

How Does MyPyramid Compare to Other Population-Based Recommendations for Controlling Chronic Disease? March 23, 2010

Presenters:

Susan M. Krebs-Smith, PhD, Chief of the Risk Factor Monitoring and Methods Branch of the Applied Research Program at the National Cancer Institute at the U.S. National Institutes of Health.

Penny Kris-Etherton, PhD, RD, Distinguished Professor of Nutrition at Pennsylvania State University

Moderator:

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ConAgra Foods Science Institute

- ▶ With a mission of:

Promoting Choices affecting
Wellness by linking
evidence-based Understanding
with Practice



Science
Institute

Today's Faculty

- ▶ James M. Rippe, MD – Leading cardiologist and Founder and Director of the Rippe Lifestyle Institute
- ▶ Susan M. Krebs-Smith, PhD - Chief of the Risk Factor Monitoring and Methods Branch of the Applied Research Program at the National Cancer Institute at the U.S. National Institutes of Health
- ▶ Penny Kris-Etherton, PhD, RD - Distinguished Professor of Nutrition at Pennsylvania State University

Learning Objectives

- ▶ Describe how MyPyramid recommendations for a healthful diet are consistent with the most recent diet-related recommendations from authoritative organizations to prevent/control chronic diseases or disorders such as CVD, diabetes, hypertension, obesity, cancer, and osteoporosis.
- ▶ Explain the potential benefits to patients, clients, and general population of following food-based recommendations vs. nutrient-based recommendations.
- ▶ Identify issues and potential solutions related to the realistic ability of patients, clients, general population to meet such dietary recommendations and guidelines.

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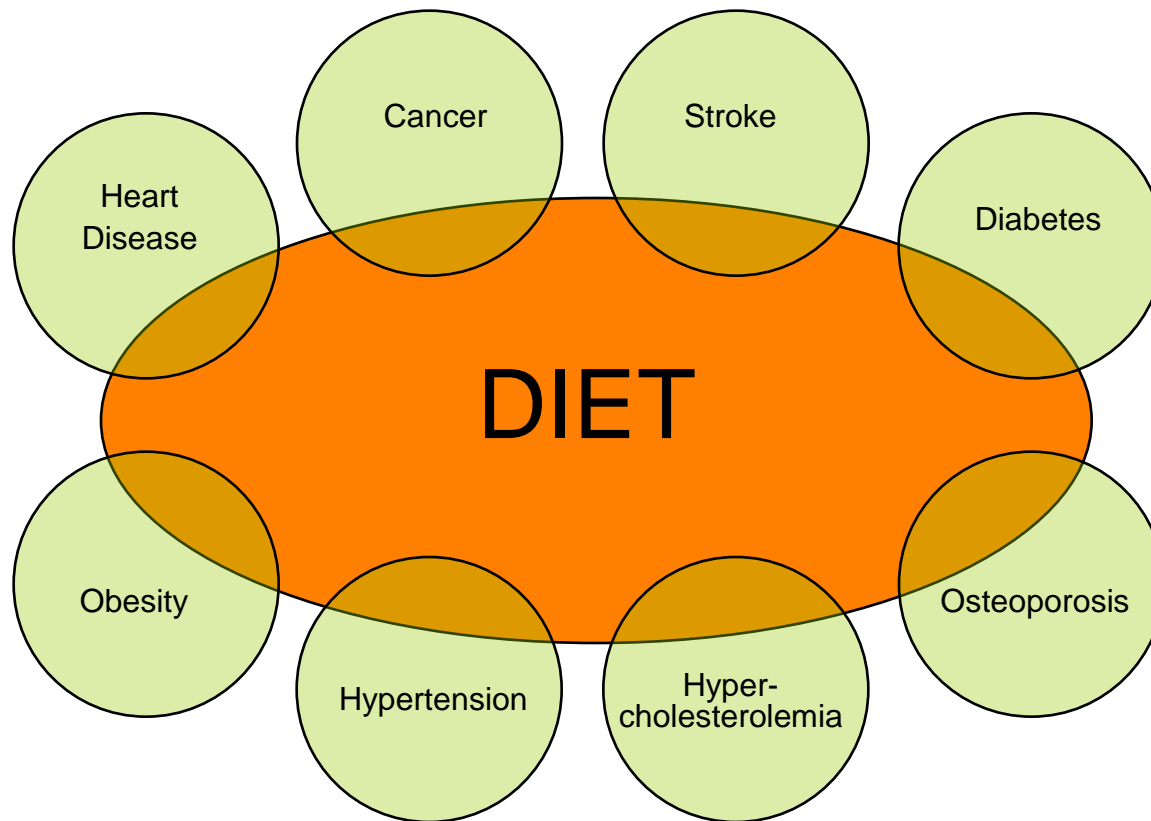
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Many Health Problems Are Related to Diet



The Burden of Poor Diets and Inactivity

- ▶ Mortality
- ▶ Economic costs
- ▶ Human toll





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Caveats in MyPyramid

- ▶ “The recommendations in ... MyPyramid are for the general public ...”
 - ▶ “Individuals with a chronic health condition should consult with a health care provider to determine what dietary pattern is appropriate for them.”
-





Audience for MyPyramid

- ▶ MyPyramid was designed for the healthy general population
- ▶ Question:
Is MyPyramid *inappropriate* for people with chronic diet-related conditions?





Purpose of This Presentation

- ▶ To examine consistency between MyPyramid recommendations and those aimed at diet-related conditions
- ▶ To determine importance of assumptions underlying MyPyramid





Overview

- ▶ Background
- ▶ Comparison between MyPyramid and current recommendations by authoritative groups
- ▶ Key assumptions
- ▶ Implications for research and practice





Principles Underlying MyPyramid

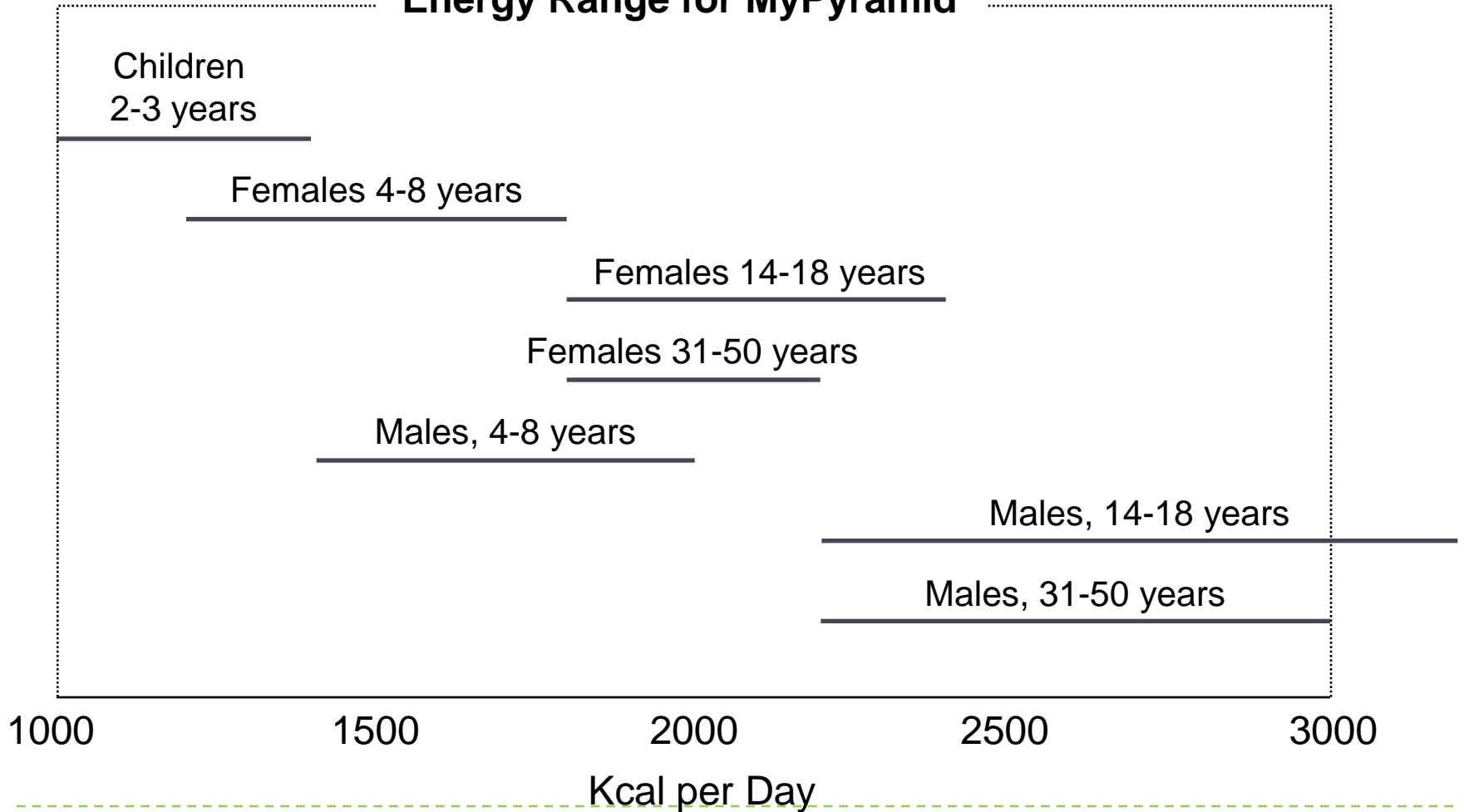
- ▶ Cover a range of energy needs
- ▶ Feature commonly eaten foods
- ▶ Meet nutrient needs
- ▶ Control overconsumption
- ▶ Form a total, rather than foundational, diet



Covering a Range of Energy Needs



Energy Range for MyPyramid



Kcal per Day



Featuring Commonly Eaten Foods



- ▶ All foods “fit”
- ▶ To test adequacy, food groups represented as composites of most frequently consumed choices





Meeting Nutrient Needs

- ▶ Various food group combinations tried until nutritional fit was optimized

- ▶ Subgroup distinctions
 - ▶ Whole grains
 - ▶ Dark green vegetables
 - ▶ Legumes





Controlling Over-Consumption

- ▶ Total diet: essential concept
- ▶ Food groups represented as composites of most frequently consumed choices *in their leanest form*
- ▶ Specific amounts of discretionary calories at each energy level



Providing a Total, Rather Than Foundation, Diet



Daily Amount of Food From Each Group (vegetable subgroup amounts are per week)												
Calorie Level	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group ¹	Food group amounts shown in cup (c) or ounce-equivalents (oz-eq), with number of servings (srv) in parentheses when it differs from the other units. See note for quantity equivalents for foods in each group. ² Oils are shown in grams (g).											
Fruits	1 c (2 srv)	1 c (2 srv)	1.5 c (3 srv)	1.5 c (3 srv)	1.5 c (3 srv)	2 c (4 srv)	2 c (4 srv)	2 c (4 srv)	2 c (4 srv)	2.5 c (5 srv)	2.5 c (5 srv)	2.5 c (5 srv)
Vegetables ³	1 c (2 srv)	1.5 c (3 srv)	1.5 c (3 srv)	2 c (4 srv)	2.5 c (5 srv)	2.5 c (5 srv)	3 c (6 srv)	3 c (6 srv)	3.5 c (7 srv)	3.5 c (7 srv)	4 c (8 srv)	4 c (8 srv)
Dark green veg.	1 c/wk	1.5 c/wk	1.5 c/wk	2 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk
Orange veg.	.5 c/wk	1 c/wk	1 c/wk	1.5 c/wk	2 c/wk	2 c/wk	2 c/wk	2 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk
Legumes	.5 c/wk	1 c/wk	1 c/wk	2.5 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3.5 c/wk	3.5 c/wk	3.5 c/wk	3.5 c/wk
Starchy veg.	1.5 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk	3 c/wk	3 c/wk	6 c/wk	6 c/wk	7 c/wk	7 c/wk	9 c/wk	9 c/wk
Other veg.	4 c/wk	4.5 c/wk	4.5 c/wk	5.5 c/wk	6.5 c/wk	6.5 c/wk	7 c/wk	7 c/wk	8.5 c/wk	8.5 c/wk	10 c/wk	10 c/wk
Grains ⁴	3 oz-eq	4 oz-eq	5 oz-eq	5 oz-eq	6 oz-eq	6 oz-eq	7 oz-eq	8 oz-eq	9 oz-eq	10 oz-eq	10 oz-eq	10 oz-eq
Whole grains	1.5	2	2.5	3	3	3	3.5	4	4.5	5	5	5
Other grains	1.5	2	2.5	2	3	3	3.5	4	4.5	5	5	5
Lean meat and beans	2 oz-eq	3 oz-eq	4 oz-eq	5 oz-eq	5 oz-eq	5.5 oz-eq	6 oz-eq	6.5 oz-eq	6.5 oz-eq	7 oz-eq	7 oz-eq	7 oz-eq
Milk	2 c	2 c	2 c	3 c	3 c	3 c	3 c	3 c	3 c	3 c	3 c	3 c
Oils ⁵	15 g	17 g	17 g	22 g	24 g	27 g	29 g	31 g	34 g	36 g	44 g	51 g
Discretionary calorie allowance ⁶	165	171	171	132	195	267	290	362	410	426	512	648





MyPyramid 2000 kcal Pattern

- ▶ 6 oz grains, including \geq 3 oz whole grains
- ▶ 2 c fruits
- ▶ 2.5 c vegetables*
- ▶ 5.5 oz lean meat equivalents
- ▶ 3 cup equivalents of fat-free milk
- ▶ 27 g (6 tsp) oils
- ▶ 290 discretionary kcal

* including 3 c/wk dark green, 2 c/wk orange, and 3 c/wk legumes



MyPyramid Recommends Foods, not Nutrients



- ▶ However, nutrient intakes associated with following the guide have been estimated
 - ▶ Assuming “typical consumption” within each group and foods being eaten in their most nutrient-dense form



Process To Develop MyPyramid Food Patterns and Estimated Nutrient Intakes



- ▶ Set energy levels
 - ▶ Based on estimated energy requirements (EER) formulas
- ▶ Set nutrient goals
 - ▶ Based on dietary reference intake (DRI) standards
- ▶ Establish food groupings
 - ▶ Based on nutrient content, use in meals, and familiarity
- ▶ Calculate nutrient profiles
 - ▶ Based on a consumption-weighted average nutrient content for foods in each group
- ▶ Determine food intake patterns
 - ▶ Iterative process to identify food group amounts that meet nutrient goals within energy level

Britten P, et al. *J Nutr Educ Behav.* 2006;38:S78-S92.



Calculate Nutrient Profiles



Determine amount of a nutrient each food group provides

For example:

What is the vitamin A content of a typical dark green vegetable?



Cooked Spinach
943 μg per cup



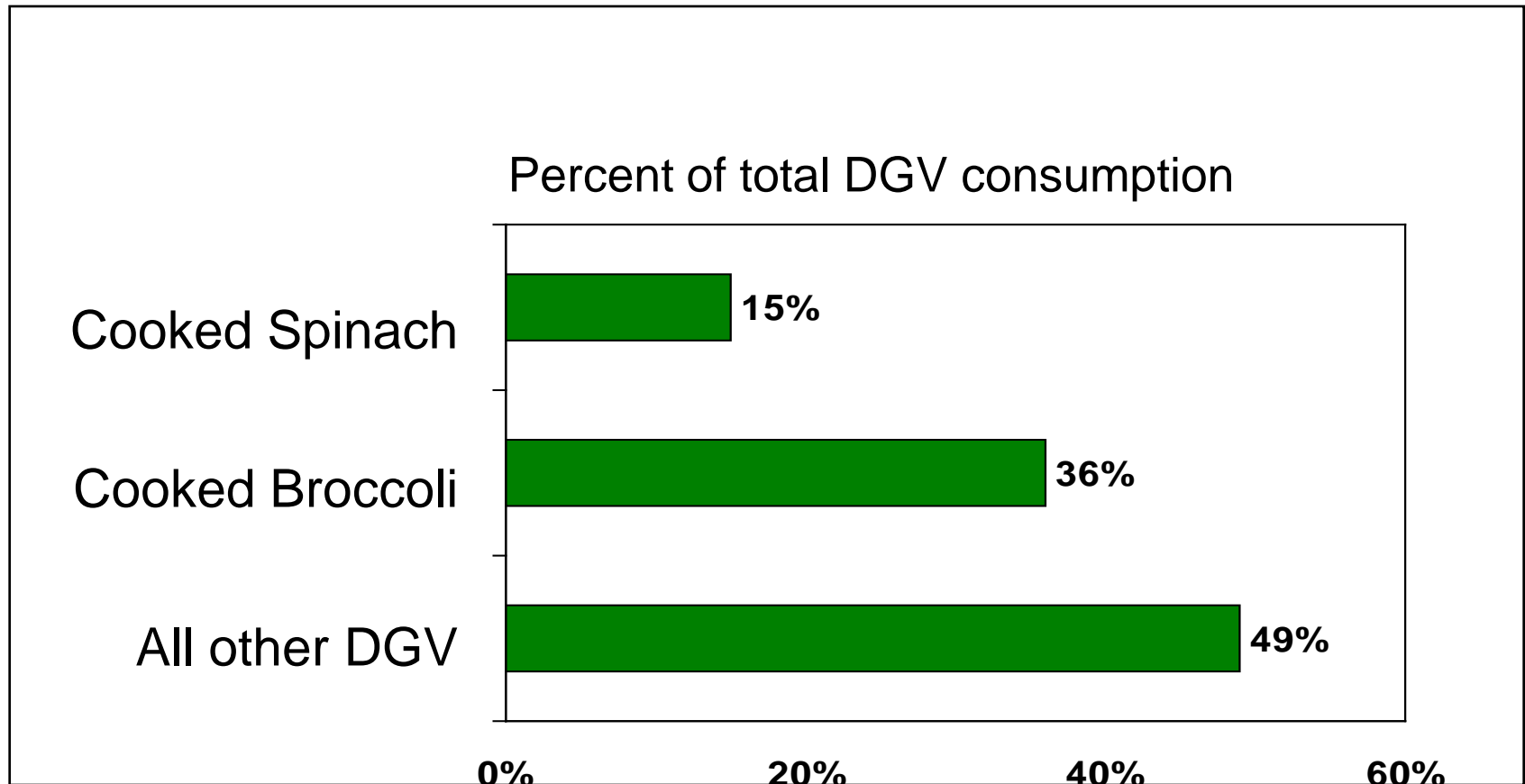
Cooked Broccoli
153 μg per cup



Calculate Nutrient Profiles



How much of each dark green vegetable (DGV) is consumed?



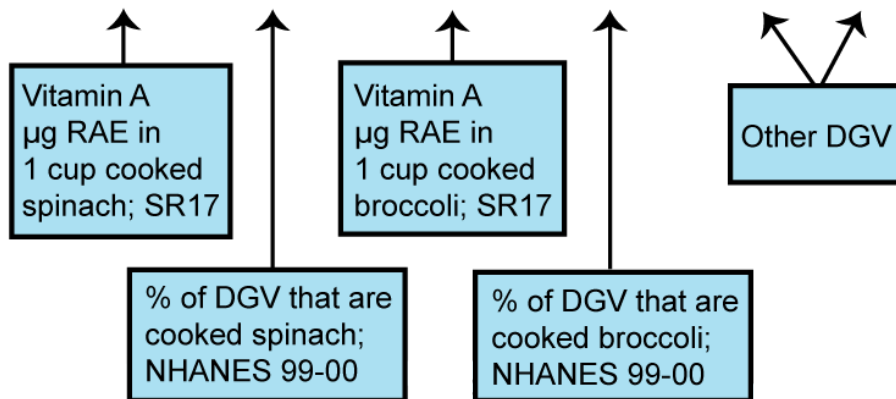
Calculate Nutrient Profiles

General formula:

$$\text{Sum} \left[\begin{array}{l} \text{Nutrient contribution} \\ \text{of each food} \end{array} \times \begin{array}{l} \text{Likelihood of each} \\ \text{food being eaten} \end{array} \right]_n = \text{Nutrient profile of food group}$$

Example: Calculating the expected amount of Vitamin A in dark-green vegetables (DGV)

$$\Sigma [(943 \times 0.15) + (153 \times 0.36) + \dots + \dots, \text{etc.}] = 334 \mu\text{g RAE Vitamin A/cup}$$



Marcoe K, et al. *J Nutr Educ Behav.* 2006;38:S93-S107.

Comparison Between MyPyramid and Other Recommendations



- ▶ Clinical Guidelines on Overweight and Obesity in Adults
 - ▶ American Diabetes Association
 - ▶ National Cholesterol Education Program
 - ▶ American Heart Association
 - ▶ National Committee on High Blood Pressure
 - ▶ American Institute for Cancer Research
 - ▶ Dietary Approaches to Stop Hypertension Eating Plan
 - ▶ American Cancer Society
-



Comparison of MyPyramid Nutrient Levels With...



Clinical Guidelines on Overweight and Obesity in Adults

Nutrients	MyPyramid	CGOOA
Total Fat	29% of Energy	≤ 30% of Energy
Saturated Fat	7.8% of Energy	8-10% of Energy
Monosaturated Fat	10.7% of Energy	≤ 15% of Energy
Polyunsaturated Fat	8.9% of Energy	≤ 10% of Energy
Cholesterol	230 mg/d	< 300 mg/d
Carbohydrate	55% of Energy	≥ 55% of Energy
Fiber	31 g/d	20-30 g
Sodium	1,779 mg/d	≤ 2,400 mg/d
Energy	1,987 kcal/d	500-1,000 kcal/d below usual intake





Comparison of MyPyramid Nutrient Levels With...

American Diabetes Association

Nutrients	MyPyramid	ADA
Saturated Fat	7.8% of Energy	< 7% of energy Minimize trans fat intake
Polyunsaturated Fat	8.9% of Energy	2 or more servings of fish per week (with the exception of commercially fried fish fillets)
Cholesterol	230 mg/d	< 200 mg/d
Carbohydrate	55% of Energy	A dietary pattern that includes carbohydrate from fruits, vegetables, whole grains, legumes, and low-fat milk is encouraged for good health. Consume a variety of fiber-containing foods
Sodium	1,799 mg/d	≤ 2,300 mg/d





Comparison of MyPyramid Nutrient Levels With...

National Cholesterol Education Program

Nutrients	MyPyramid	NCEP
Total Fat	29% of Energy	25-35% of Energy
Saturated Fat	7.8% of Energy	< 7% of Energy
Monosaturated Fat	10.7% of Energy	≤ 20% of Energy
Polyunsaturated Fat	8.9% of Energy	≤ 10% of Energy
Cholesterol	230 mg/d	< 200 mg/d
Carbohydrate	55% of Energy	50-60% of Energy
Fiber	31 g/d	20-30 g/d
Energy	1,987 kcal/d	Balance energy intake and expenditure to maintain weight



Comparison of MyPyramid Nutrient Levels With...



American Heart Association

Nutrients	MyPyramid	AHA, 2006
Saturated Fat	7.8% of Energy	< 7% of Energy <1% of Energy from trans fat
Cholesterol	230 mg/d	< 300 mg/d
Fiber	31 g/d	Consume whole grain, high fiber foods
Sodium	1,770 mg/d	< 2,300 mg/d*
Energy	1,987 kcal/d	Balance calorie intake and physical activity to achieve or maintain a health body weight

* < 1,500 for African Americans, middle-aged and older adults, and people with high blood pressure



American Heart Association 2020 Goals (Dietary)



Primary

Fruits & Vegetables: ≥ 4.5 cups/day

Fish: \geq two 3.5 oz. servings/week (preferably oily fish)

Fiber-rich whole grains (≥ 1.1 g of fiber/10 g of CHO:
 \geq three 1 oz. equivalent servings per day)

Sodium: < 1500 mg/day

Sugar-sweetened beverages: ≤ 450 kcal (36 oz.)/week

Secondary

Nuts, legumes, & seeds: ≥ 4 servings/week

Processed meats: none or ≤ 2 servings/week

Saturated fat: $< 7\%$ of total energy intake

Comparison of MyPyramid Nutrient Levels With...

National Committee on High Blood Pressure



Nutrients	MyPyramid	NCHBP
Total Fat	29% of Energy	Follow Dietary Approaches to Stop Hypertension Eating Plan
Saturated Fat	7.8% of Energy	
Sodium	1,770 mg/d	≤ 2400 mg/d



Comparison of MyPyramid Nutrient Levels With...



American Institute for Cancer Research

Nutrients	MyPyramid	AICR
Total Fat	29% of Energy	Select foods low in fat
Saturated Fat	7.8% of Energy	
Cholesterol	230 mg/d	Choose diet rich in plant-based foods and eat plenty of fruits and vegetables
Sodium	1,770 mg/d	Limit consumption of salty foods and foods processed with salt (sodium).



Comparison of MyPyramid Food Intake Recommendations With...



Dietary Approaches to Stop Hypertension Eating Plan

Nutrients	MyPyramid	DASH
Grains	6 oz	6-8 servings
Whole Grains	3 oz	Whole grains recommended for most grain servings
Fruits	2 cups	4-5 servings
Vegetables	2.5 cups	4-5 servings
Meats	5.5 oz lean meat or equivalent	≤ 6 servings
Milk	3 cup-equivalents fat-free milk	2-3 servings fat-free or low-fat milk and milk products
Oils	27 g (6 tsp)	2-3 servings
Discretionary Energy	267 kcal	5 or fewer servings/week of sweets and added sugars



Comparison of MyPyramid Food Intake Recommendations With...



American Heart Association

Nutrients	MyPyramid	AHA
Grains	6 oz	6-8 servings
Fruits	2 cups	4-5 servings
Vegetables	2.5 cups	4-5 servings
Meats	5.5 oz lean meat or equivalent	< 6 oz lean meats, poultry, and seafood
Milk	3 cup-equivalents fat-free milk	2-3 servings fat-free or low-fat milk and milk products
Oils	27 g (6 tsp)	2-3 servings
Discretionary Energy	267 kcal	Minimize intake of beverages and foods with added sugar.



Comparison of MyPyramid Food Intake Recommendations With...



American Cancer Society

Nutrients	MyPyramid	ACS
Grains	6 oz	Choose whole grains over processed (refined) grains
Fruits/Vegetables	2 cups/2.5 cups	Eat 5 or more servings of a variety of vegetables and fruits each day
Meats	5.5 oz lean meat or equivalent	<ul style="list-style-type: none">• Limit intake of processed and red meats• Select lean cuts and small portions• Prepare by baking, broiling, or poaching rather than frying or charbroiling





Comparison of MyPyramid Nutrient Levels With...

National Osteoporosis Foundation

Nutrients	MyPyramid	NOF
Calcium	Adequate Intake level as defined by Institute of Medicine	Adequate Intake level as defined by Institute of Medicine
Vitamin D	Databases insufficient to assess; recommendations exceed current intake	Adequate Intake level as defined by Institute of Medicine





Consistency with Current Recommendations

- ▶ Obesity
- ▶ Diabetes
- ▶ Heart disease and stroke
- ▶ Hypertension
- ▶ Cancer
- ▶ Osteoporosis





Key Assumptions

- ▶ Energy level selection and adherence

- ▶ Selection of appropriate foods
 - ▶ Severe limitations on discretionary calories
 - ▶ Subgroups as important as major groups





Further Assumptions Behind Composites

- ▶ Plain bread, cereal, pasta and rice
- ▶ Vegetables without fat
- ▶ Unsweetened fruit
- ▶ Skim milk
- ▶ Leanest meats
- ▶ No salt added; high sodium soups, sauces and condiments not represented





Typical Choices in Various Groups

▶ Grains

- ▶ Less than 10% of grain intake is whole grains
- ▶ Bread is greatest single contributor to non-whole grains, but sweets (e.g., donuts, sweet rolls, and cookies) and grain mixtures (e.g., pizza) are also major sources

▶ Vegetables

- ▶ White potatoes, mostly eaten fried, are top vegetable
- ▶ Green and orange vegetables and legumes would need to double/triple to meet recommendations

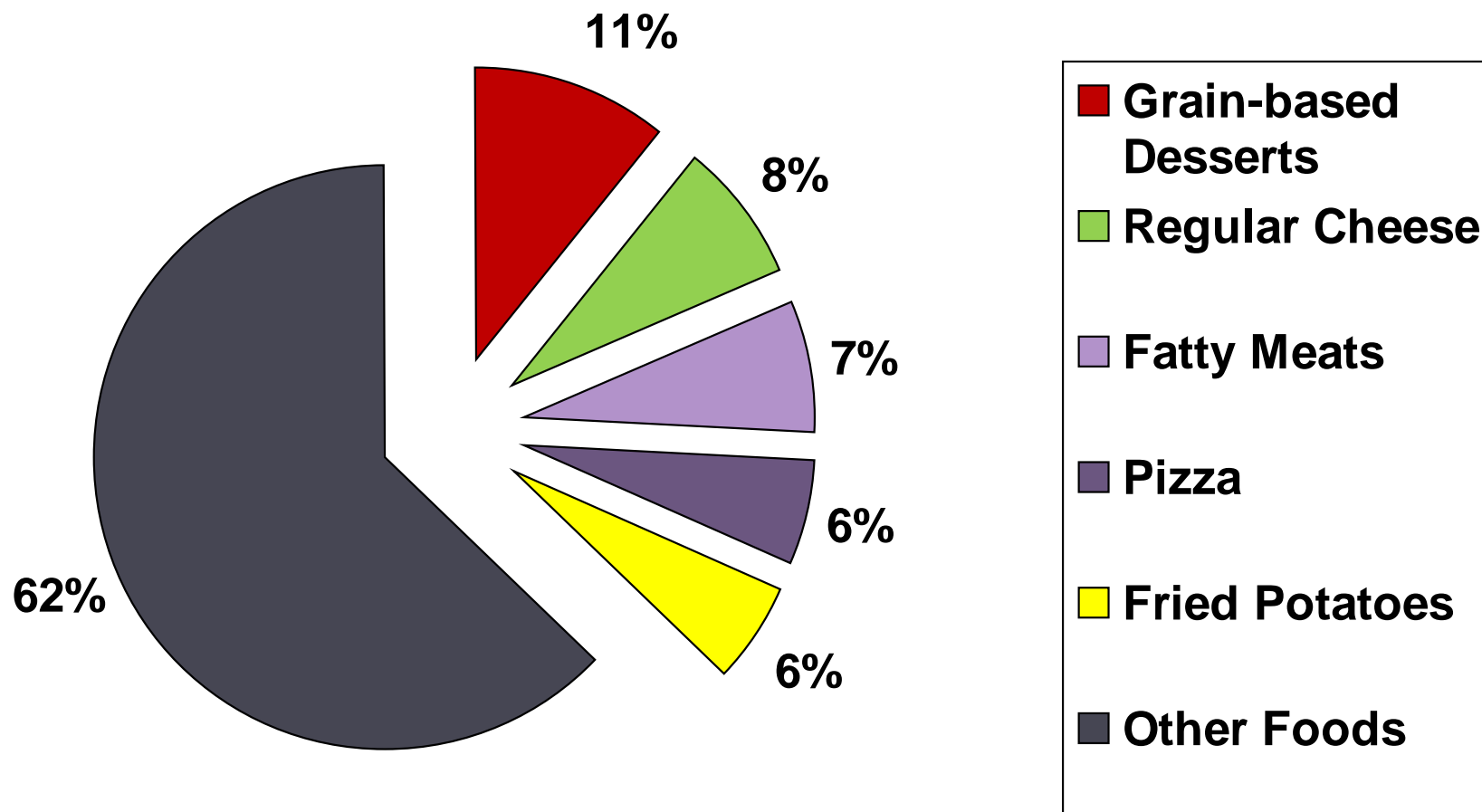
▶ Milk

- ▶ Skim milk contributes only 16% of fluid milk consumed; nearly all cheese consumed is full fat

Source: NHANES, 2001-2002.



Top Sources of Solid Fats

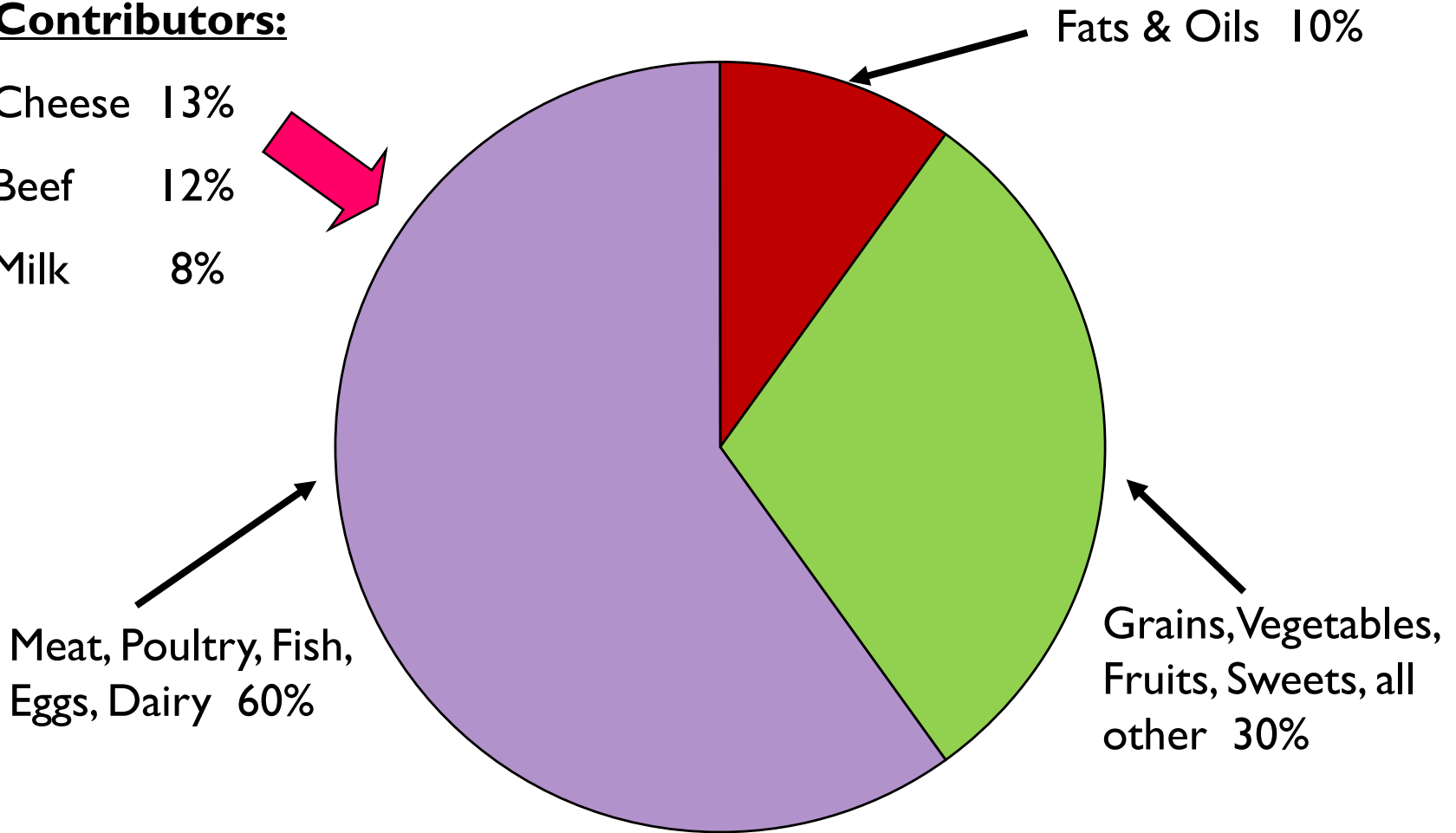


Source: 2001-2002 National Health and Nutrition Examination Survey.

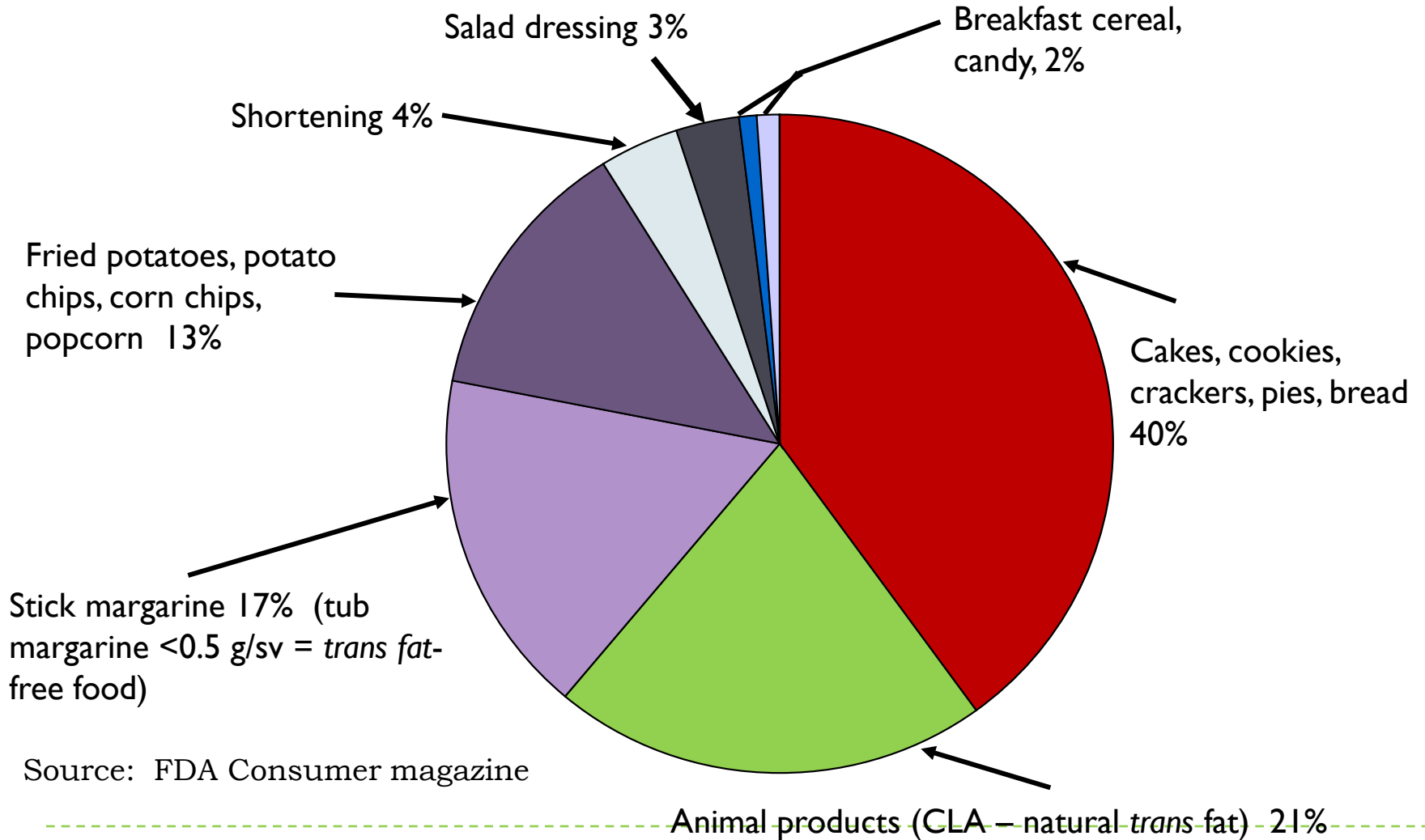
Major Sources of Saturated Fatty Acids

Top Three Contributors:

Cheese 13%
Beef 12%
Milk 8%



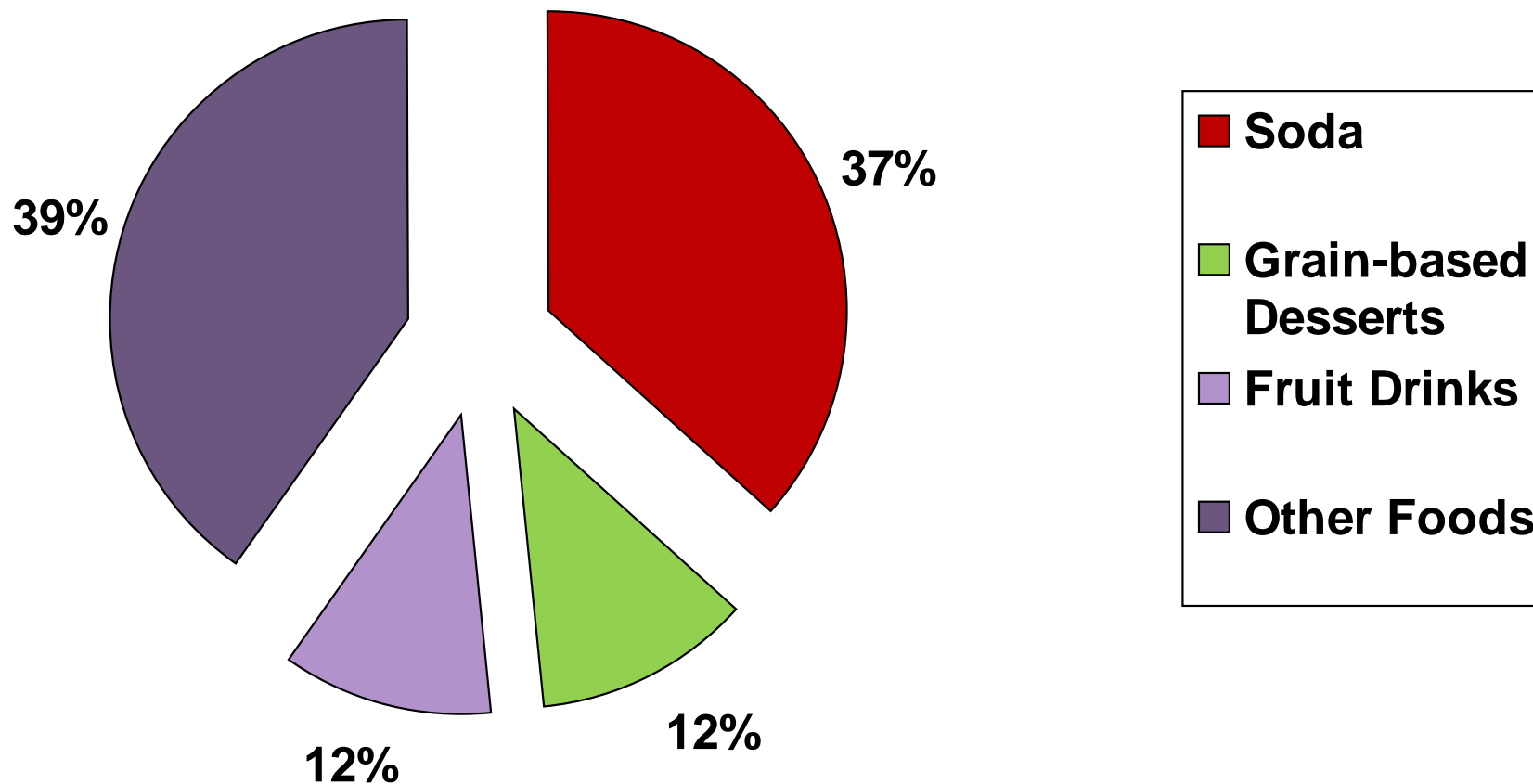
Major Sources of *Trans* Fatty Acids



Source: FDA Consumer magazine



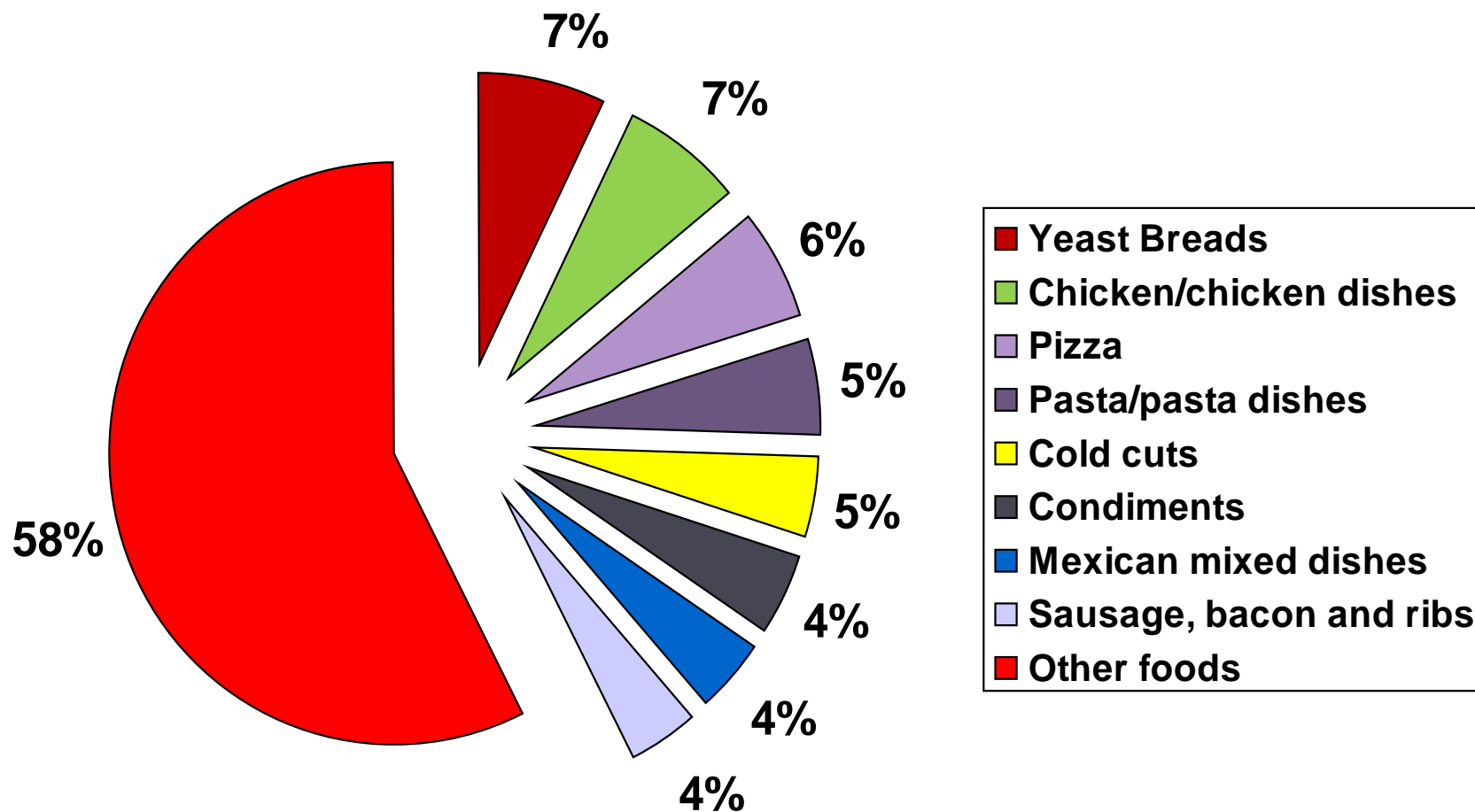
Top Sources of Added Sugars



Source: 2001-2002 National Health and Nutrition Examination Survey.



Top Sources of Sodium



Source: 2005-2006 National Health and Nutrition Examination Survey.



History of Dietary Guidance

Basic 4,
1960's

US Dietary Goals,
1977

US Dietary Guidelines, 1980-present



Nutrient adequacy

Limits on saturated fats, added sugars, alcohol
Emphasis on fruits, vegetables, whole grains

Guidance directed at individuals: "personal choice"

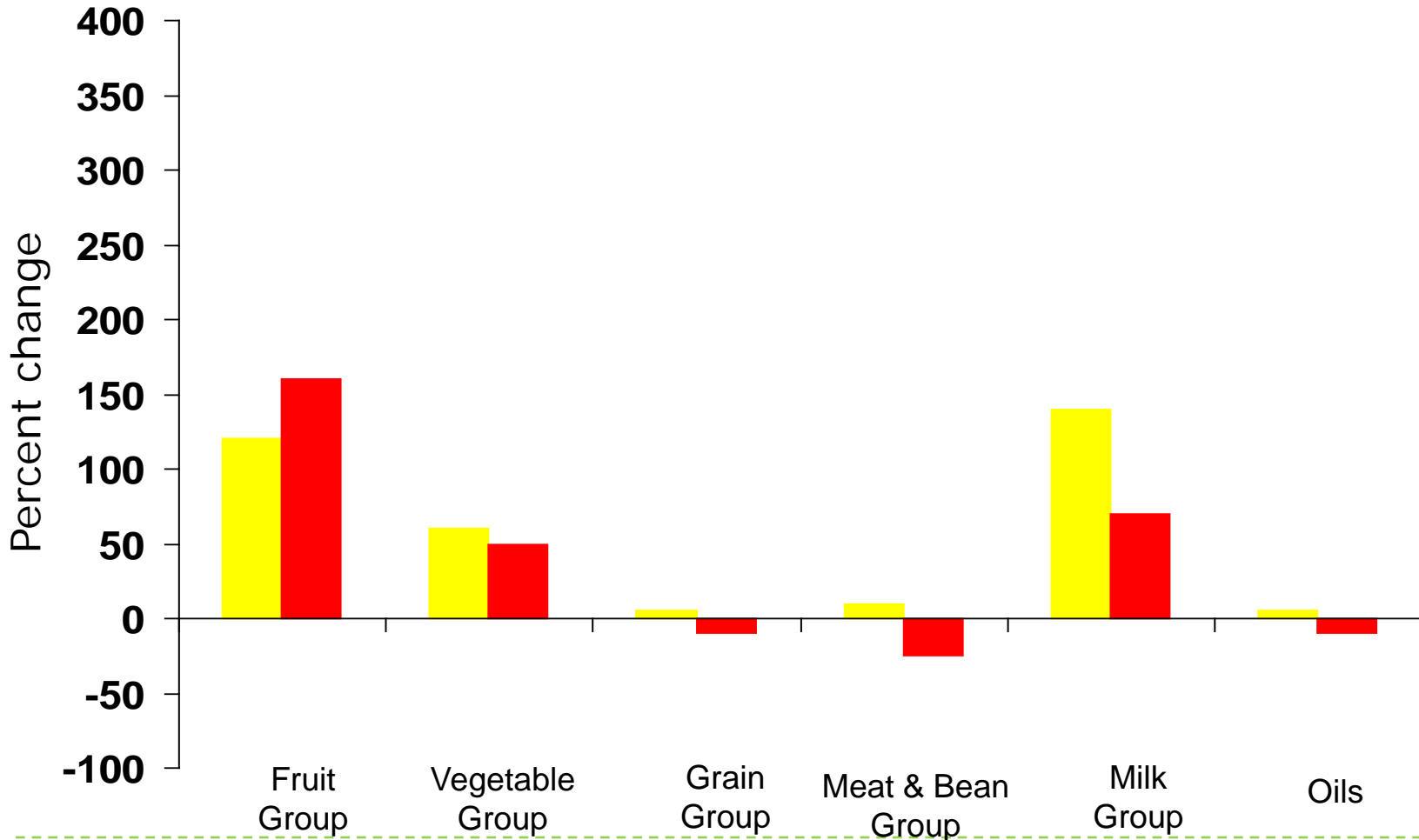


Percent Change

From Current Intake To Recommendations



■ Females ■ Males

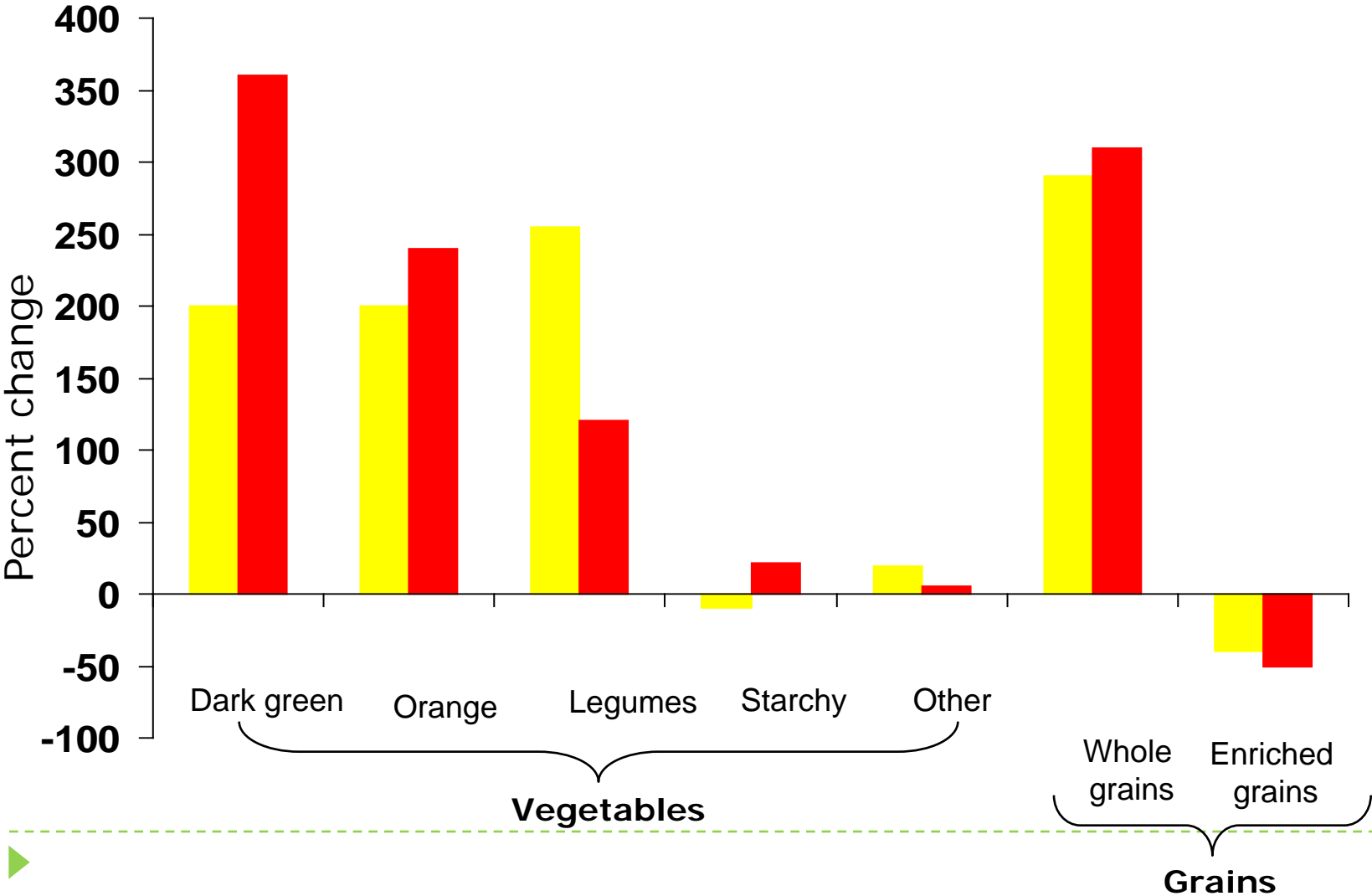


Percent Change

From Current Intake To Recommendations



■ Females ■ Males

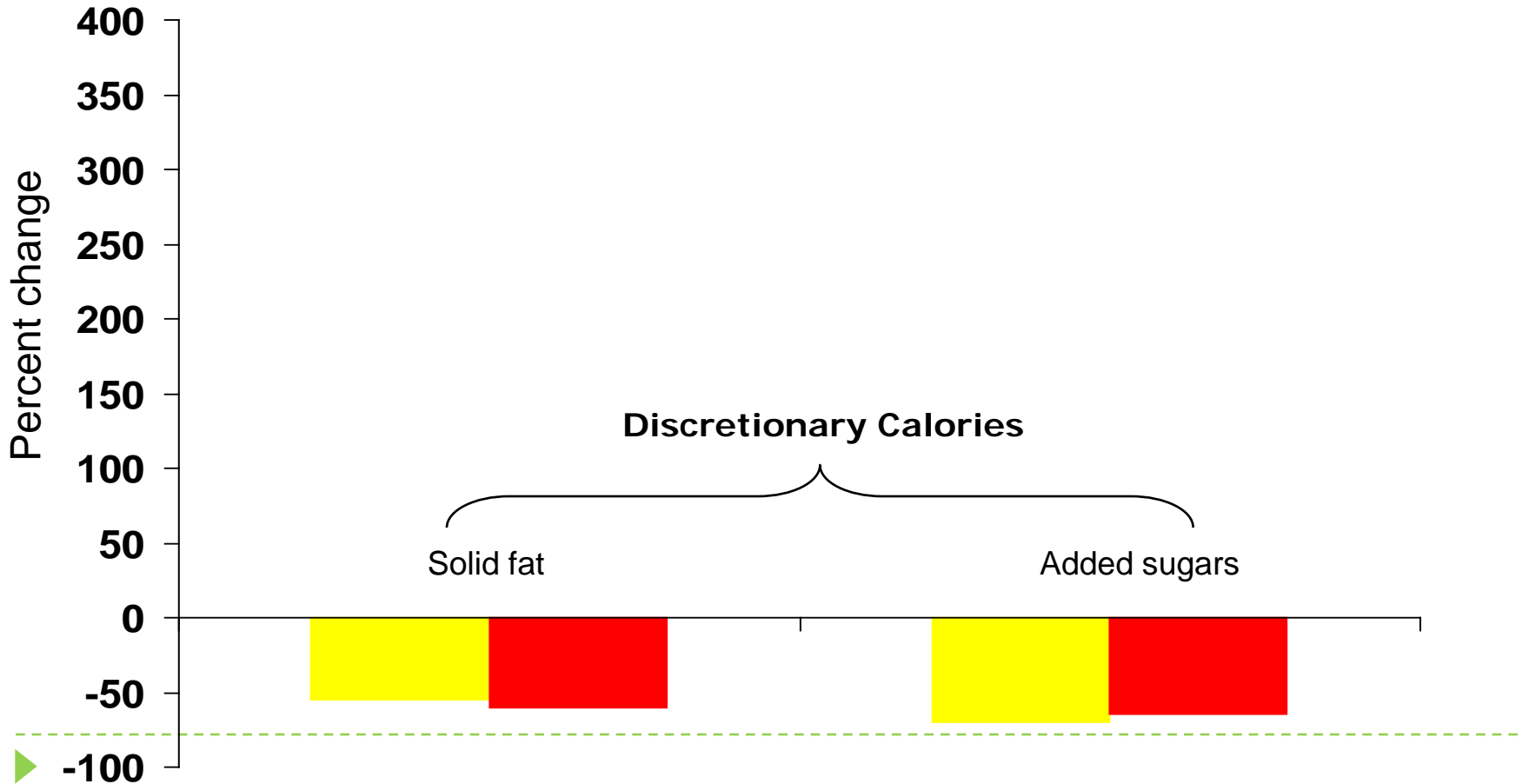


Percent Change

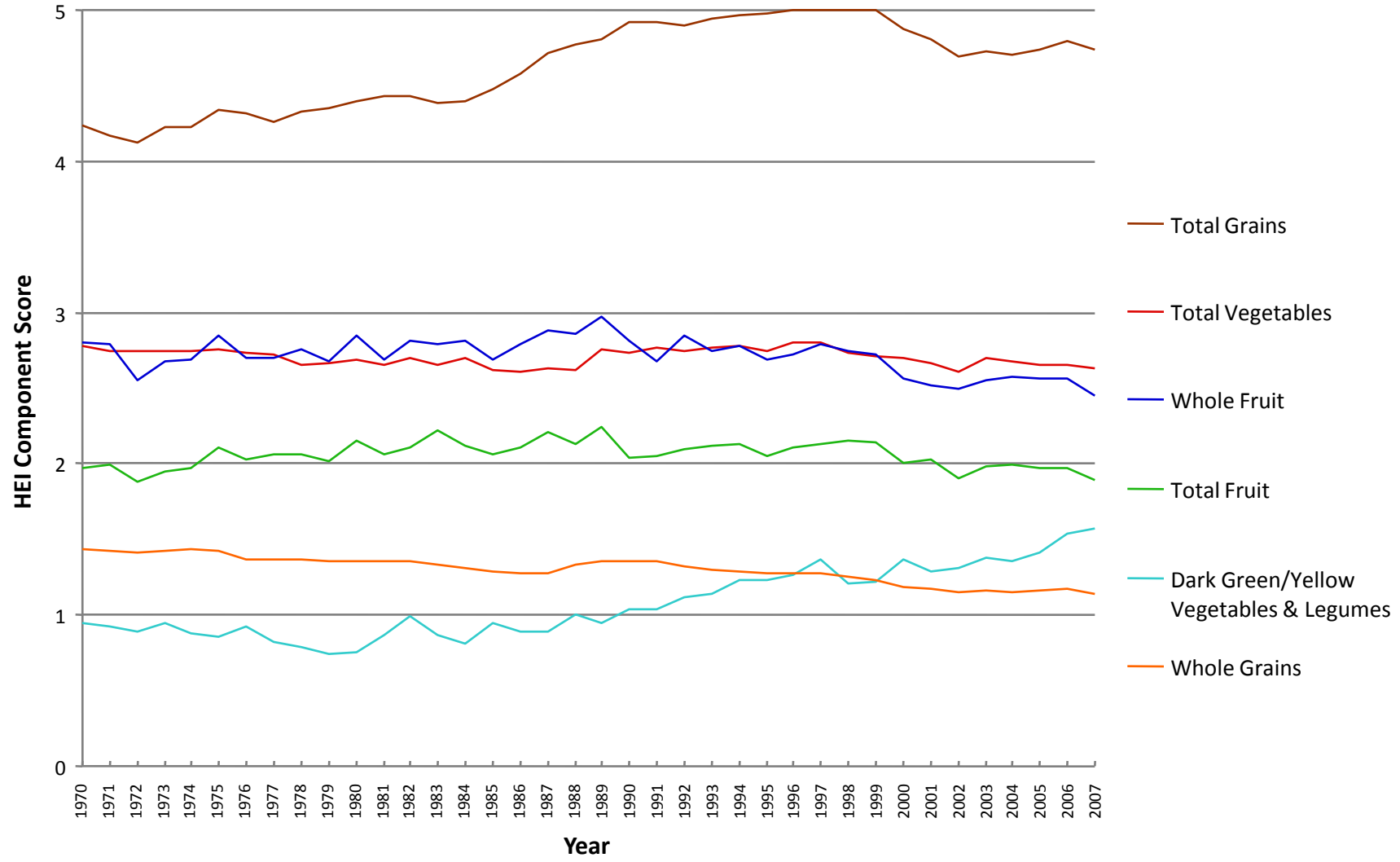
From Current Intake To Recommendations



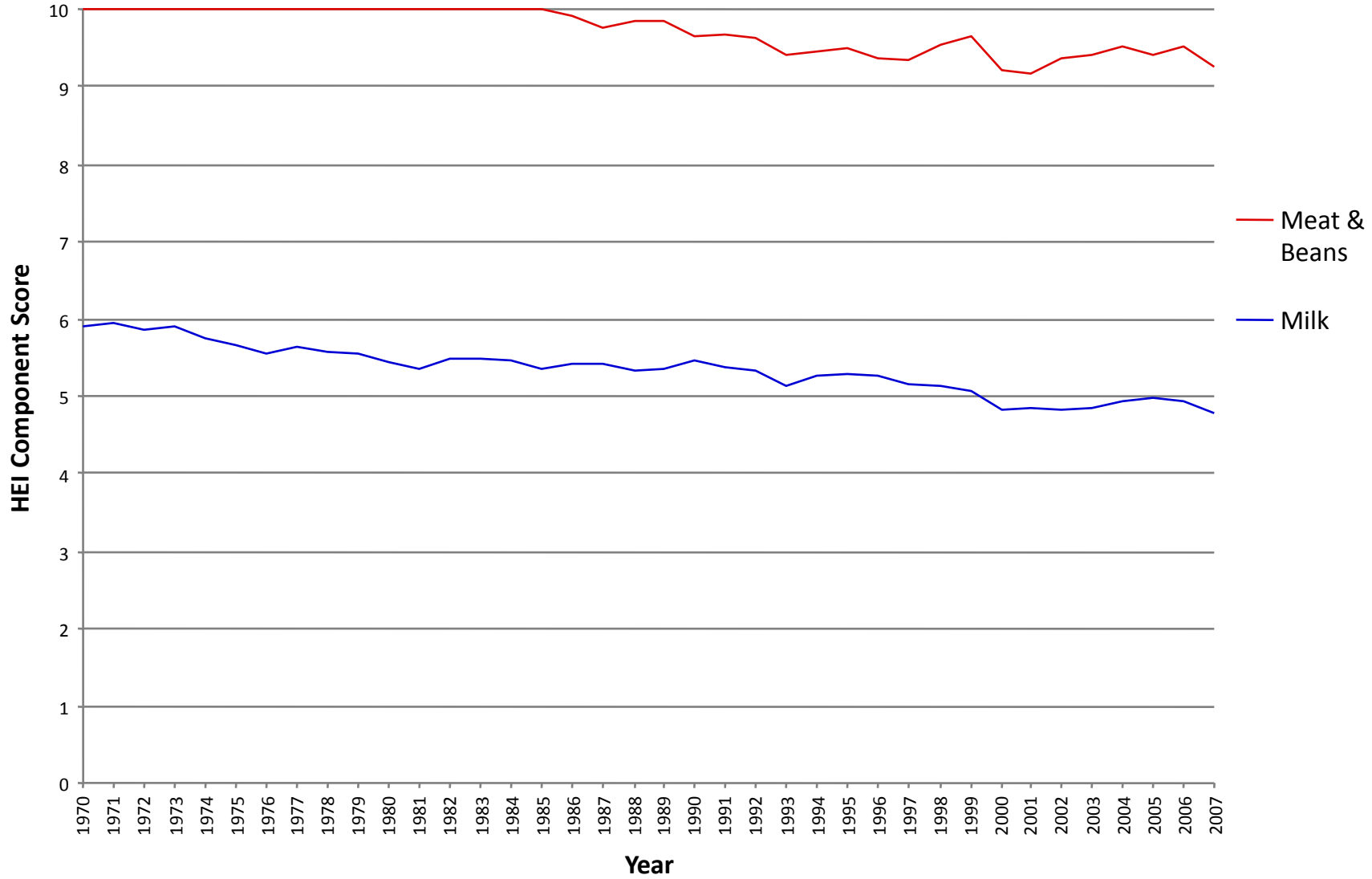
■ Females ■ Males



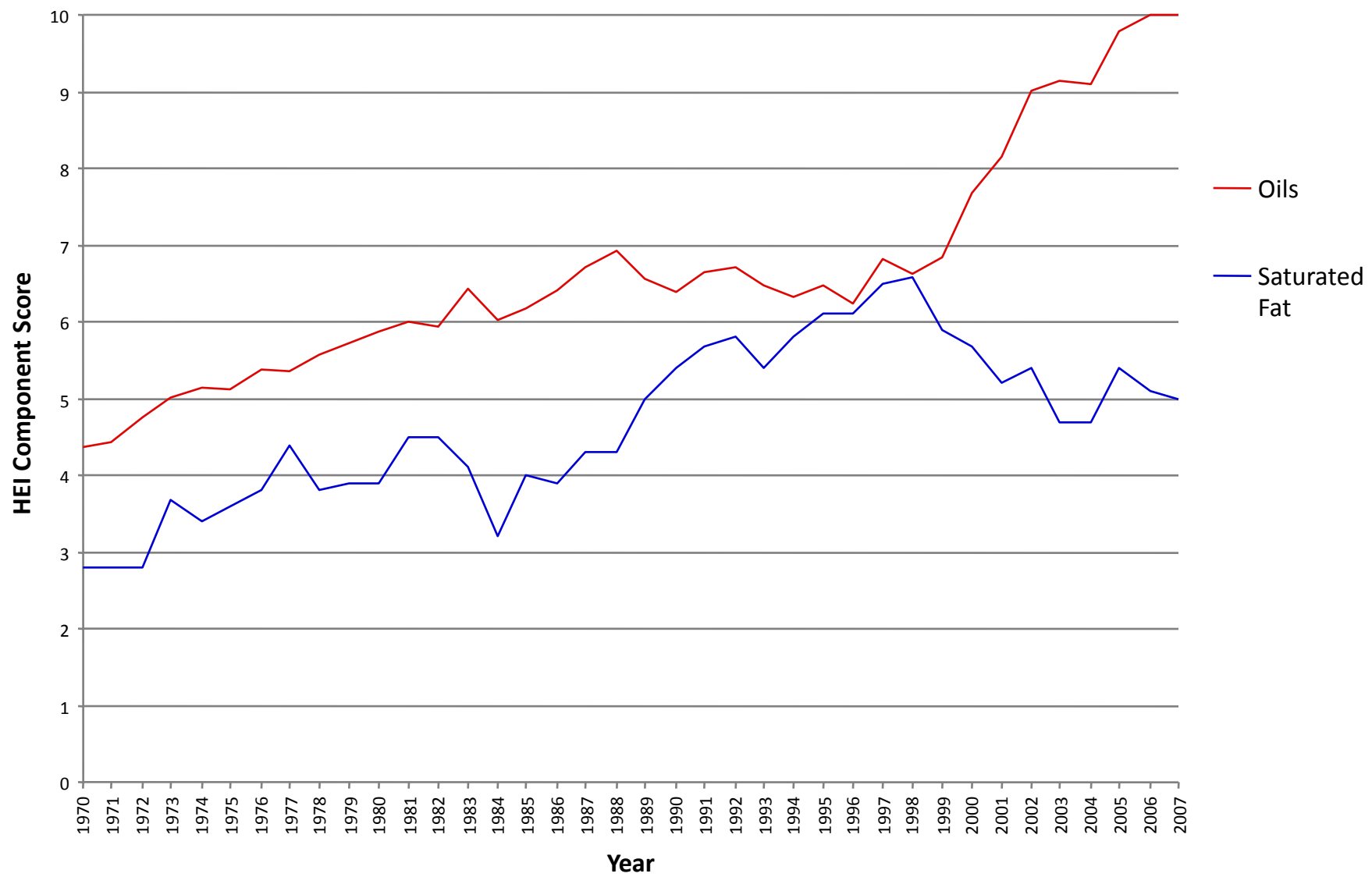
Quality of US Food Supply With Regard To Fruits, Vegetables, and Grains, 1970-2007



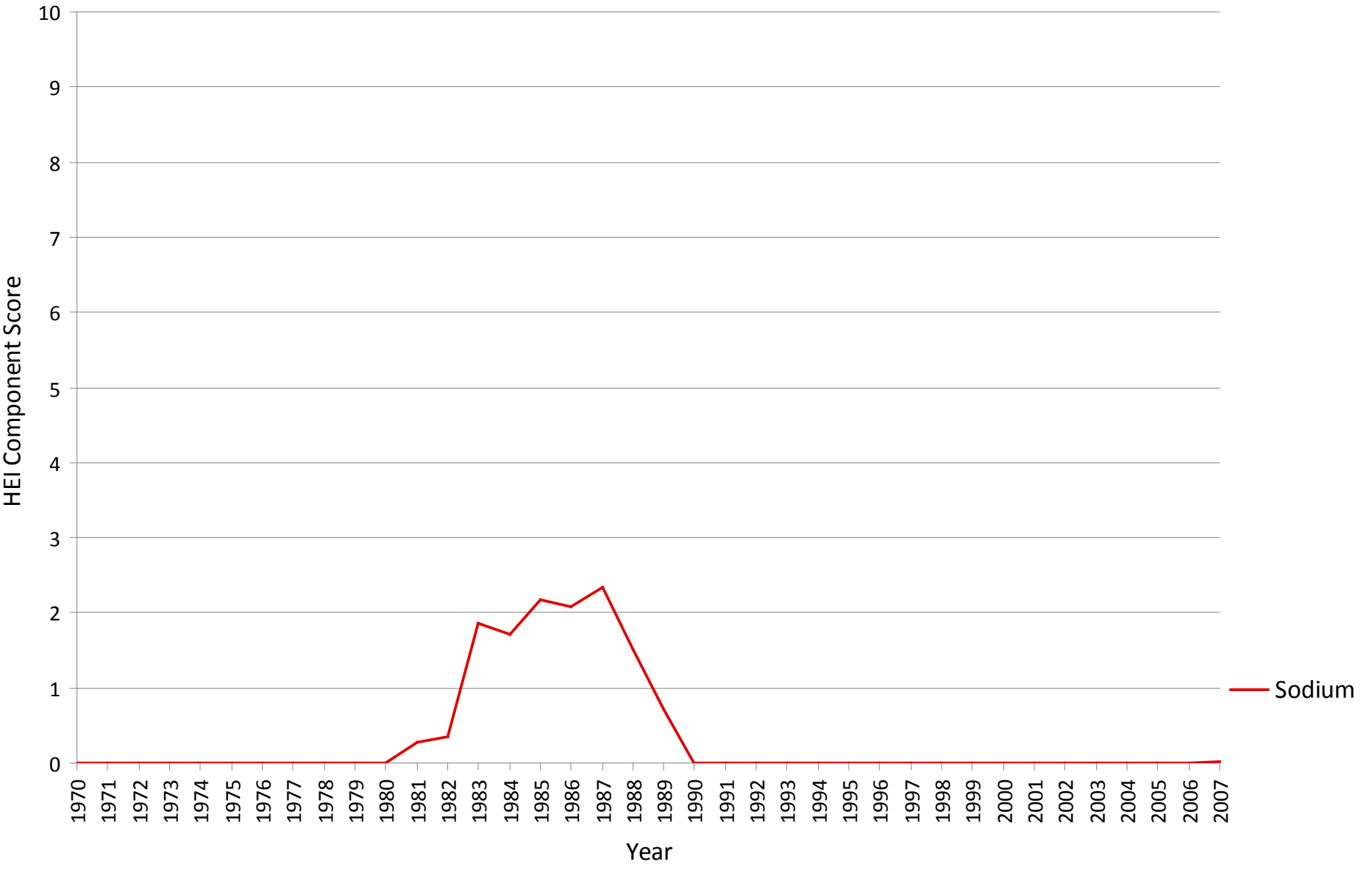
Quality of US Food Supply With Regard To Meat & Beans and Milk, 1970-2007



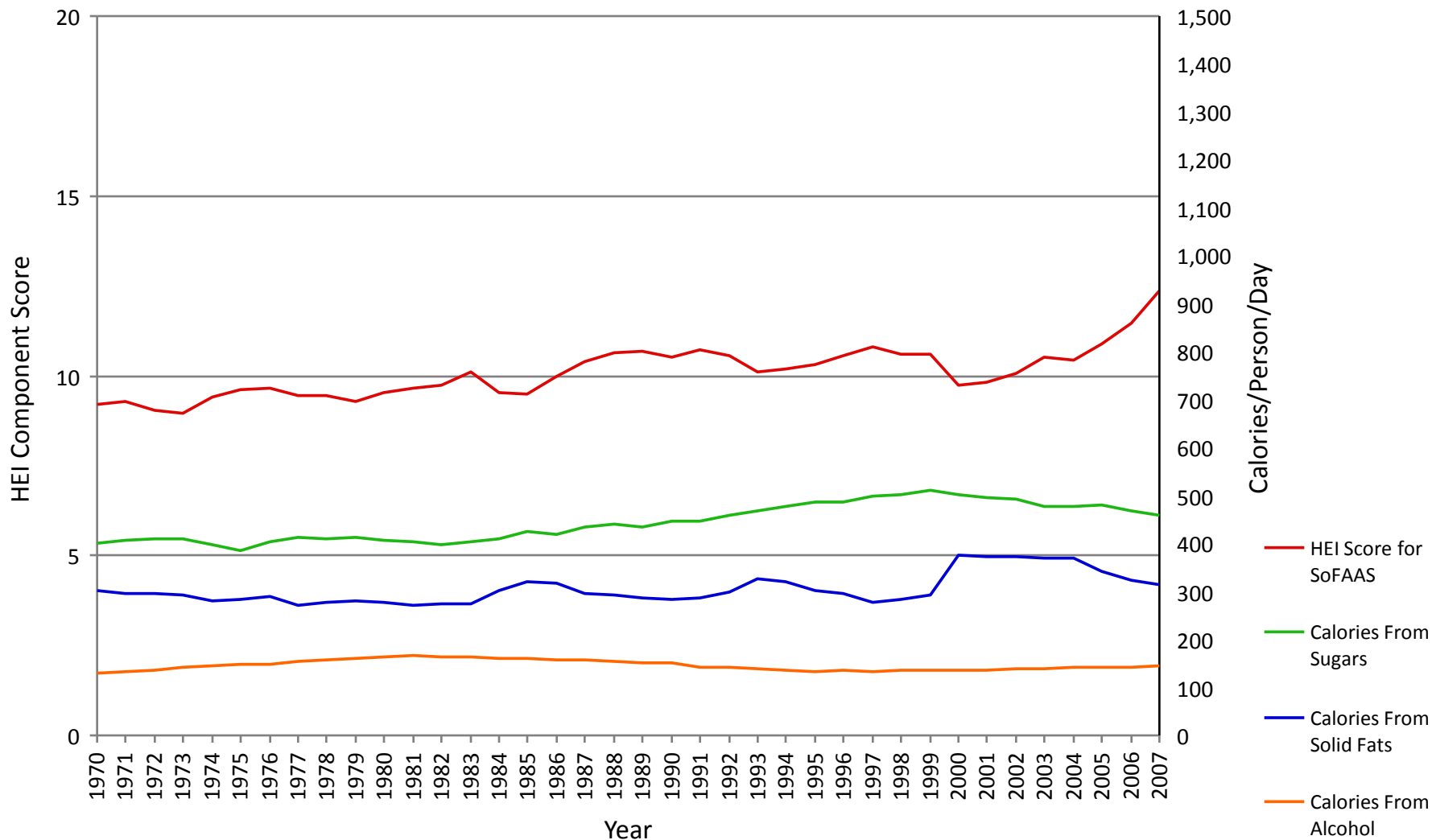
Quality of US Food Supply With Regard To Oils and Saturated Fat, 1970-2007



Quality of US Food Supply With Regard To Sodium, 1970-2007



Quality of US Food Supply With Regard To Calories From SoFAAS, 1970-2007



Agricultural Shifts Needed to Meet Recommendations



- ▶ Fruit: increase by >50%
- ▶ Milk: increase by almost 50%
- ▶ Lean meat: increase by 15%
- ▶ Dark green/deep yellow vegetables and legumes: triple!
- ▶ Potatoes: decrease by 50%
- ▶ Caloric sweeteners: decrease by 50%





No Good Food, No Bad Food?

- ▶ All foods “fit”...
 - ▶ Every food can be assigned

- ▶ ... but some create the potential for greater imbalance
 - ▶ Some foods limit other choices, if pattern is to be maintained





Implications for Research and Practice

- ▶ Communications and behavioral research needed

- ▶ Meanwhile, nutrition professionals should...
 - ▶ Be mindful of underlying assumptions
 - ▶ Help guide consumers toward appropriate choices
 - ▶ Advocate for healthier food environment



Questions?



Nutri-Bitessm Webinar Summary

How Does MyPyramid Compare to Other Population Based Recommendations for Controlling Chronic Disease?

- ▶ Remarkable consistency between MyPyramid recommendations and those aimed at diet-related conditions
- ▶ Food intake recommendations of MyPyramid similar to those recommended by DASH, AHA and American Cancer Society
- ▶ Nutrient intake recommendations of MyPyramid generally consistent with nutrient ranges of other authoritative groups
- ▶ Nutrition professionals should be aware of the underlying assumptions of MyPyramid in order to help guide consumers toward appropriate choices and conform to dietary guidance

Resource Links on Dietary Recommendations



- ▶ MyPyramid <http://www.mypyramid.gov/>
- ▶ Clinical Guidelines on Overweight and Obesity in Adults http://www.nhlbi.nih.gov/guidelines/obesity/ob_home.htm
- ▶ American Diabetes Association <http://www.diabetes.org/>
- ▶ National Cholesterol Education Program <http://www.nhlbi.nih.gov/about/ncep/index.htm>
- ▶ American Heart Association www.americanheart.org
- ▶ National Committee on High Blood Pressure <http://www.nhlbi.nih.gov/guidelines/hypertension/>
- ▶ American Institute for Cancer Research <http://www.aicr.org>
- ▶ Dietary Approaches to Stop Hypertension Eating Plan http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf
- ▶ American Cancer Society www.cancer.org

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- ▶ For recorded webcast and pdf download of PowerPoint: www.startmakingchoices.com/health-professionals

- ▶ For future ConAgra Foods Science Institute **Nutri-Bites**sm webinars:

www.startmakingchoices.com/health-professionals

Next **Nutri-Bites**sm Webinar

Implementing Dietary Recommendations for
Heart Health: Moving from Ideal to Real

Presenters:

James M. Rippe, M.D.

Lisa Cooper, M.S., R.D.

Date: April 28, 2010

2-3 pm EST



ConAgra Foods Science Institute

Promoting Choices affecting
Wellness by linking
evidence-based Understanding
with Practice



Science
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