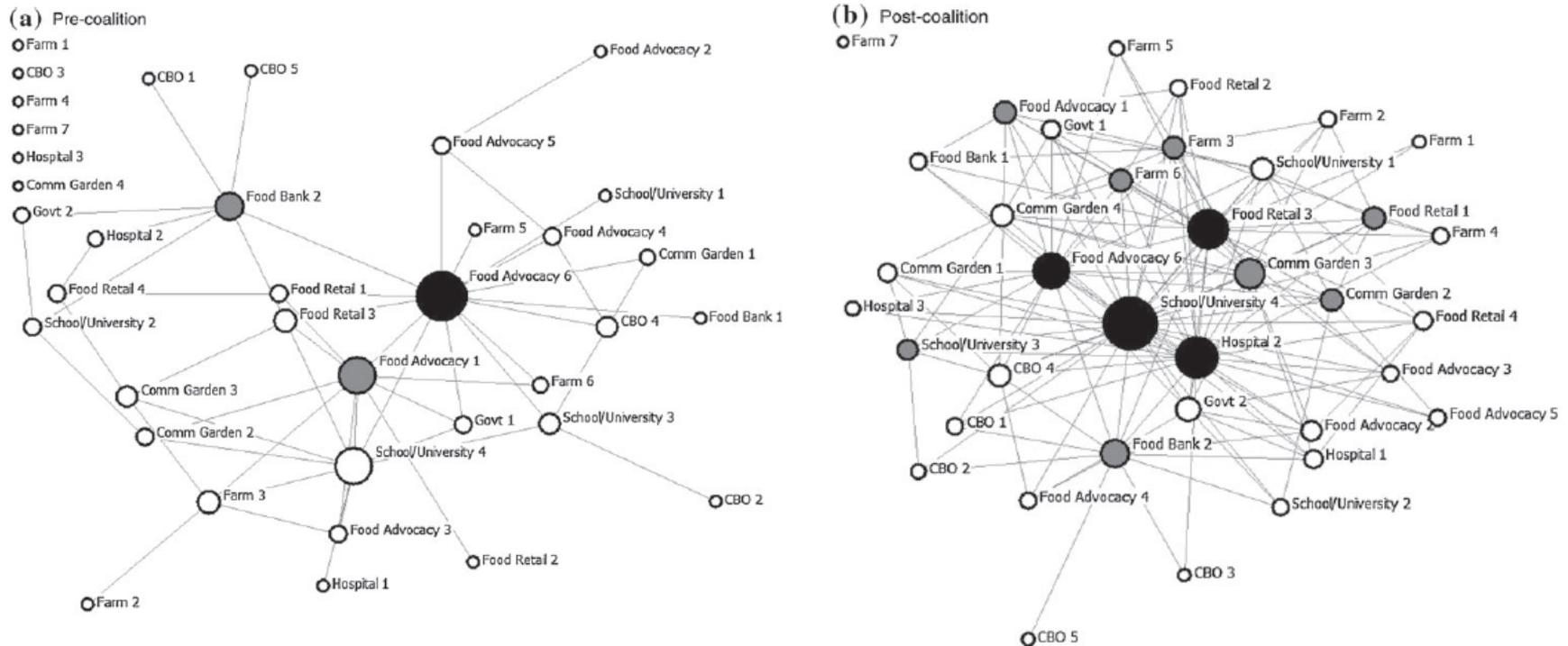
Fig. 2. Flowchart illustrating organization of the US health care system



* Health Care Financing Administration, an arm of the federal government.

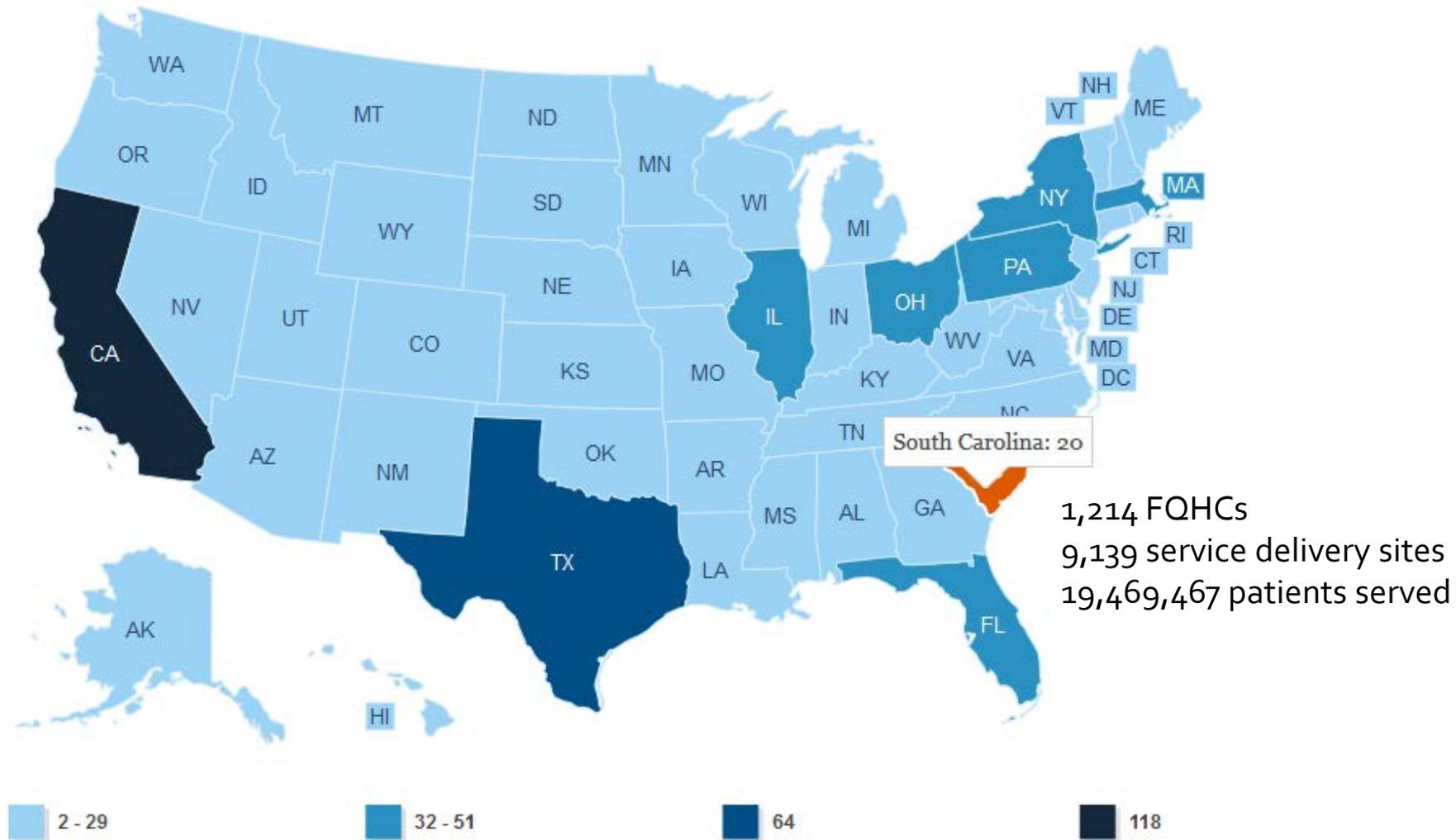
Source: Sekhri N, *Cross border health insurance*, California Health Care Foundation and Healthcare Redesign International, 1999.

Changes in Information Seeking Among Food Systems Stakeholders Before and 1 Year After the Formation of a Food Security Coalition



Organizational degree centrality : Pre-coalition 35% v. 1 Year Post-coalition 70%

Federally Qualified Health Centers in the United States (2010)



Why Federally Qualified Health Centers?

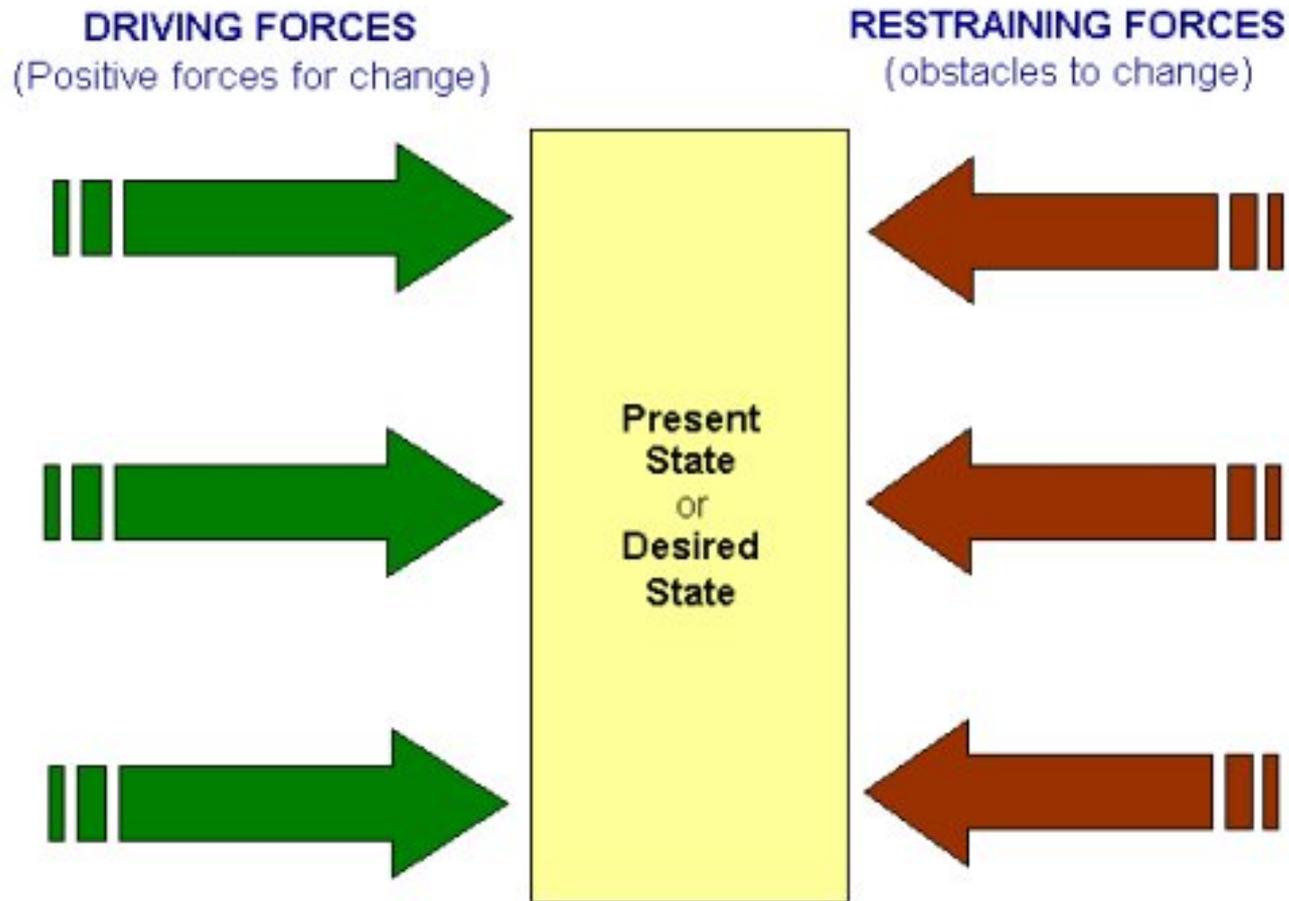
- Common system of health care delivery
- Extensive network across the country
- Focus on preventive health care
- Dual goals of health promotion and community economic development
- Serve populations disparately affected by health impairments
- Located in areas that may be more likely to have limited access to healthy food retailers (i.e., food deserts)



“...there are times when human communities face the need to adapt, and to do so quickly. But adaptation does not occur automatically just because it is needed.” (p. 5)

Source: Thomas J. Rochon, 1998

Force Field Analysis (Lewin, 1951): Shifting the Status Quo



Source: Lewin, K. (1976). *Field theory in social science: Selected theoretical papers*. Chicago: University of Chicago Press.

C U R R E N T S Y S T E M	Driving Forces					E Q U I L I B R I U M	Restraining Forces					D E S I R E D C H A N G E
	Commitment by management						Aversion by staff to learning a new system					
	Adequate financial resources						Lack of prior computer experience					
	Educational/training needs provided for						Negative past experience with change					
	High level of autonomy in organizational culture						Low level of commitment by staff					
1 2 3 4 5					5 4 3 2 1							

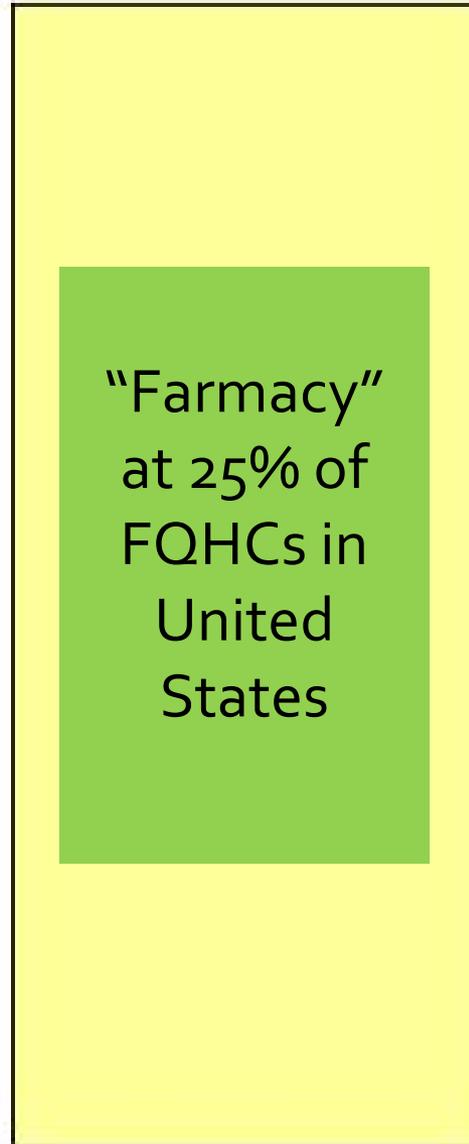
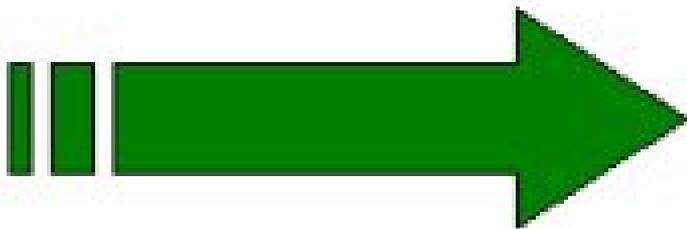
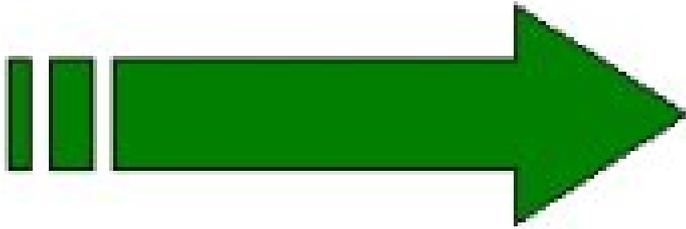
Source: Bozak, M.G. (2003). Using Lewin's force field analysis in implementing a nursing information system. *Computers, Informatics, Nursing*, 21(2); 80-85.

Force Field Analysis Process

- Describe current situation
- Describe desired situation
- Identify what happens if no action taken
- **IDENTIFY FORCES THAT FACILITATE OR CONSTRAIN CHANGE**
 - Are they valid? Can they be changed? Which are most critical?
- Valuate forces (strong to weak)

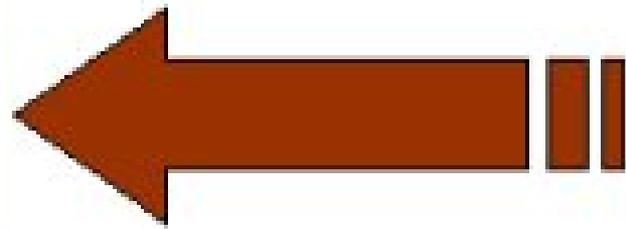
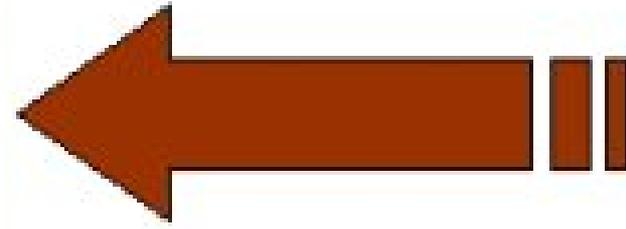
DRIVING FORCES

(Positive forces for change)



RESTRAINING FORCES

(obstacles to change)



Research Opportunities

- What evidence is needed?
 - Health outcomes
 - Economic outcomes
 - Community outcomes
- What methods, designs, and measures best capture these outcomes?

Case Example: Right Choice Fresh Start Farmers' Market

First federally qualified health center-based farmers' market in SC



Example: Health Outcome



- Design: Longitudinal; no comparison group
- Sample: 45 diabetic patients at FQHC
- Intervention: FQHC-based farmers' market + financial incentive (up to \$50)
- Outcome measure: F/V consumption measured with NCI screener; patient-provider communication
- Results:
 - Dose-response relationship between improvement in F/V consumption and use of market
 - Improvers more likely to rely on financial incentive to purchase foods at market
 - Provider role modeling at farmers' market critical to patient motivation for shopping

Example: Economic Outcome



- Design: Time series
- Intervention: FQHC-based farmers' market + Shop N Save (SNS) Food Assistance Monetary Incentive
- Sample: 20 markets pre-SNS, 20 markets post-SNS
- Outcome measure: Food assistance revenue recorded on sales receipts
- Results:
 - 336 people self-enrolled in SNS
 - Overall farmers' market revenue increased from after SNS (\$14,285.60 to \$15,719.73, $p < .01$)
 - All forms of food assistance more than doubled
 - Four times more SNAP post-SNS
 - 3.5 times more Senior Farmers' Market Nutrition Program Vouchers

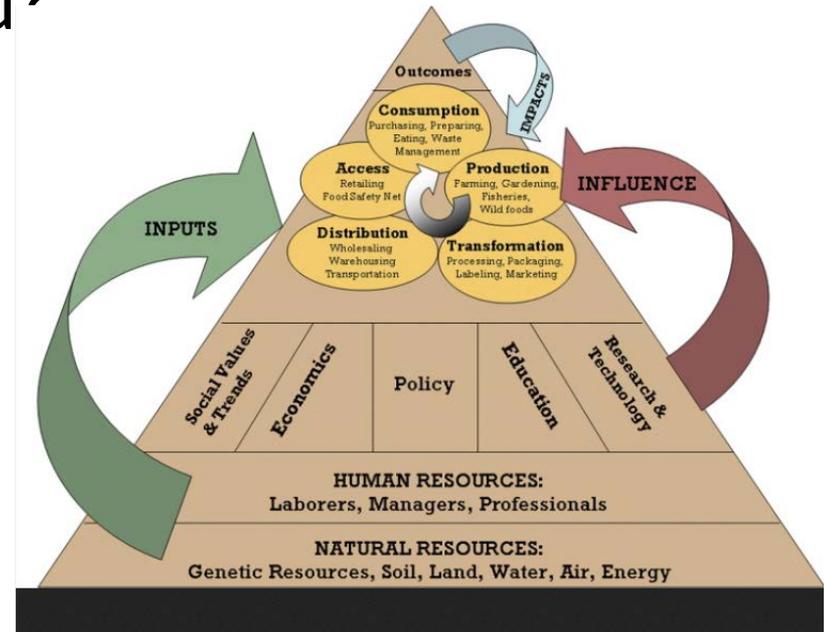
Example: Community Outcome



- Design: Ethnographic observations
- Sample: 61 observations collected over 18 weeks
- Intervention: FQHC-based farmers' market
- Outcome measure: social interactions between farmers, consumers, and health care providers
- Results:
 - Importance of human and non-human actors (e.g., boiled peanuts)
 - Interactions may mediate relationship between farmers' market intervention and behavioral and health outcomes
 - Deal-making reduced price of produce, extended buying power
 - Camaraderie provided incentive to return to market each week
 - Recipe exchange gave informal opportunity to enhance food preparation techniques

Research Opportunities

- What evidence is needed?
 - Health outcomes
 - Economic outcomes
 - Community outcomes



- What methods, designs, and measures best capture these outcomes?

Question?



The image shows two woven wooden baskets filled with fresh green beans. The beans are a mix of solid green and variegated green and purple. The baskets are placed on a grassy surface. A dark grey rectangular box with the text 'Thank you!' is centered over the middle of the image. The left basket has a small black number '3' on its wooden band.

Thank you!

Public Health Goal to Bridge the Gap Between Fruit and Vegetable Consumption Recommendations and Intake

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U.S. National	2.7	64.8	10	2.5	21.0
South Carolina	2.5	66.4	No	2.7	13.6
Oregon	3.0	77.1	No	4.2	45.4
California	3.1	82.4	Yes	2.2	27.4
New Hampshire	3.1	54.5	No	7.3	16.7