

Can a food solution influence long-term eating behavior?

Adam Drewnowski, PhD

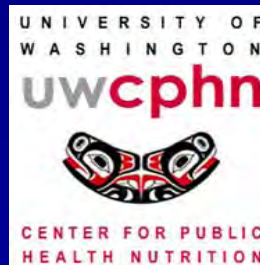
Director, Center for Public Health Nutrition

Director, Nutritional Sciences Program

Professor of Epidemiology and Medicine

School of Public Health and Community Medicine

University of Washington



Obesity Conundrum Two

- **How do people make food choices?**
- **What are the current dietary trends?**
- **Do healthier diets cost more?**
- **What is the satiating power of liquid and/or energy dense foods?**
- **Is the food industry to blame?**
- **Is there a food solution?**
- **What are the gaps in research/policy?**

First question:

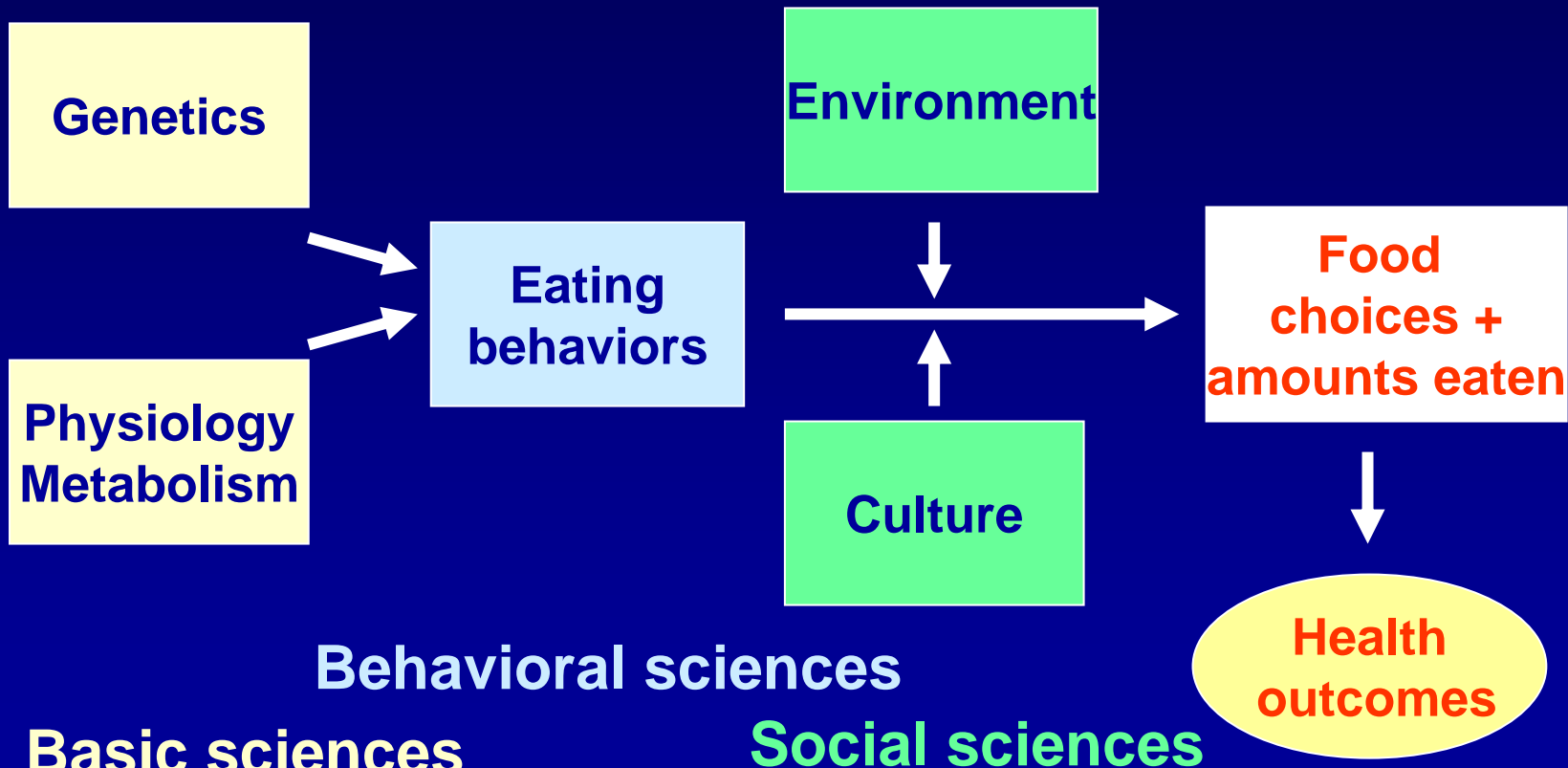
How do people make food choices?

Food choices – the traditional view

Brain controls behavior

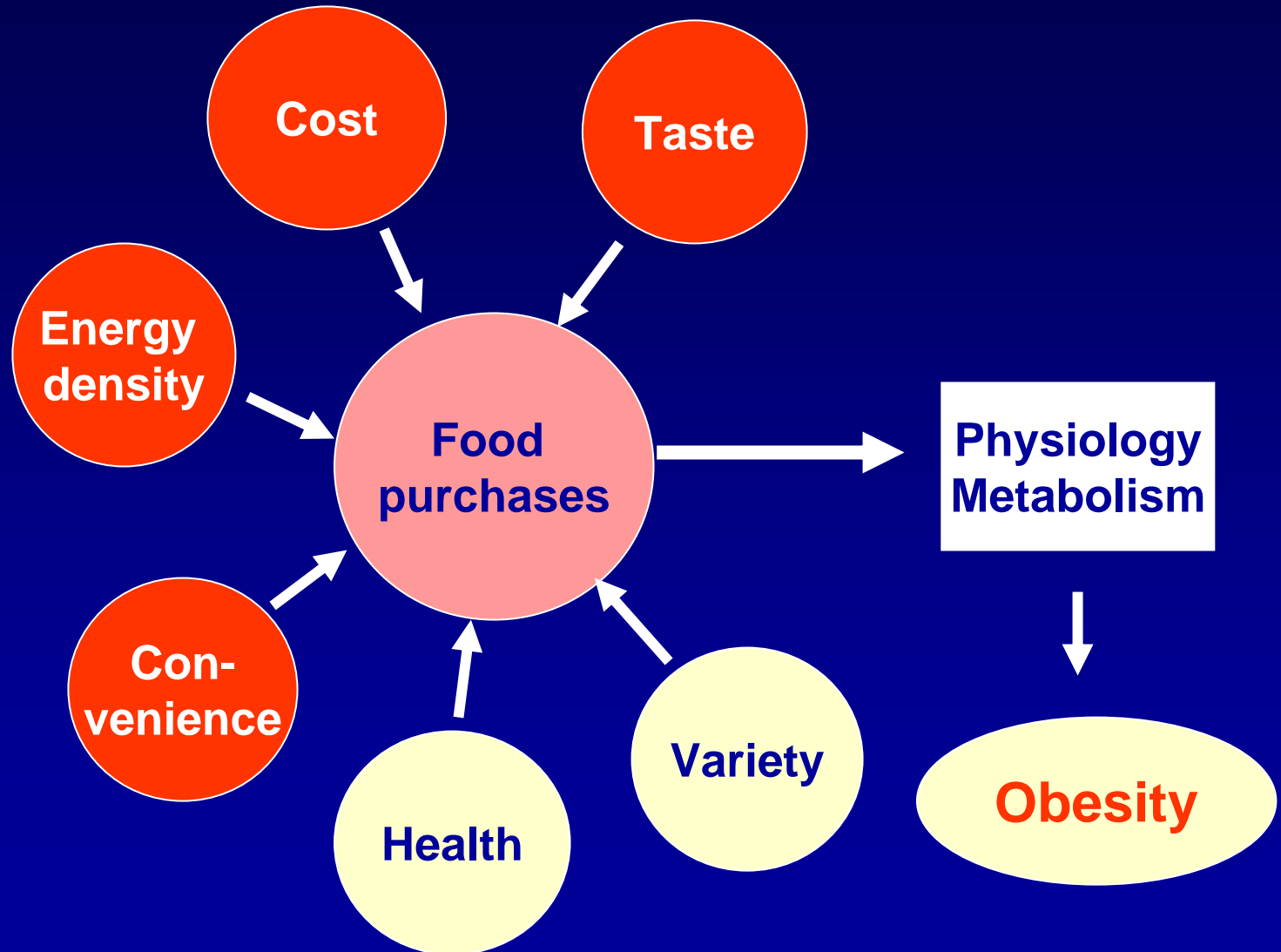


Poor dietary choices lead to adverse health outcomes



Nutritional epidemiology

Food choices: the consumer view



From the draft NIH Strategic Plan for Obesity Research 2004

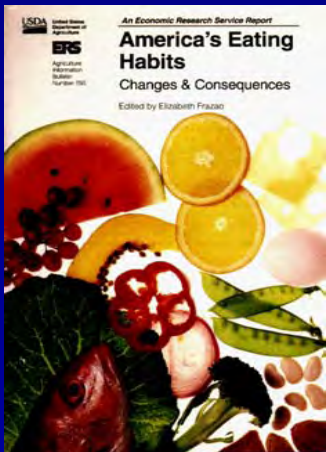
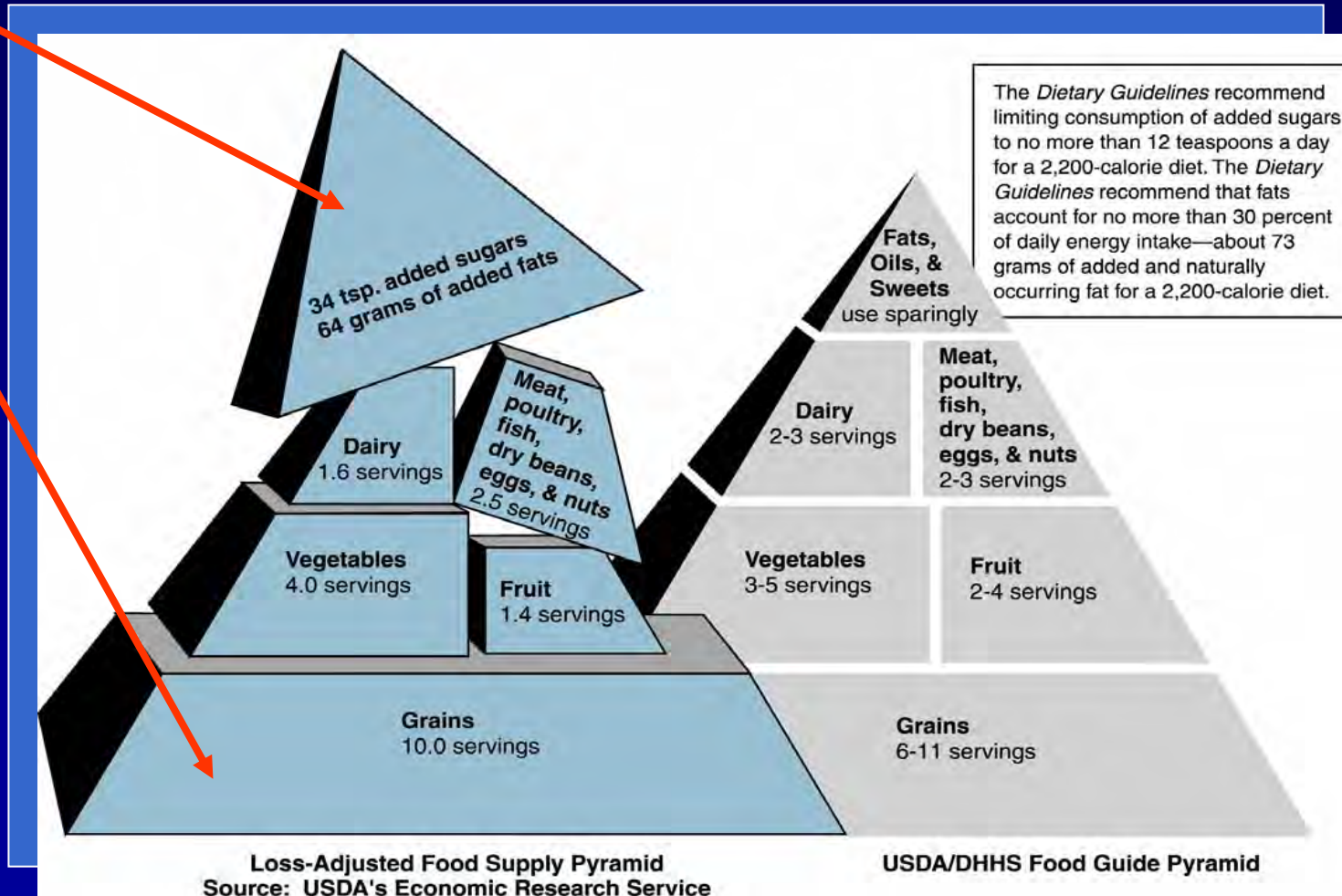
- Obesity is one of the most daunting health challenges of the 21st century
- Although genetic factors clearly play an important role, the dramatic rise in obesity rates must be due to changes in the environment
- Abundant choices of relatively inexpensive, calorically-dense foods that are convenient, and taste good

What are the current dietary trends?

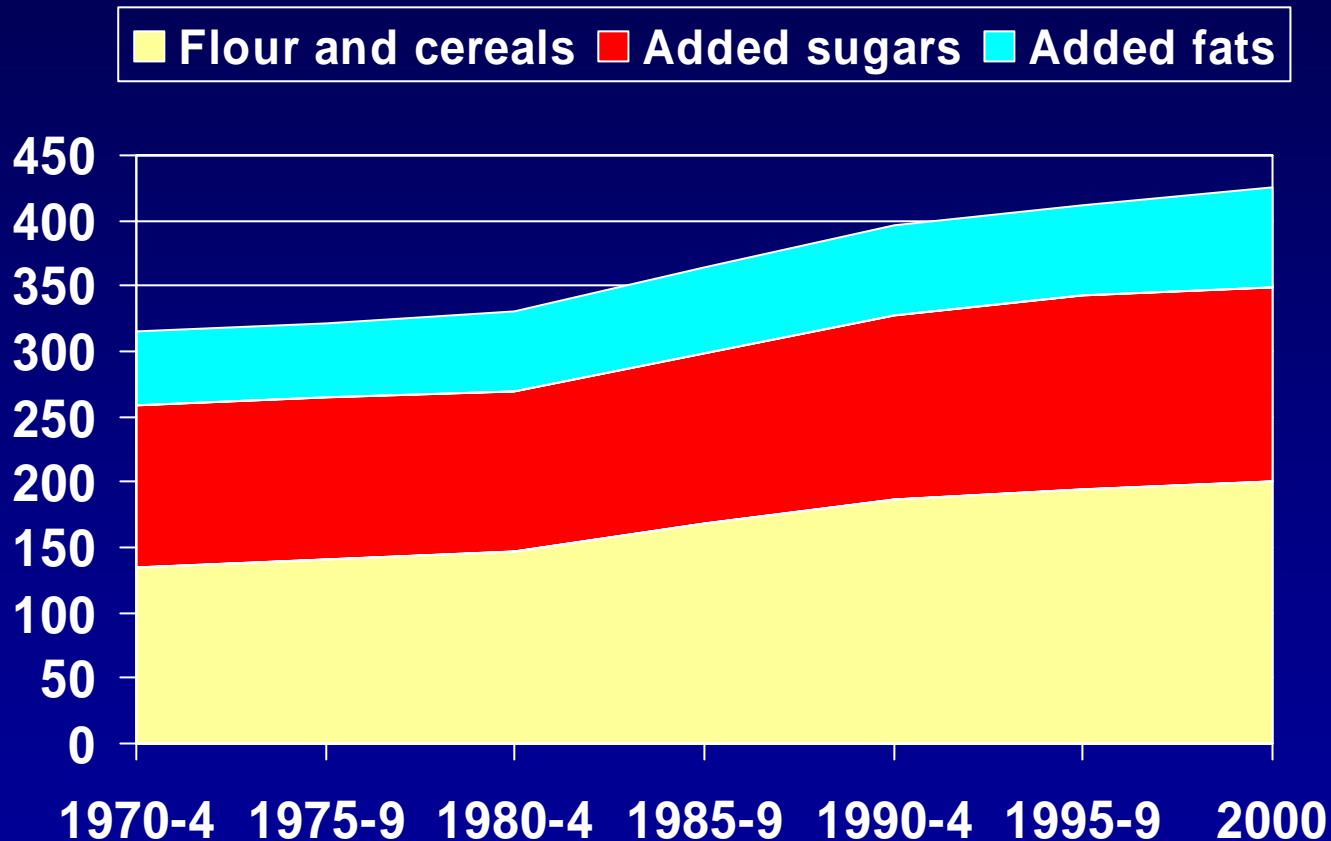
The US public does not follow the Food Guide Pyramid - what to do?

Source: Frazao, ERS/USDA 2002

Added sugars
Added fats
Grains



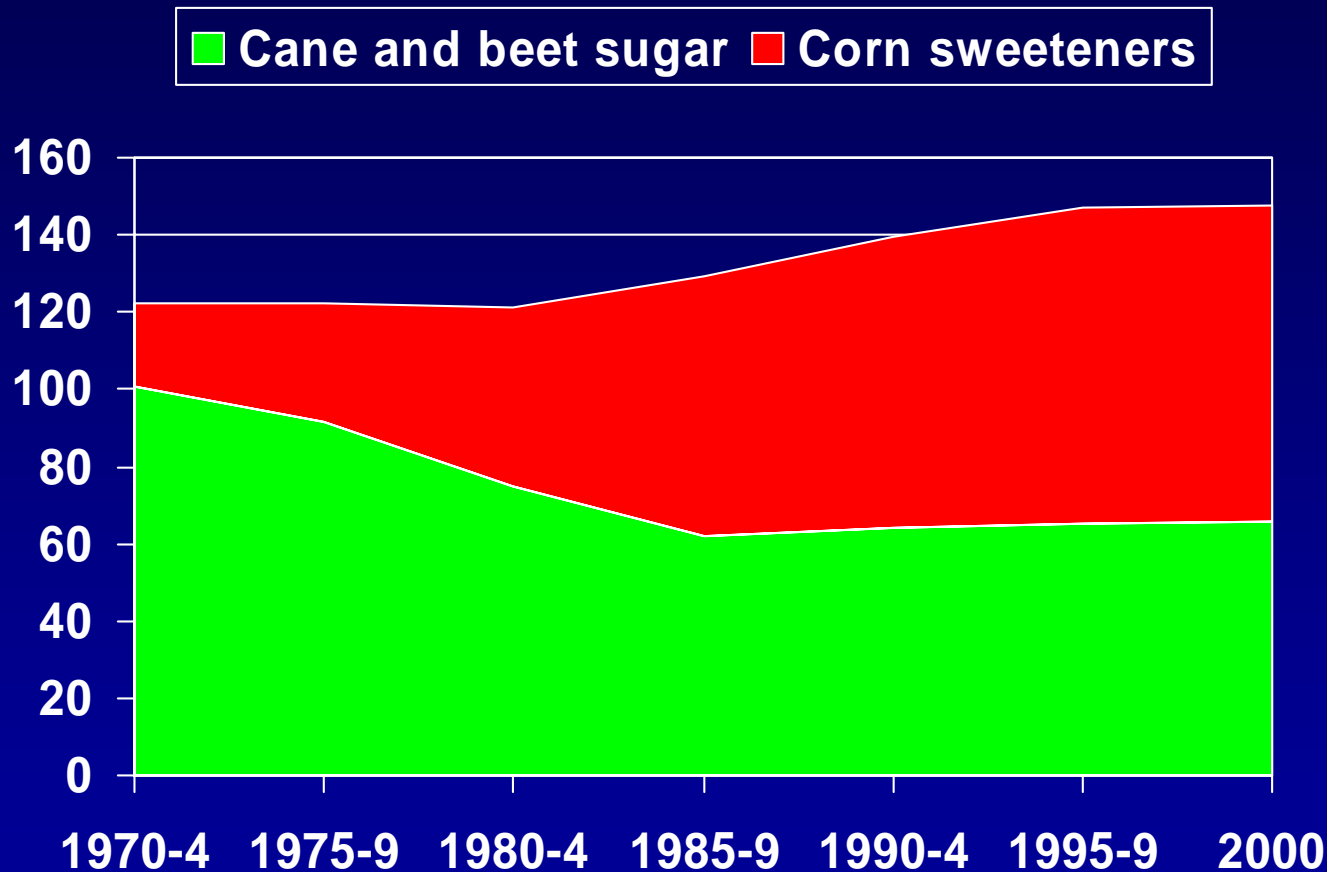
Consumption of cereals, added sugars and fats has gone up (lb per capita)



Note that the major increases was in the cereals category

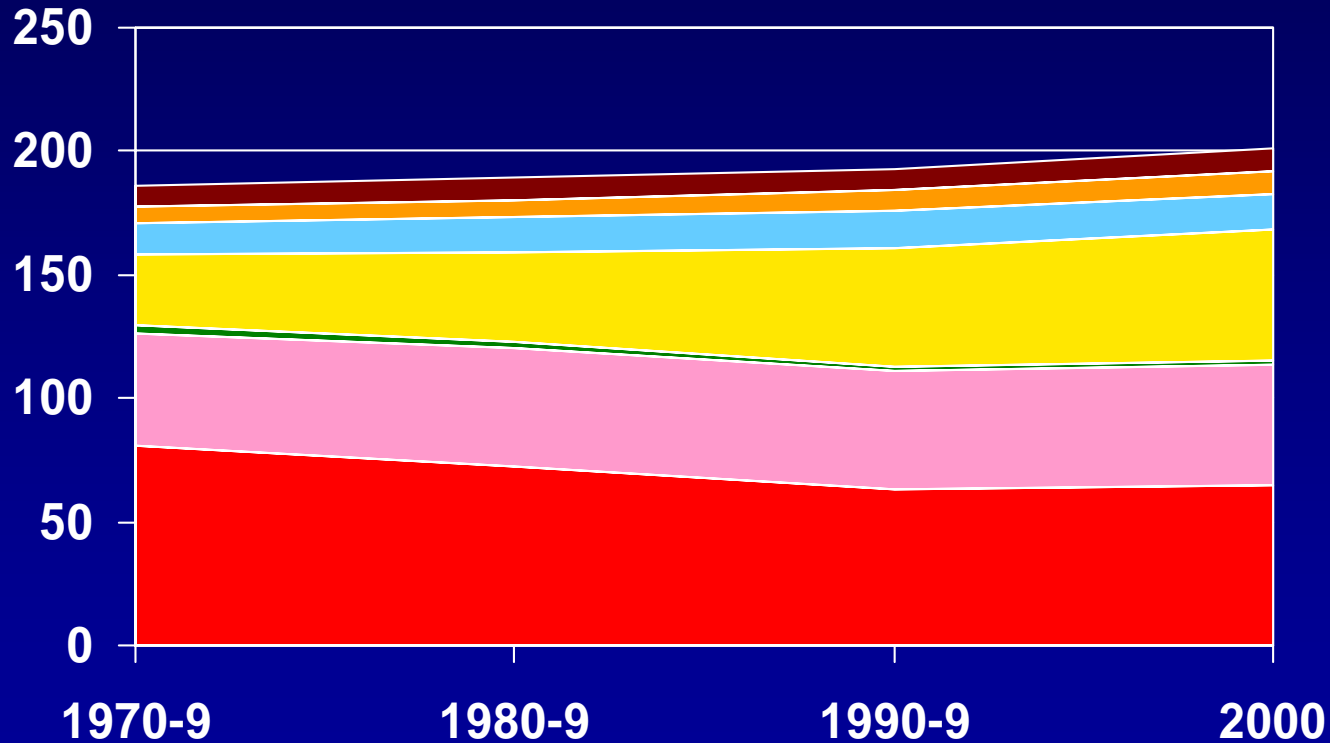
Source: ERS/USDA FoodReview 2002

Corn sweeteners have overtaken cane and beet sugar (lb per capita)

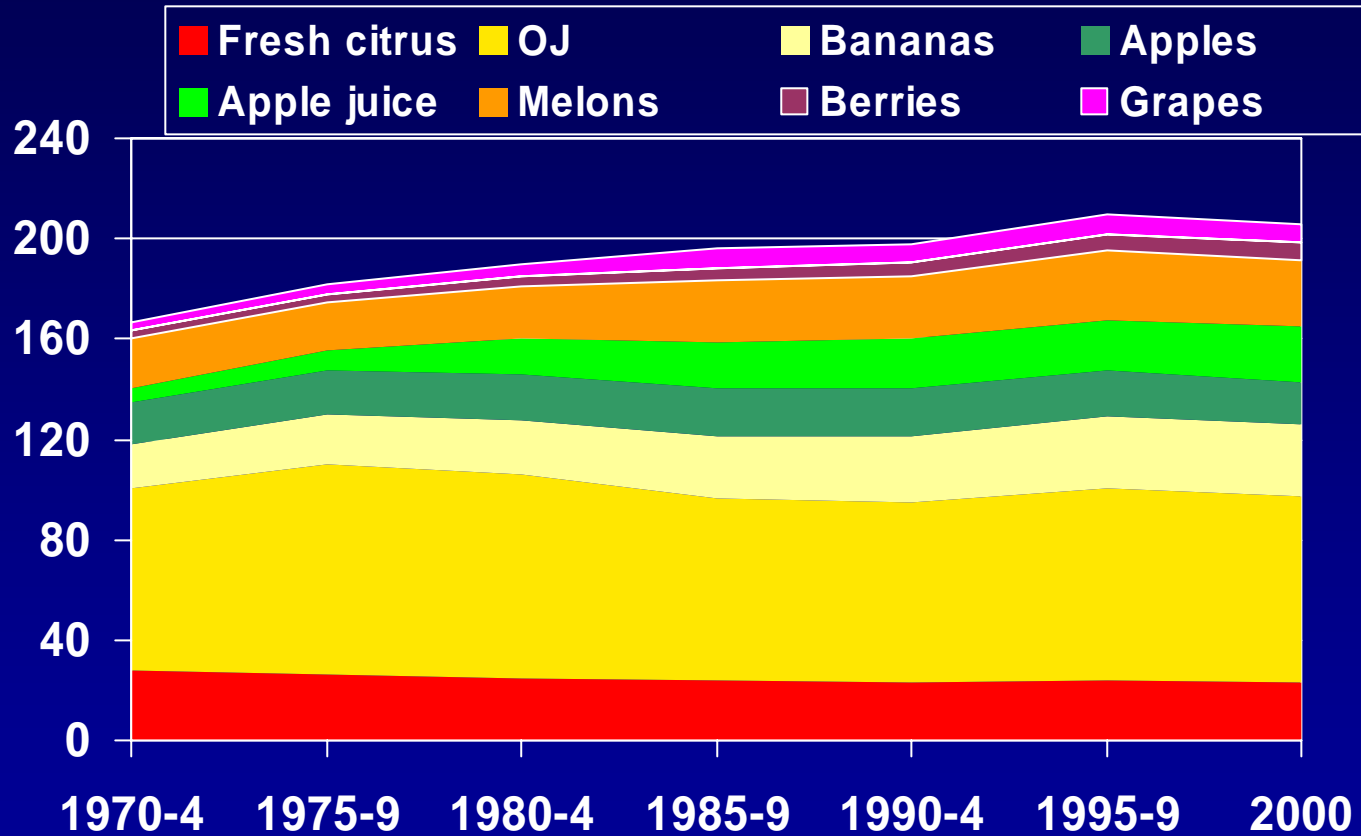


Sucrose = 50% fructose; 50% glucose; HFCS = 55% fructose; 45% glucose
Source: ERS/USDA FoodReview 2002

Less red meat, fewer eggs, and more poultry and fish (lb per capita, edible weight)

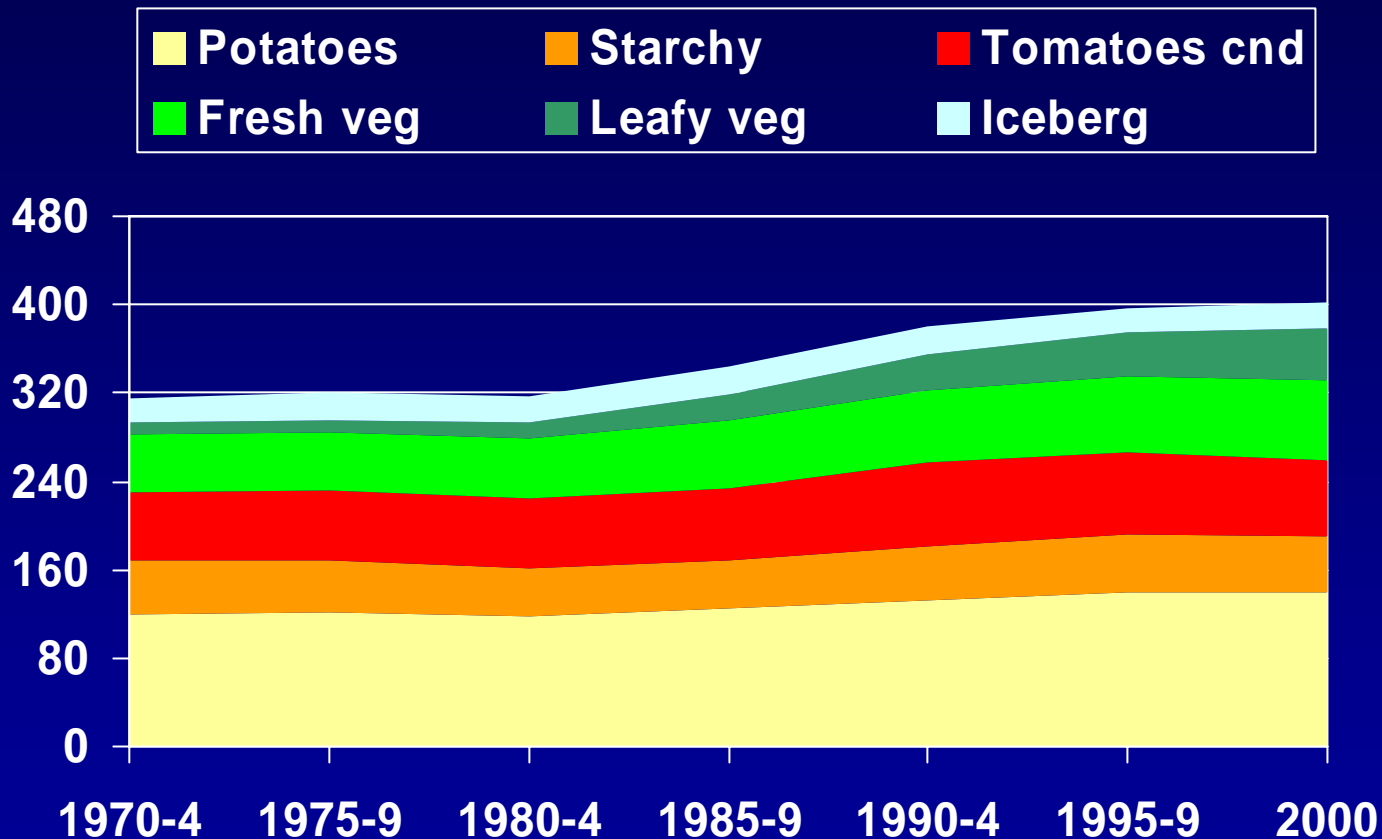


Oranges, apples, and bananas account for 50% of all fruit servings (lb per capita)



Iceberg lettuce, frozen potatoes, and potato chips account for 33% of vegetable servings

(lb per capita)

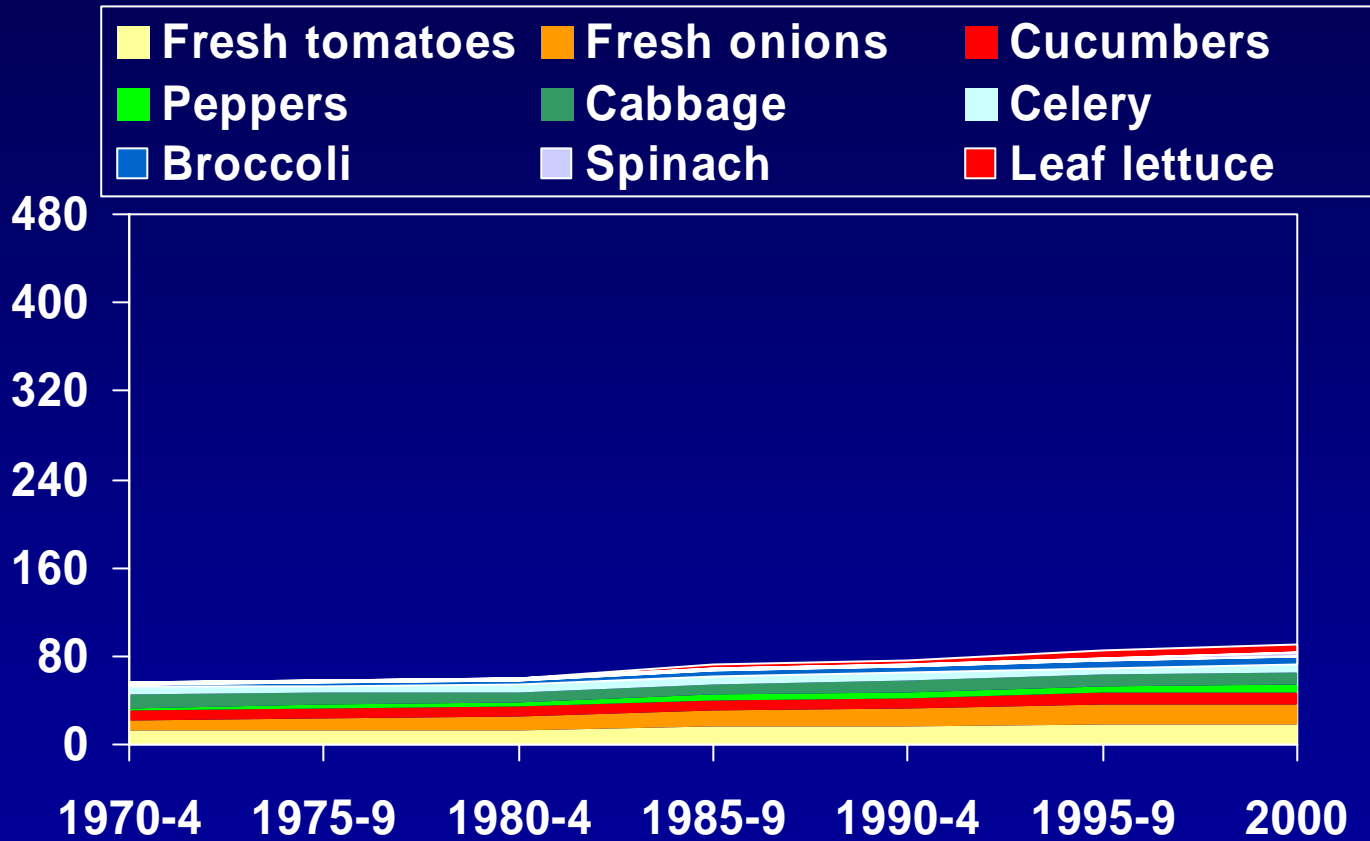


Starchy vegetables: corn, carrots, peas, sweet potatoes, beans

Fresh vegetables: tomatoes, onions, cucumbers, peppers, cabbage, celery

Dark green leafy: Leaf lettuce, broccoli, spinach, squash

Too few fresh vegetables, too little variety (lb per capita)

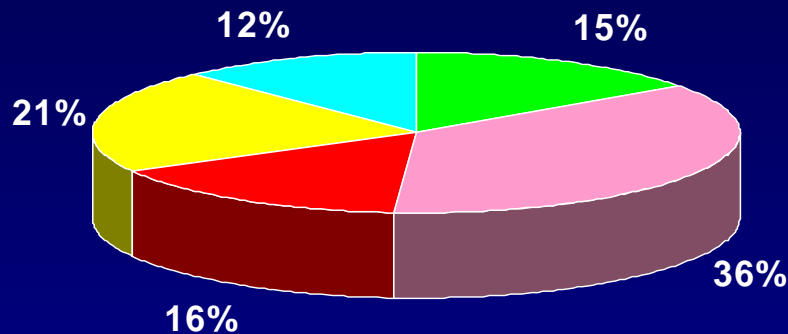


Source: ERS/USDA FoodReview 2002

Cost

What do different foods cost per calorie?

The economics of added sugar and fat

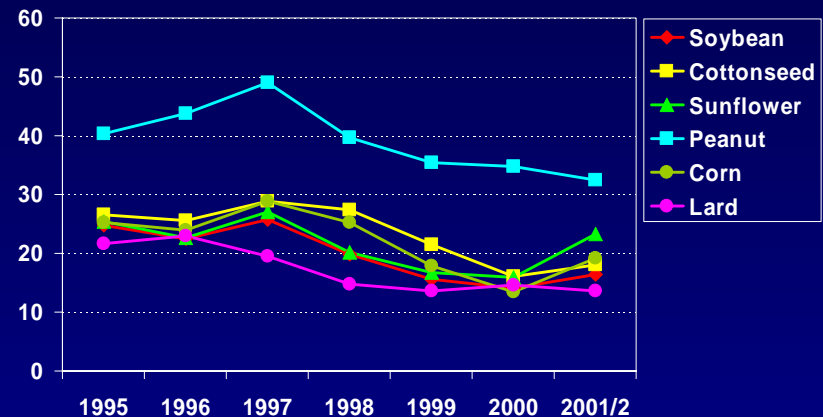
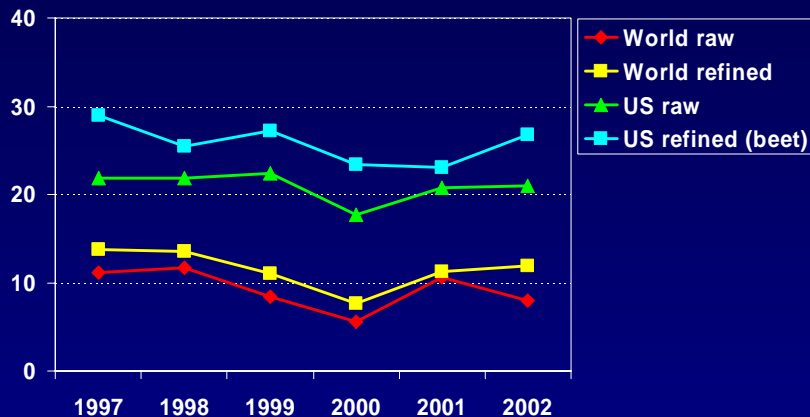


Almost 40% of energy in the US diet is provided by added sugars and added fats

■ Protein ■ Carbs ■ Added sugar ■ Added fat ■ Fat

- The key difference between added and natural sugars and fats is not nutritional but economic
- Added sugars and added fats are far cheaper
- Source: Drewnowski, Fat and sugar: an economic analysis J Nutr 2003

World and US prices for raw and refined sugar and for fats and oils 1997-2002 (cents per lb)

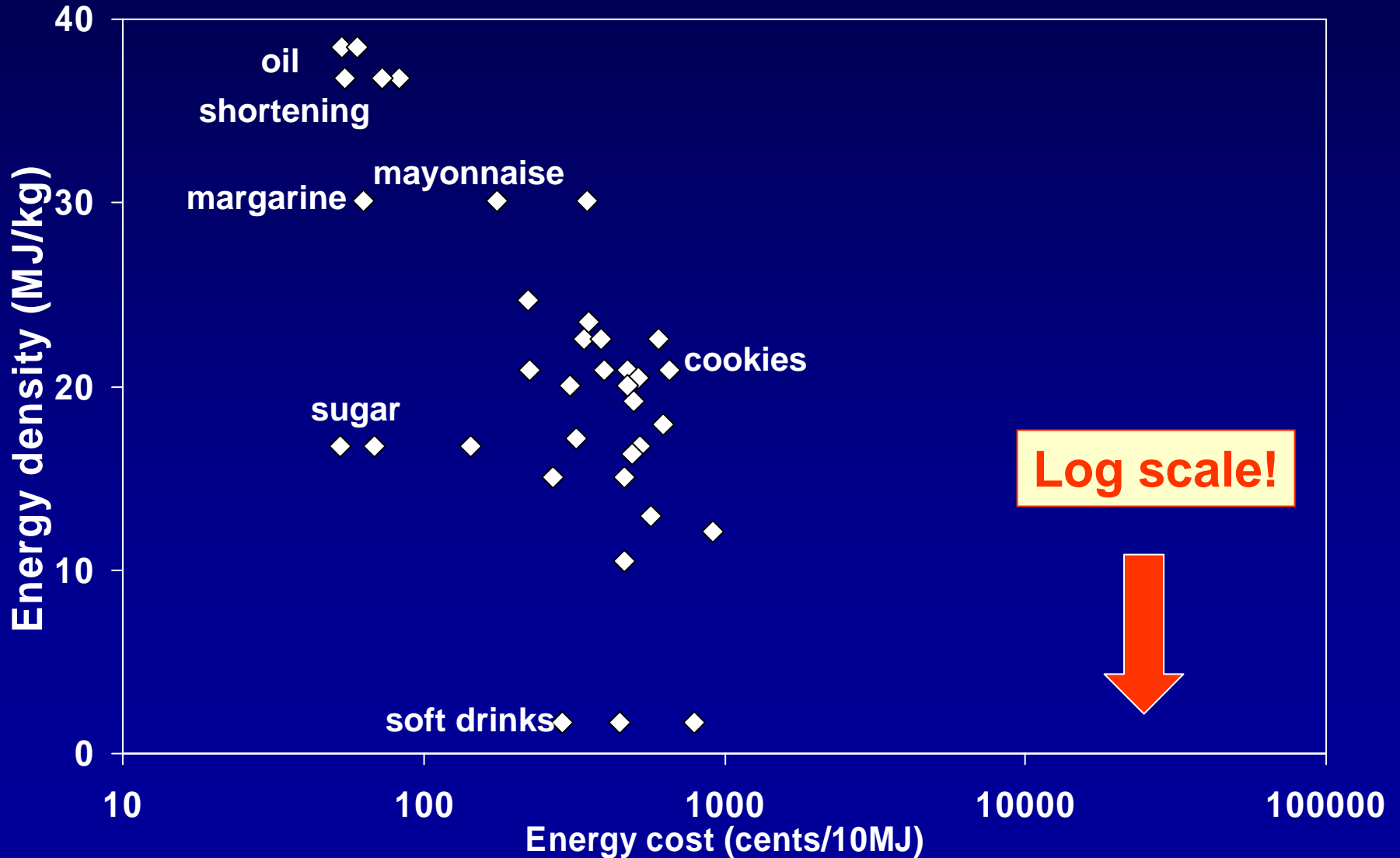


- At world prices, sugar provides 20,000 kcal per dollar.
- Fats and oils provide another 20,000 kcal per dollar
- Nutritionists equate 3,500 kcal with 1 lb of body weight
- The “economic cost” of gaining 1 lb body wt is 12 cents
- Provided that you consume sugar and fat – and people do

Energy density (mJ/kg) and energy cost (cents/10MJ)

10 MJ ~2,500 kcal

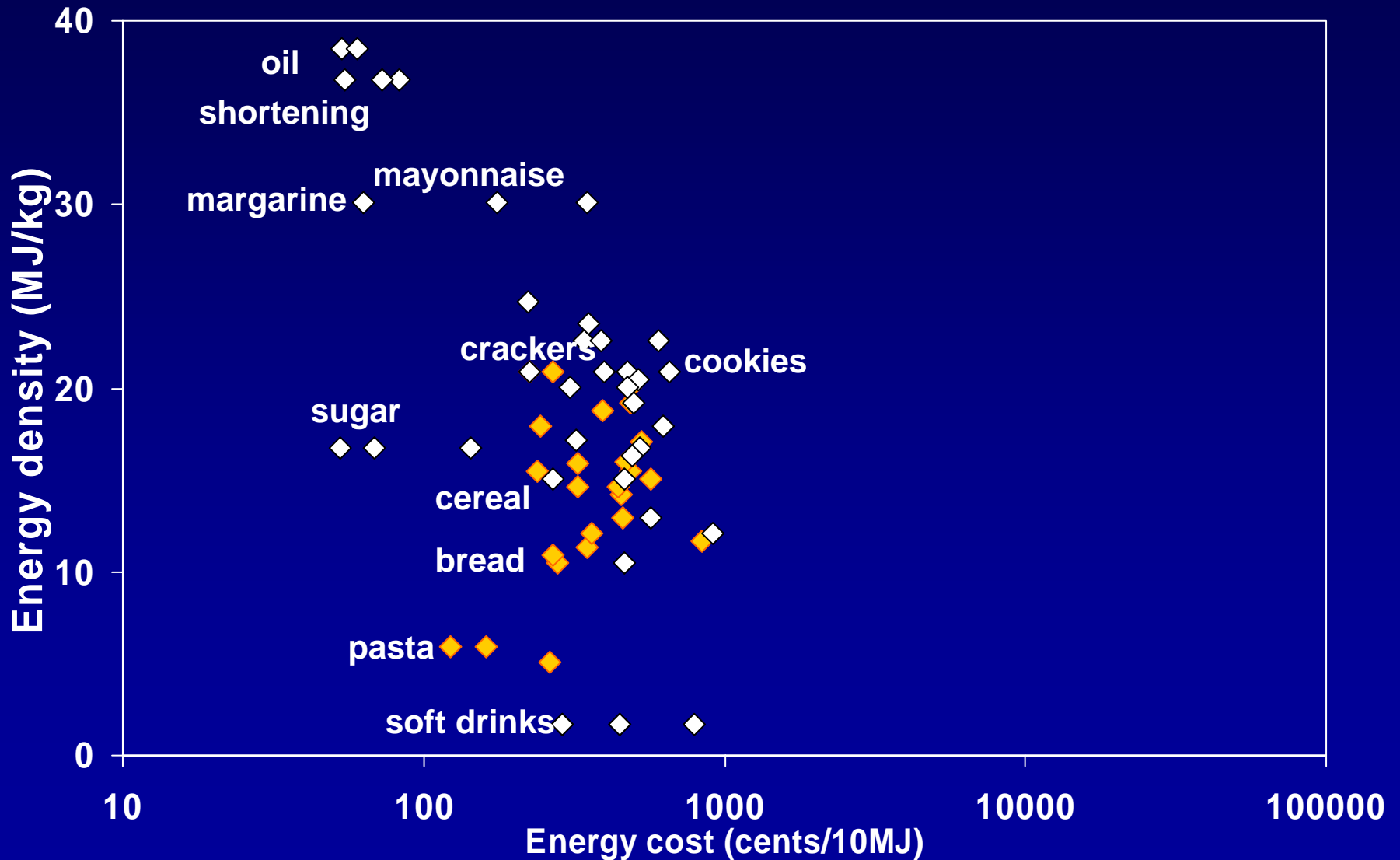
◆ Fats/sweets



Energy density (mJ/kg) and energy cost (cents/10MJ)

10 MJ ~2,500 kcal

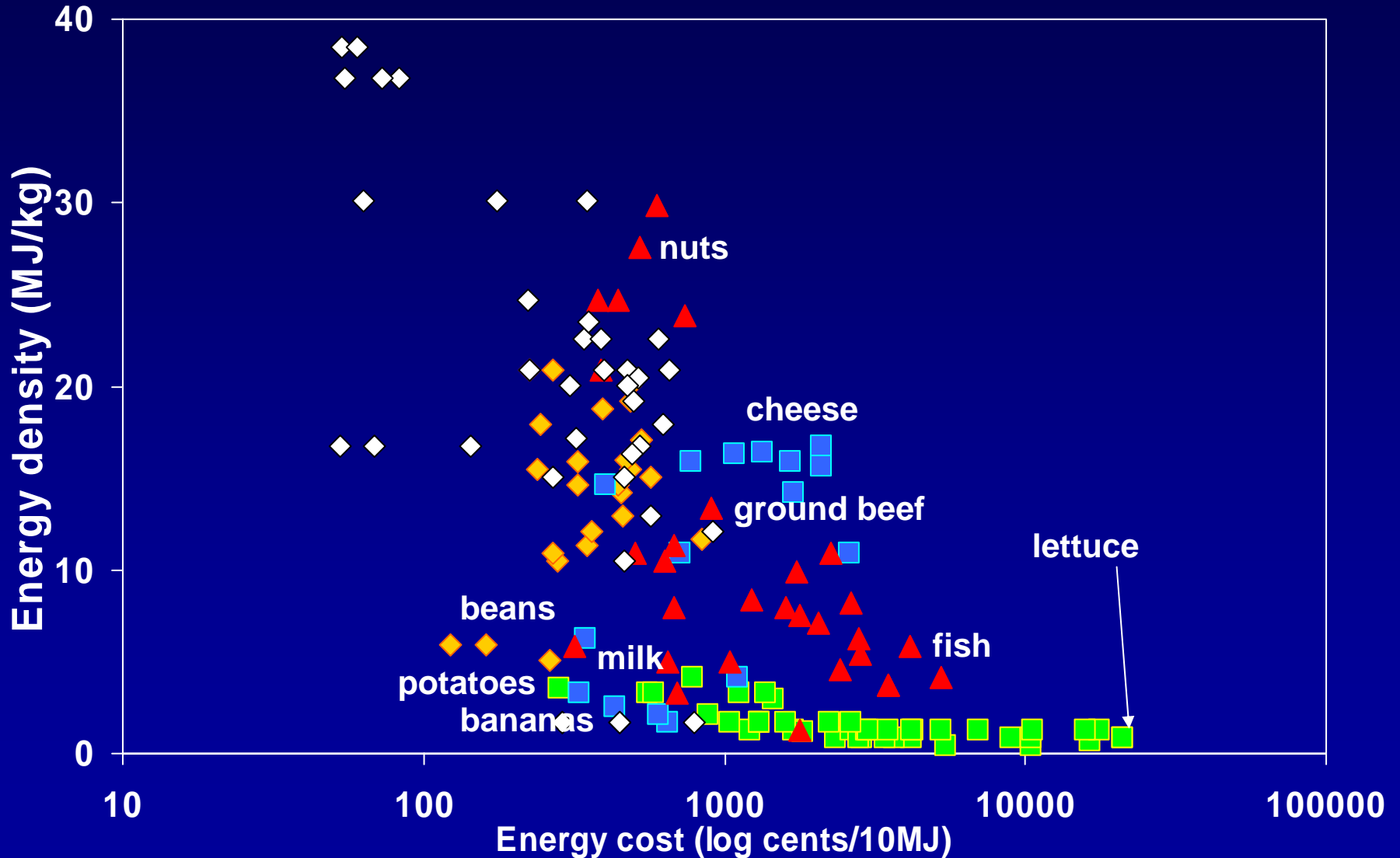
◆ Grains ◆ Fats/sweets



Energy density (mJ/kg) and energy cost (cents/10MJ)

10 MJ ~2,500 kcal

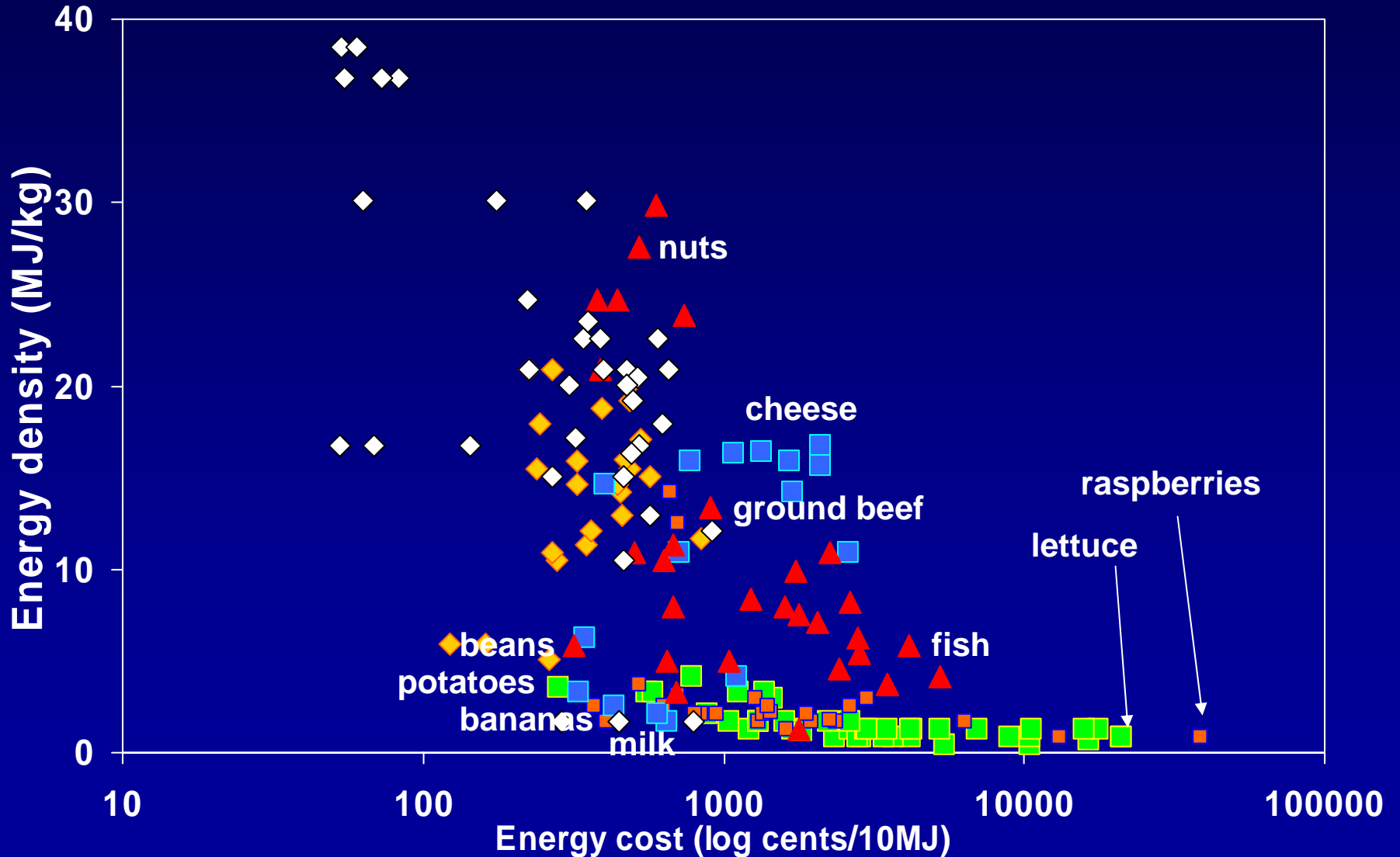
◆ Grains ■ Vegetables ■ Milk ▲ Meat ◆ Fats/sweets



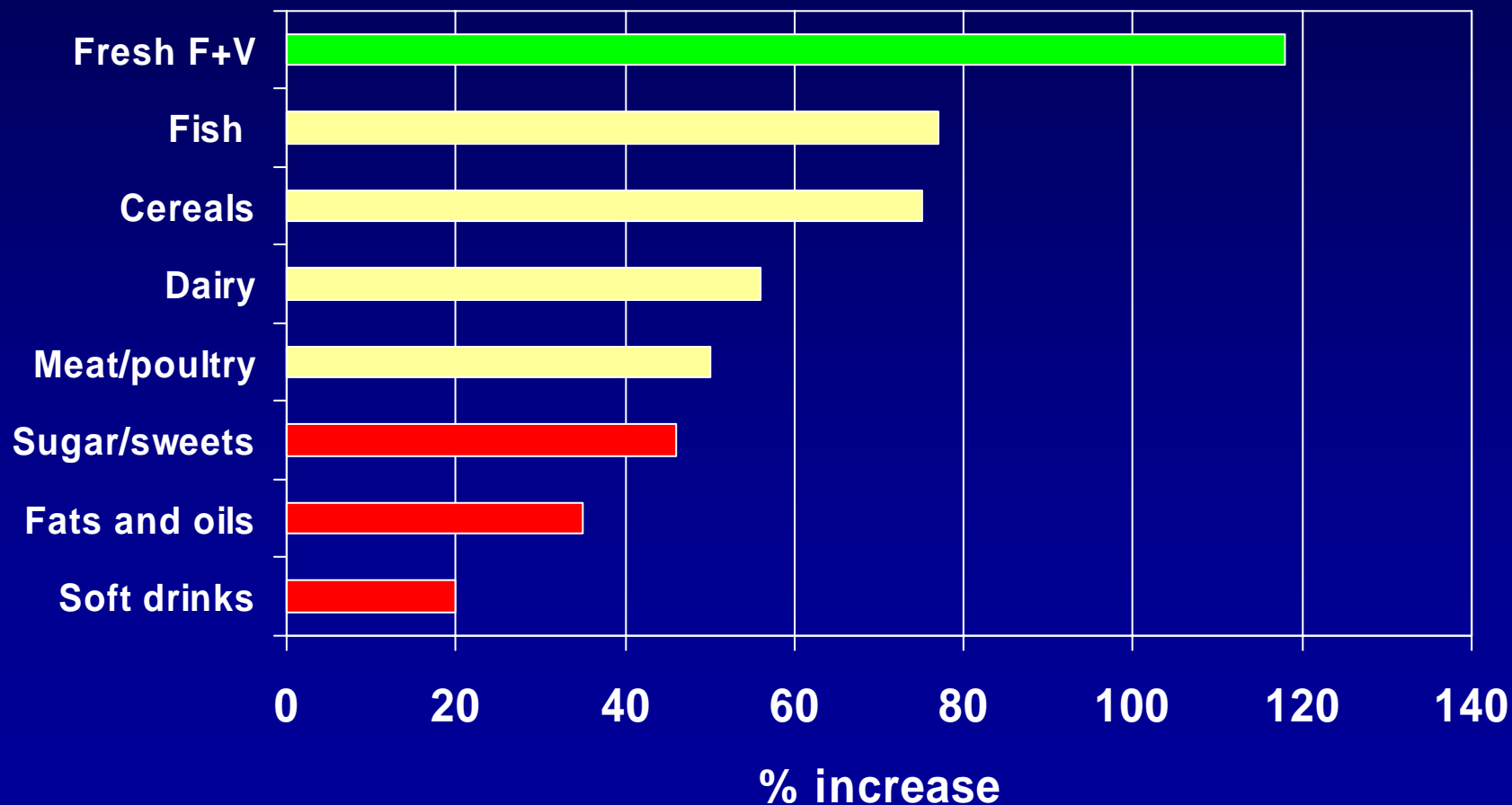
Energy density (mJ/kg) and energy cost (cents/10MJ)

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◆ Grains ■ Vegetables ■ Fruit ■ Milk ▲ Meat ◆ Fats/sweets



Retail price increases 1985-2000 were highest for F+V, lowest for sugar and fat (as% base year)



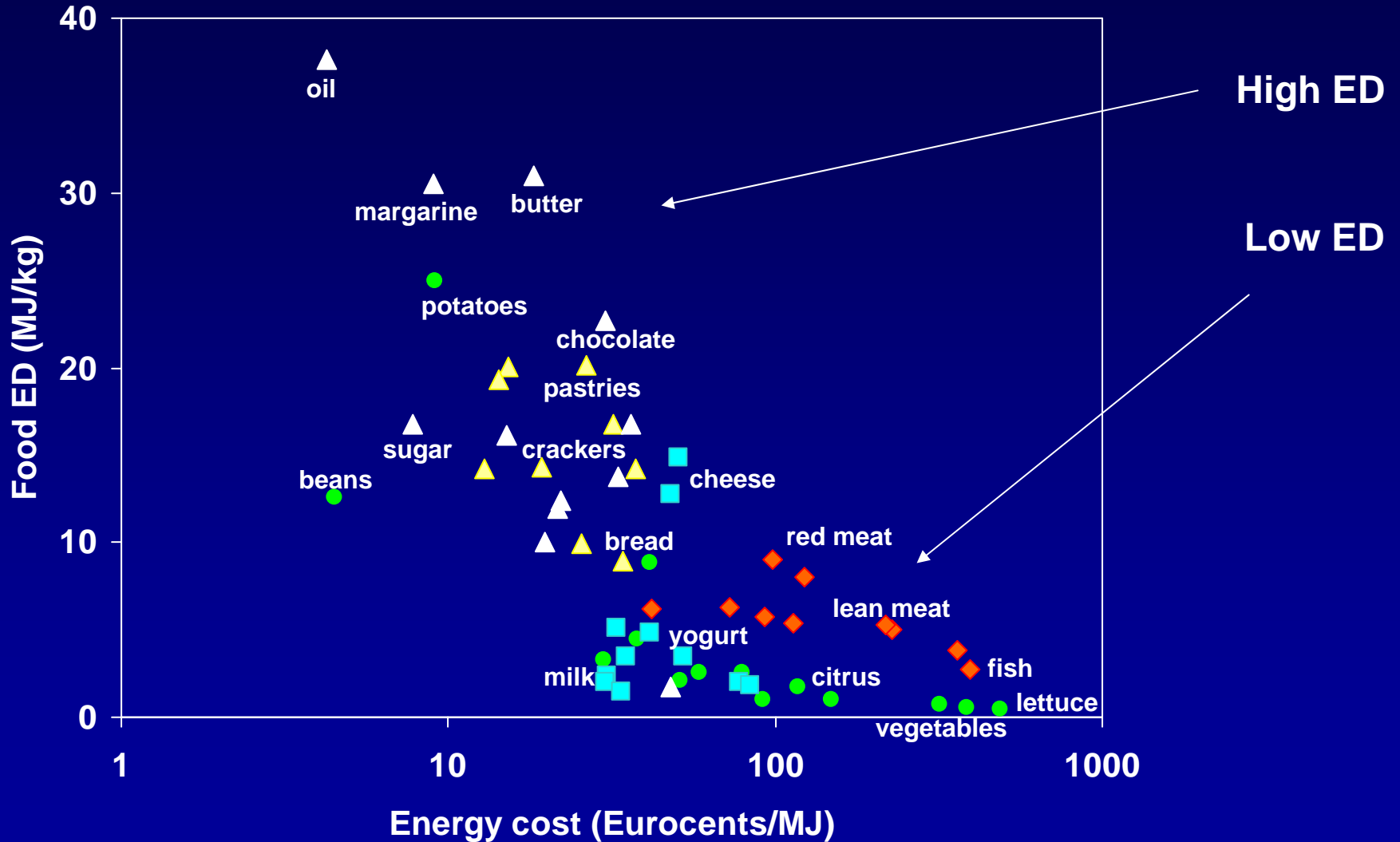
Do “healthier” diets cost more?

A community study of French adults

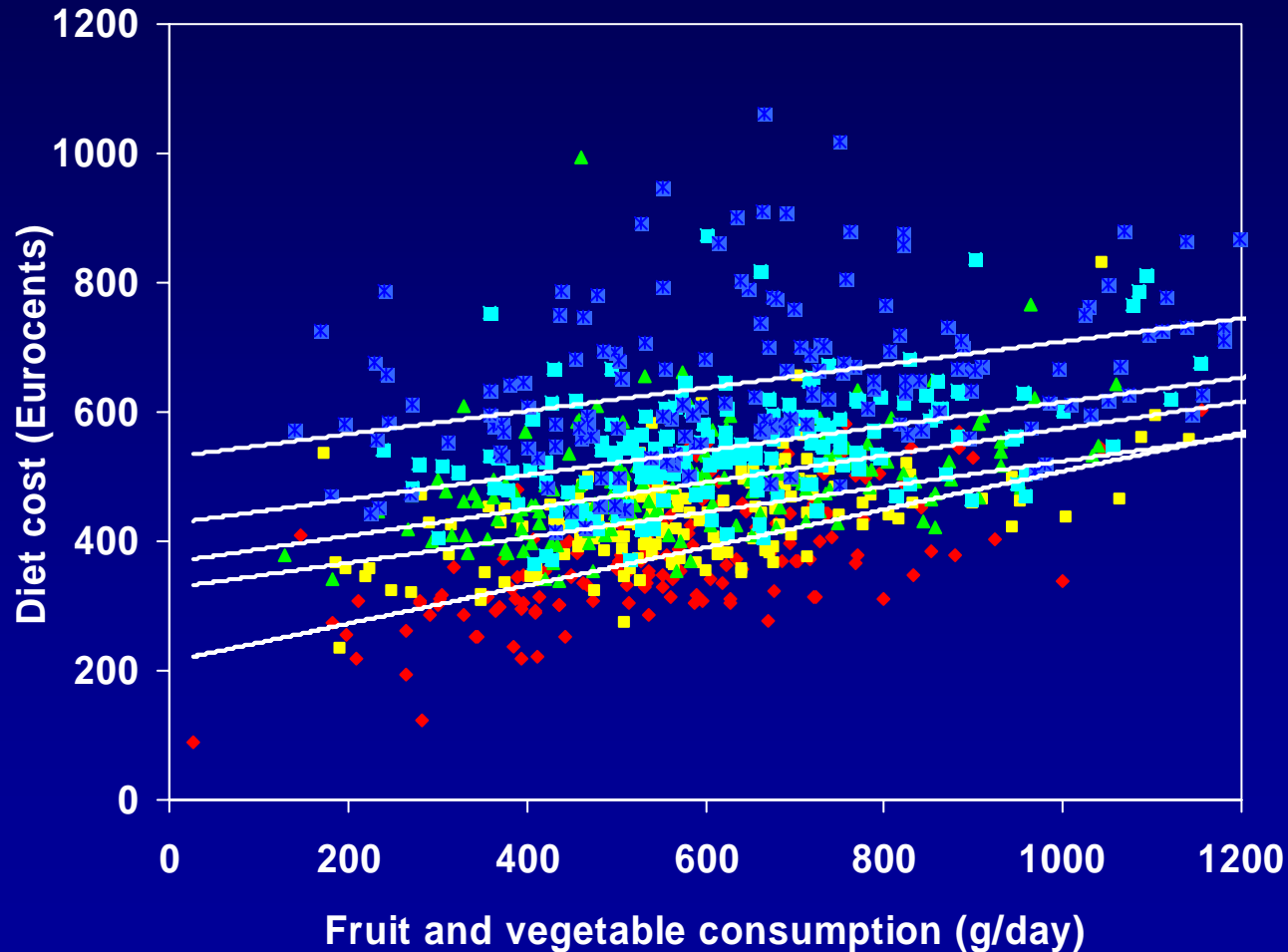
- **Val-de-Marne data: 361 adult men and 476 women**
- **For each of the 57 foods in the database**
 - **Mean cost per kg obtained from the French National Institute for Economic Research (INSEE) corresponding to mean national price for that item**
 - **Mean cost per kg multiplied by amount consumed**
 - **Data summed over all foods to yield diet cost**
- **This gave us estimated diet costs for each person**
- **We then examined the relationship between diet structure (foods and nutrients) and diet cost**

- **Darmon, Briend, Drewnowski Public Health Nutrition 2004**
- **Drewnowski, Briend, Darmon. Am J Public Health 2004 (in press)**
- **Darmon, Ferguson, Drewnowski, Briend. Rome Nutrition Congress 2003**

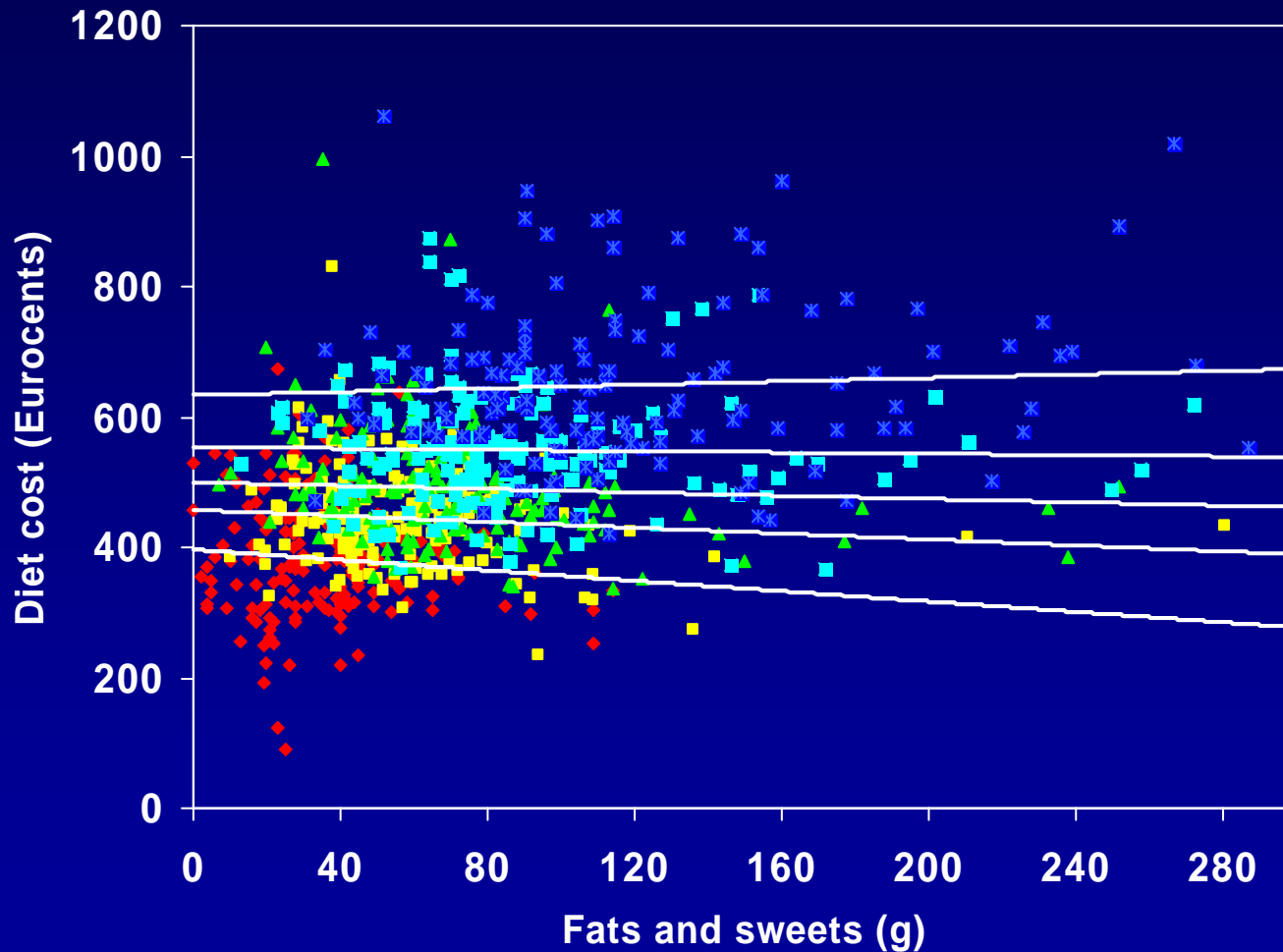
Energy dense foods = lower energy costs



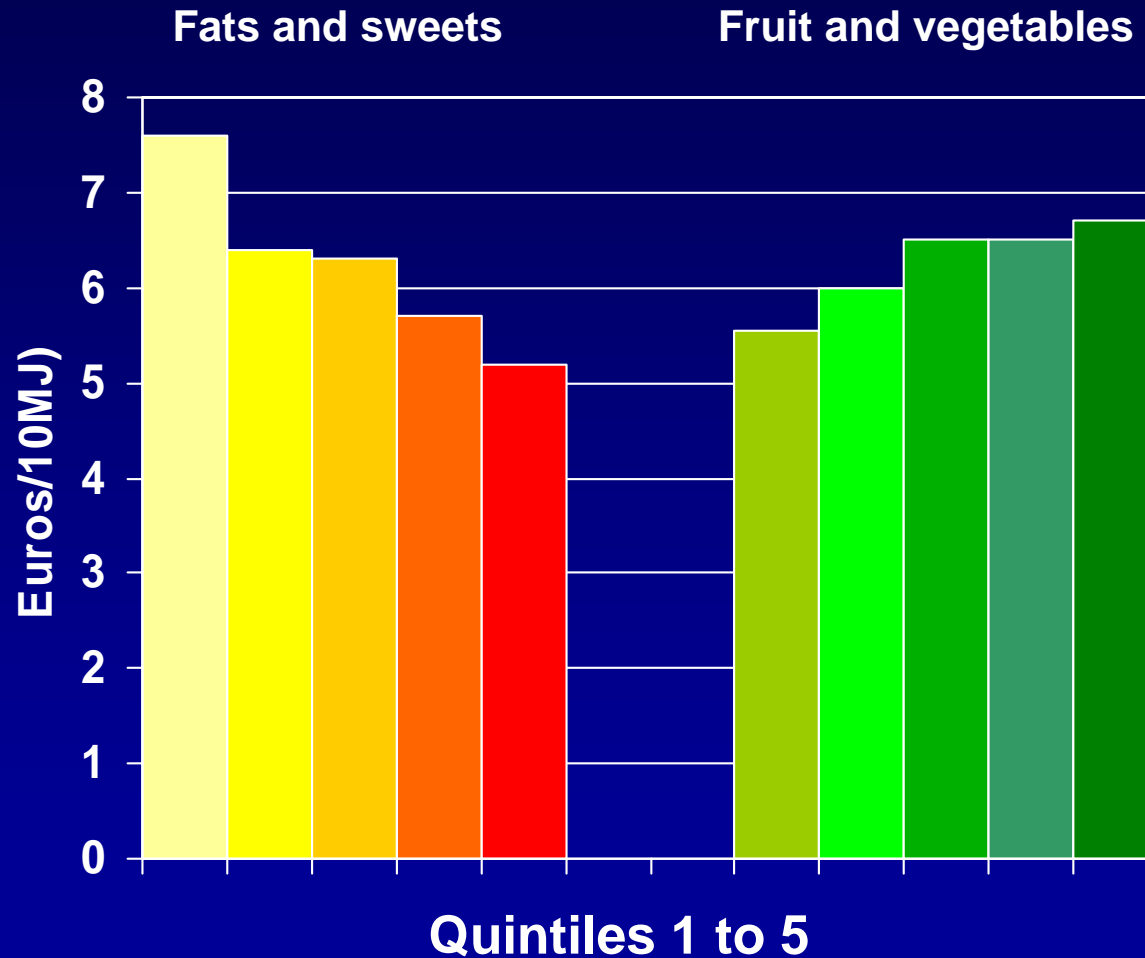
At each level of energy intake, eating more vegetables and fruit was associated with higher diet costs



At each level of energy intake, eating more fats and sweets was associated with lower diet costs



Energy cost (Euros/10MJ) by quintiles of consumption

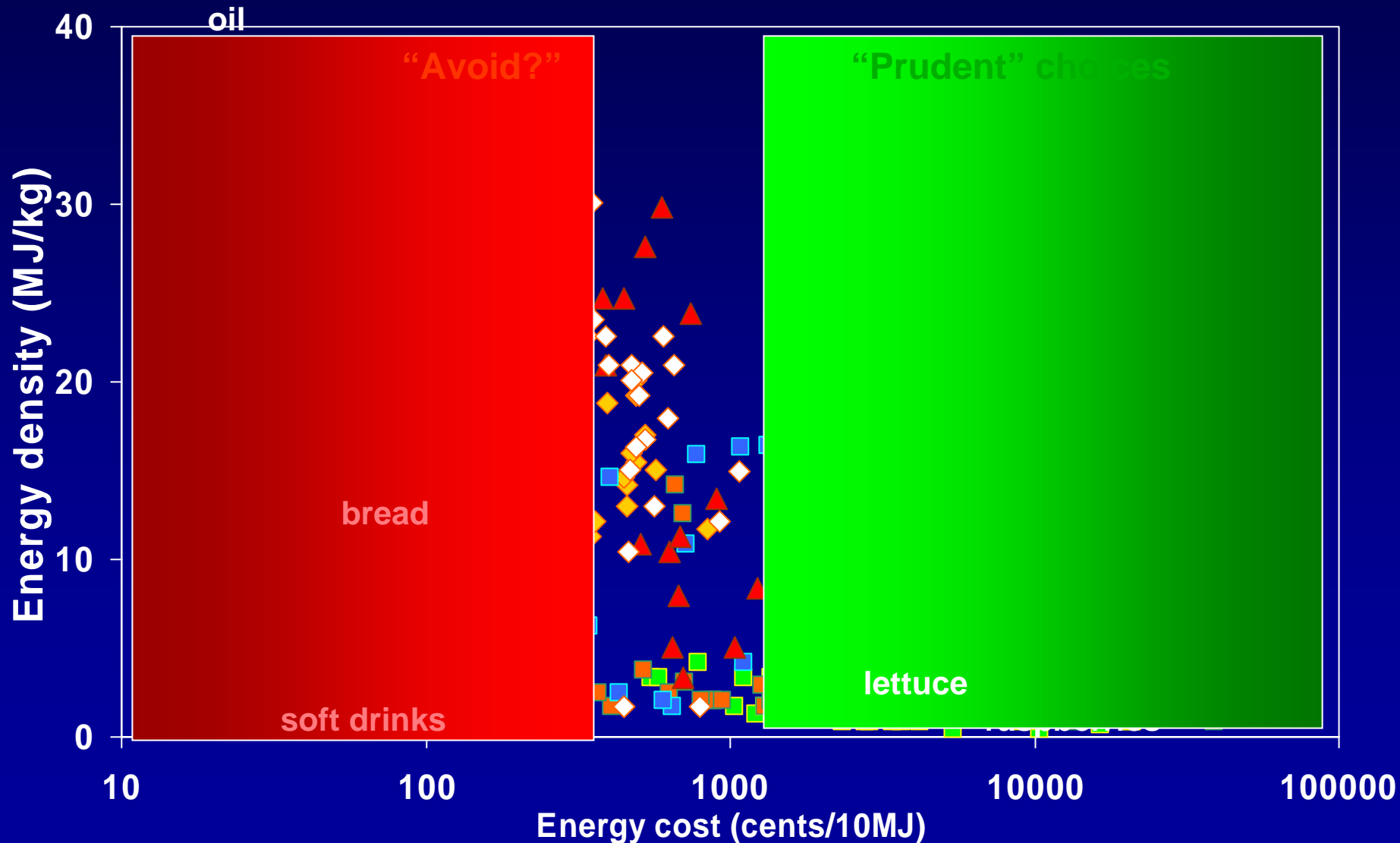


**More fats and sweets
=
Lower cost**

Are “healthful” foods simply more expensive?

Drewnowski 2003

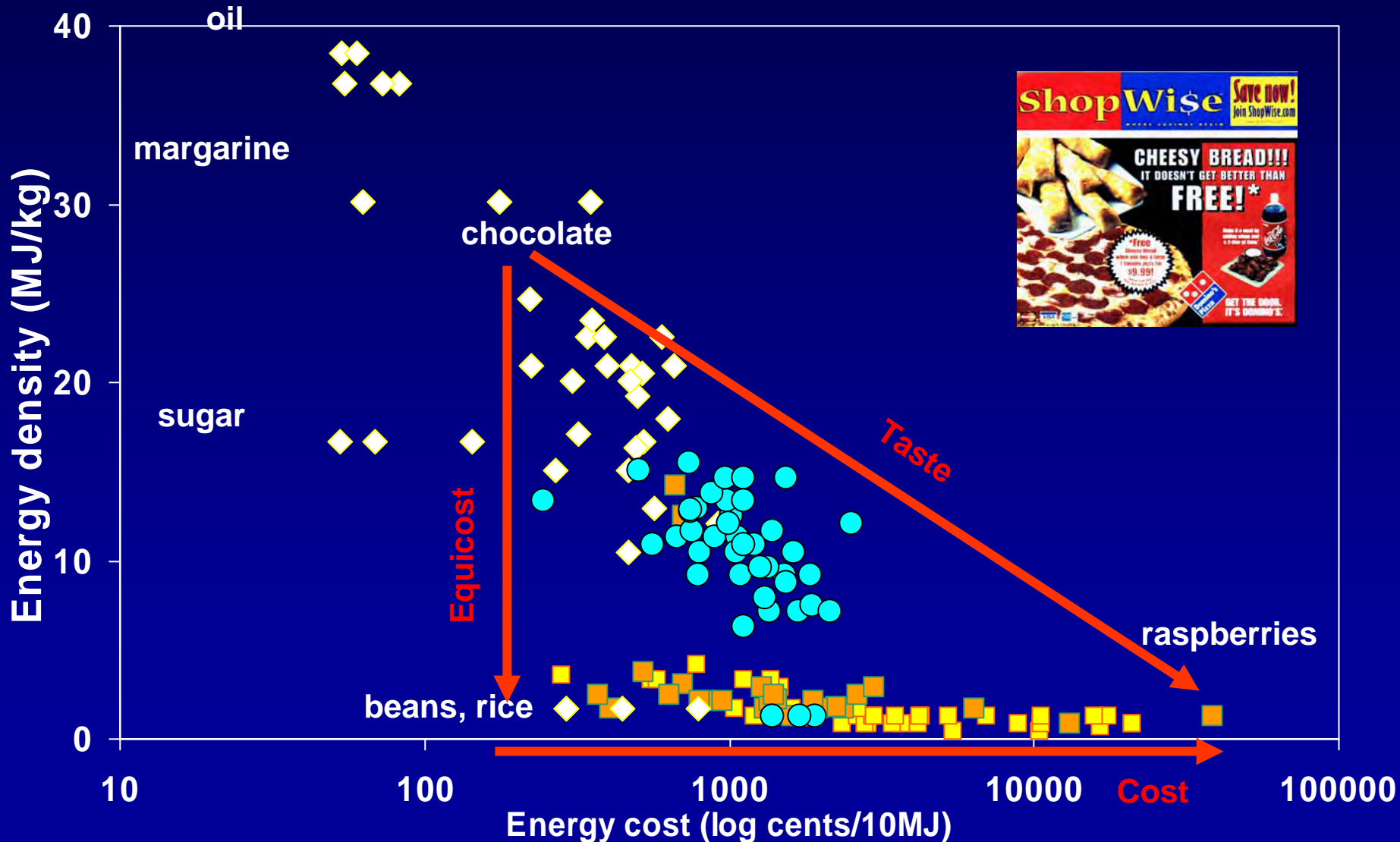
◆ Grains ■ Vegetables ■ Fruit ■ Milk ▲ Meat ◆ Fats/sweets



**So why do we behave as if all
diets cost the same?**

Tradeoffs – taste, cost, and convenience

■ Vegetables ■ Fruit ◆ Fats/sweets ● Fast foods



Obesity and “unhealthy” diets are both associated with low incomes and low education

Could there be a link between dietary energy density and obesity...

...that is mediated by low food costs?



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CHEESY BREAD!!!
IT DOESN'T GET BETTER THAN
FREE!*

*Free Cheesy Bread when you buy a large 1 topping pizza for \$9.99!

Make it a meal by adding wings and a 2-liter of Coke.

GET THE DOOR. IT'S DOMINO'S.

Domino's Pizza

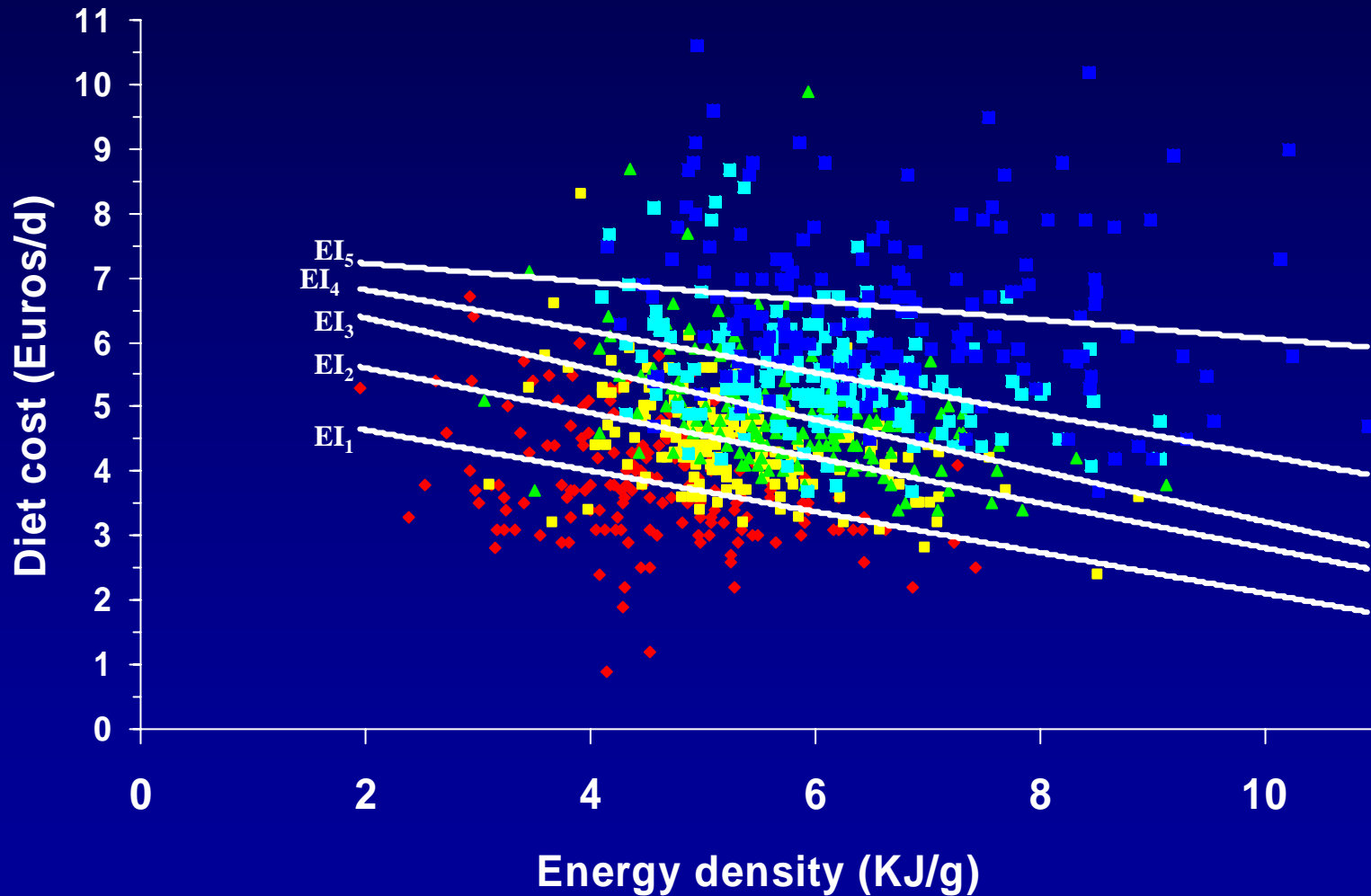
Domino's now accepts credit cards

The advertisement features a large image of a pepperoni pizza with a cheesy bread roll on top. A starburst graphic highlights the offer. To the right, there is an image of a 2-liter Coca-Cola bottle and a plate of wings. The Domino's logo is in the bottom right corner.

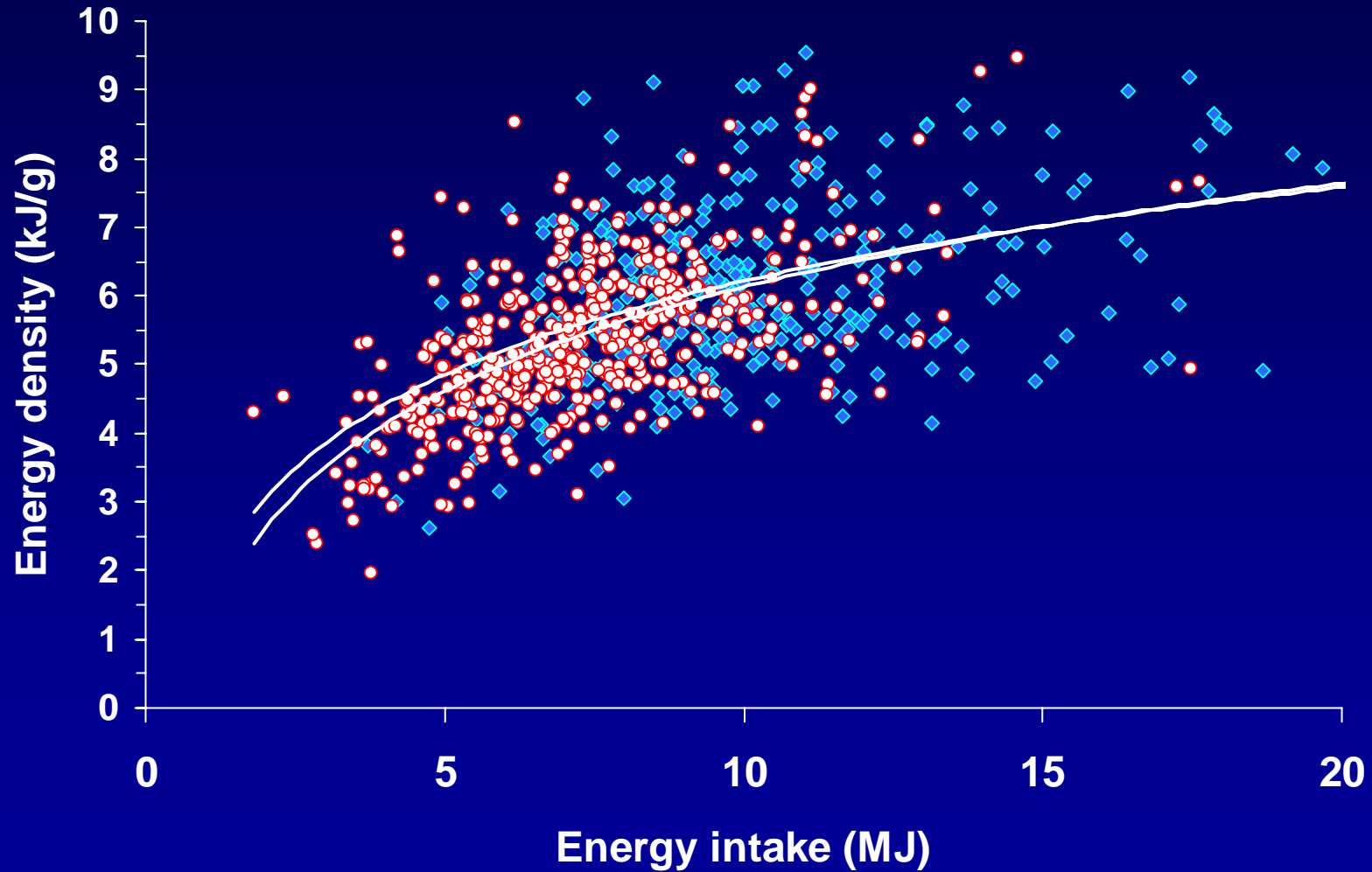
**Are energy-dense diets associated
with lower diet costs?**

An observational study

At each EI level, higher ED = lower cost



Higher dietary ED = higher energy intakes



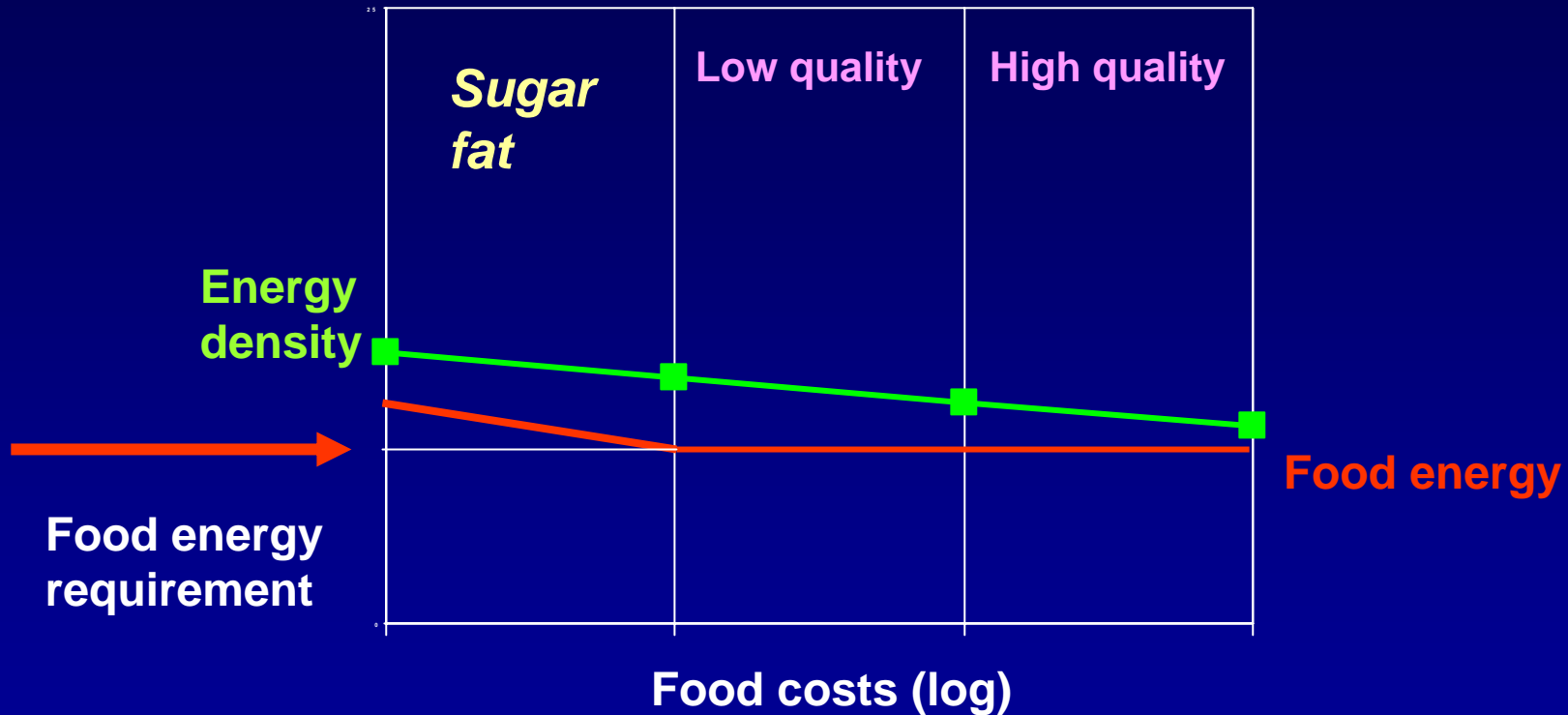
Source: Darmon, Briend, Drewnowski PHN 2004

Does reducing diet costs lead to energy dense diets?

A hypothesis and a linear programming model

The Energy Density curve

Drewnowski and Specter AJCN 2004:79:6-16

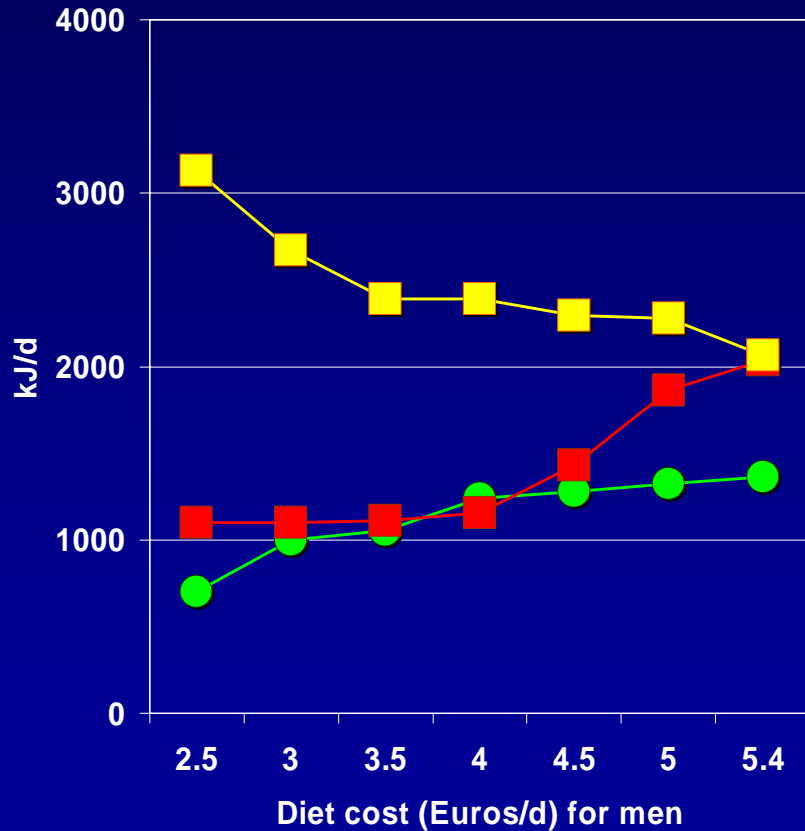


The paradox – it is possible to spend less and get more
But the calories will be refined grains, added sugar and fat

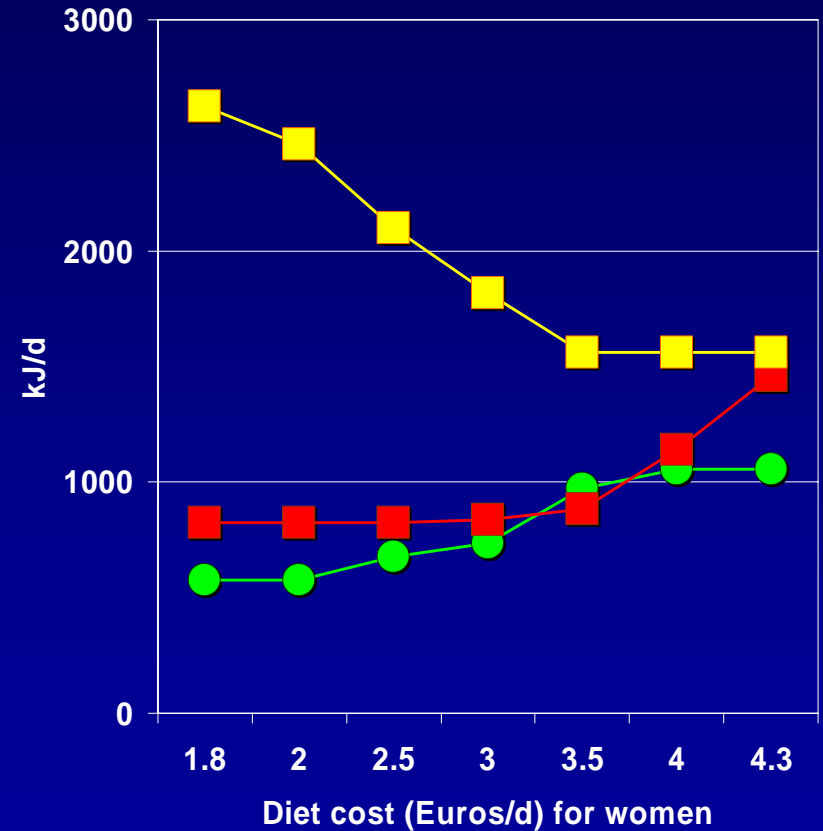
Diet composition after imposing cost constraints: less meat and produce; more added fats

(Val-de-Marne data cited in Drewnowski & Specter, 2004)

● F+V ■ Meat, fish, eggs ■ Added fats and sweets



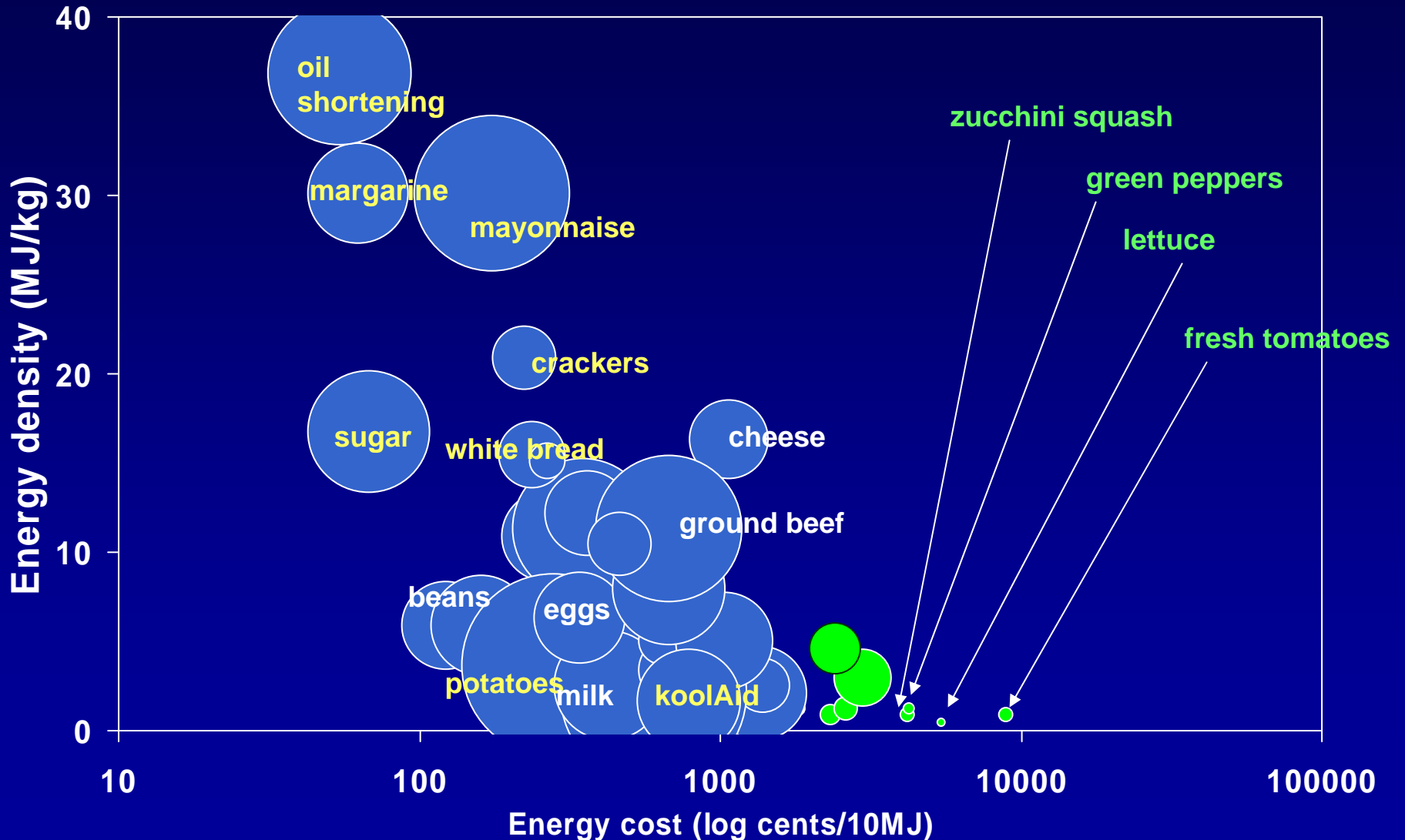
● F+V ■ Meat, fish, eggs ■ Added fats and sweets



The USDA Thrifty Food Plan meets nutritional standards and can be considered a “healthy” diet

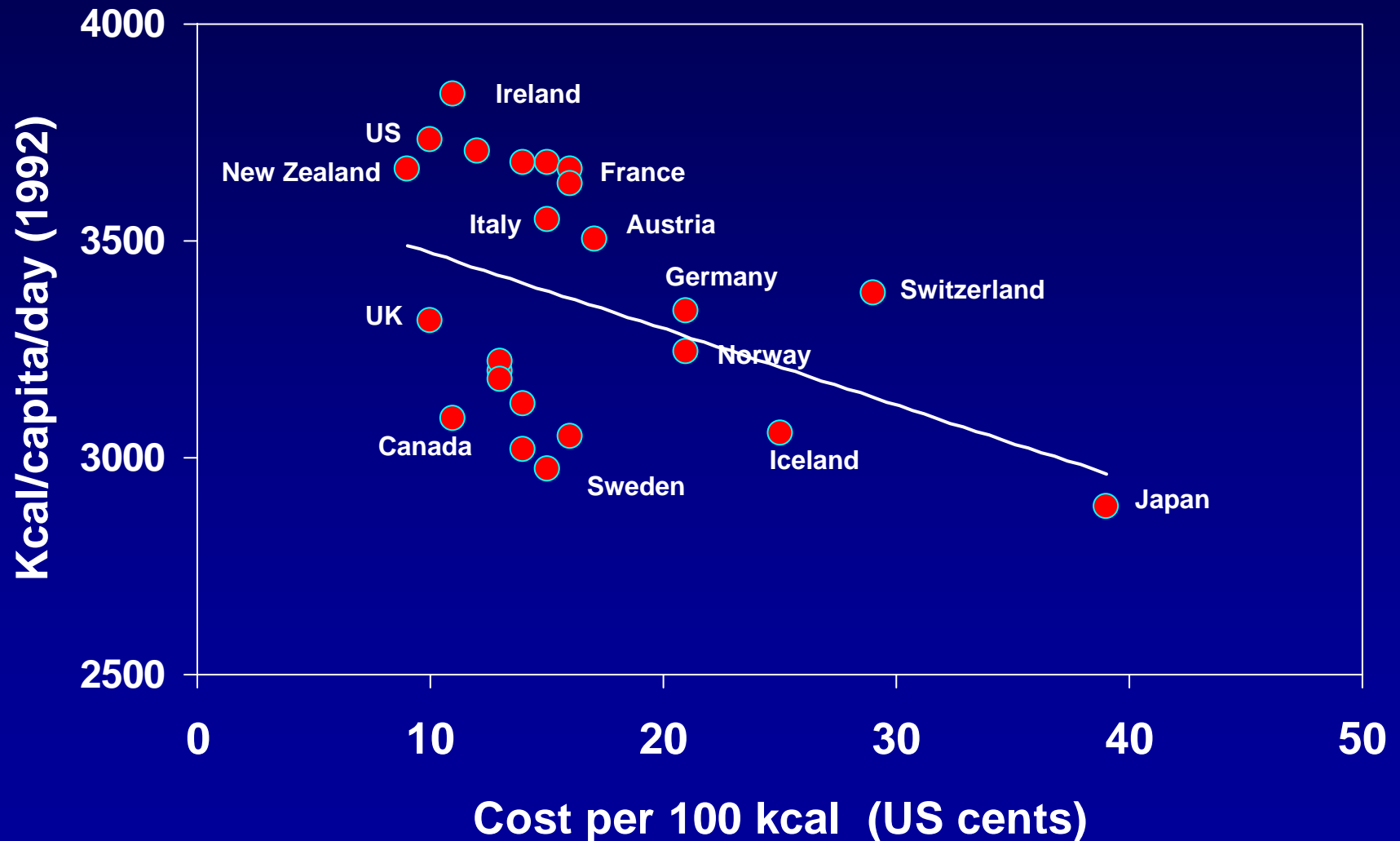
It was created using a cost constraint (\$104/wk/family of 4) in non-linear programming

What can you get for \$100/week for a family of 4. The USDA Thrifty Food Plan: 1999

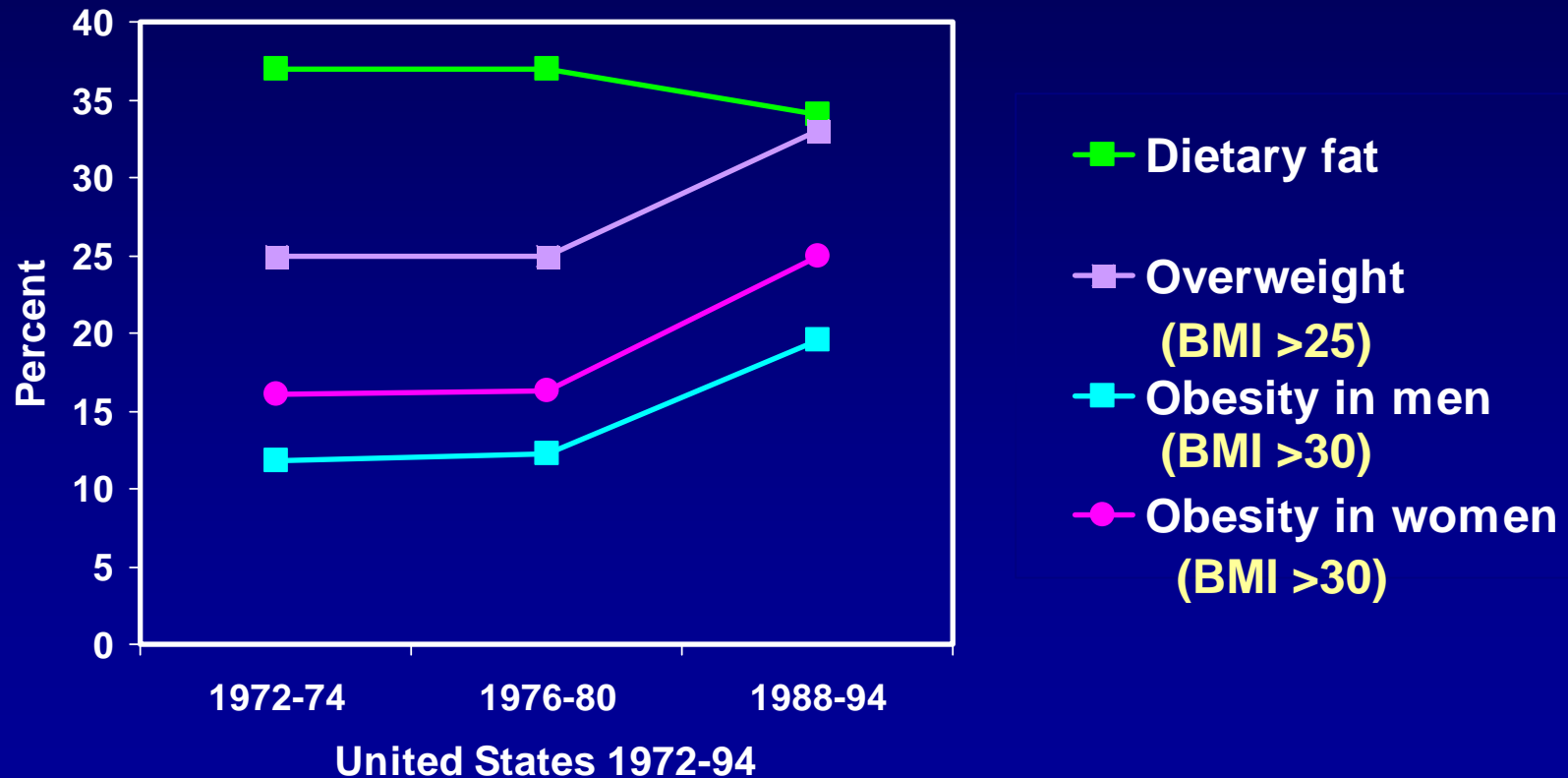


**What are the current trends on
food spending?**

Energy costs (US cents/d) and estimated per capita energy intakes for high-income nations

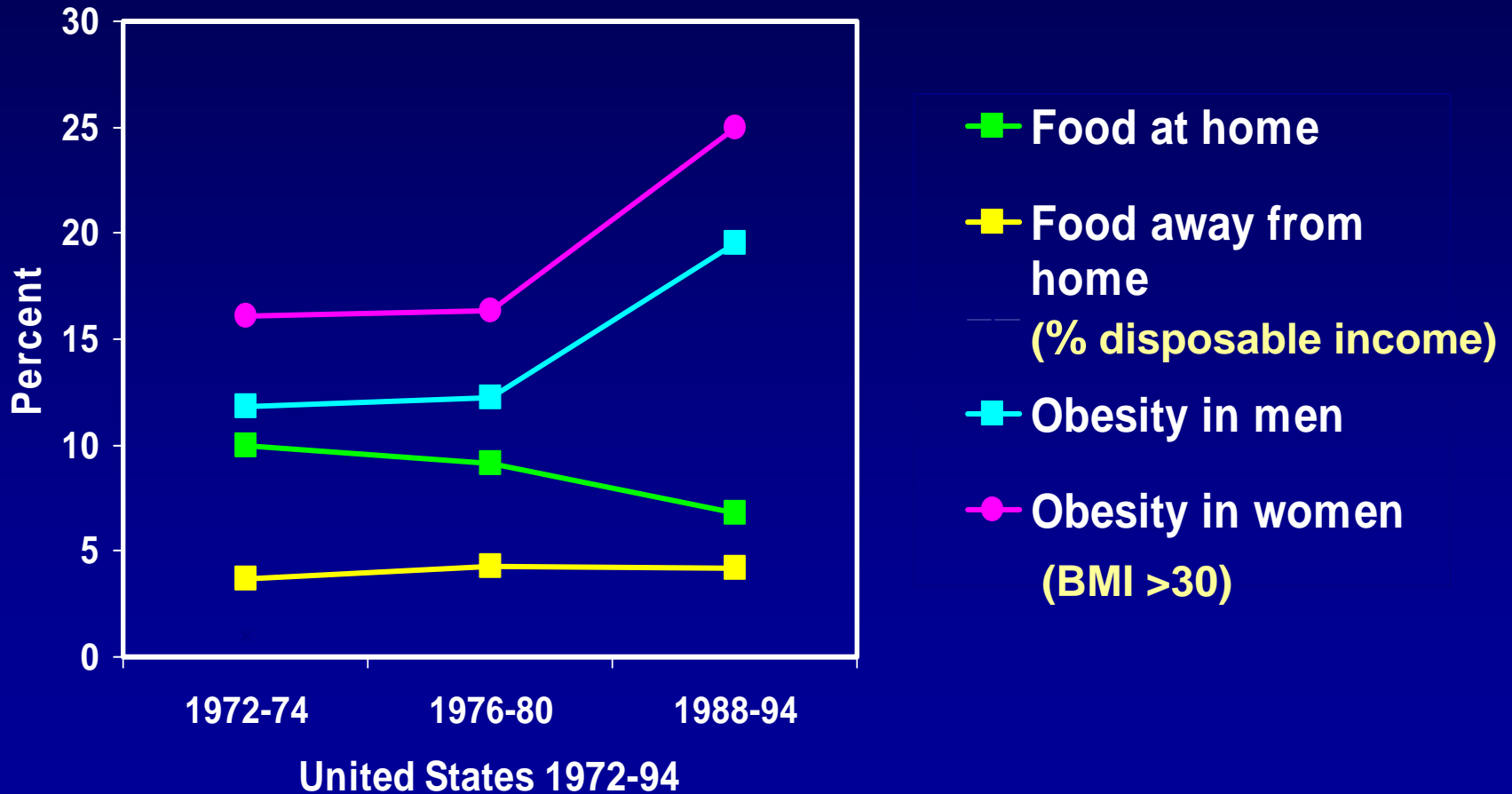


Changes in dietary fat (% energy) and the prevalence of overweight and obesity



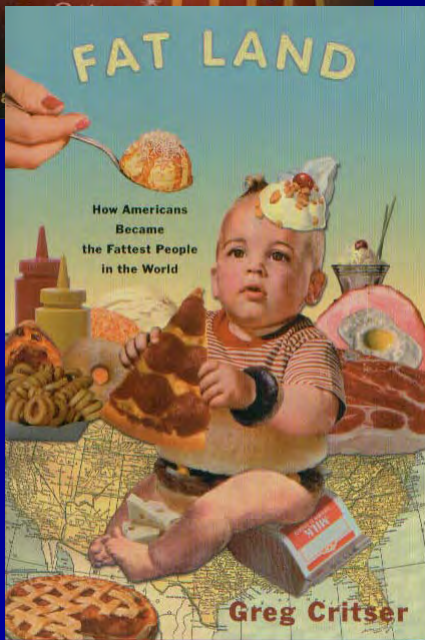
Food expenditures and obesity in the US

data from NHANES (NCHS), DHHS, and ERS, USDA



Is the food industry to blame?

Who made us obese?



- Do we have too much of a good thing – or...
- Is it a criminal offense to provide consumers with a wide choice of inexpensive foods that are convenient and taste good?
- If consumers become obese, to whom does liability attach?
- Is fast food the “tobacco of the 21st century?”

OBESITY CLAIMS

LEGAL, SCIENTIFIC AND REGULATORY UPDATES STRATEGIES FOR REDUCING YOUR EXPOSURE

January 29 and 30, 2004 The Hay-Adams, Washington, DC

Legislative Update: Will Resolution Come from The Hill?
 Congressman Ric Keller 8th District of Florida (Washington, DC)
 Leon R. Sequoia, Legal Counsel U.S. Senator Mitch McConnell (Washington, DC)
 Victor Schwartz Partner Shook, Hardy & Bacon, LLP (Washington, DC)

Using Legal Action as a Weapon Against the Public Health Problem of Obesity
 Prof. John Banzhaf III George Washington University Law School (Washington, DC)

Leading product liability and advertising litigators, regulatory attorneys, nutritionists, epidemiologists and senior government officials will update you on the critical issues, including:

- Exposure of various sectors of the food, grocery and restaurant business
- The science behind the causation of obesity: what helps/hurts your case
- Legislative update: how likely is it that "personal accountability" laws will pass and what will they mean for your client?
- Effective marketing in a litigious environment
- Lessons learned from diet drug litigation: what can the food industry do to protect itself going forward?
- What do food companies need to do now to protect themselves?
- Managing the minefield — preemptive tools for success in the face of litigation

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The McDonald's's Lawsuit

ASHLEY PELMAN, a child under the age of 18 years, by her Mother and Natural Guardian BERTA PELMAN, ROBERTA PELMAN, Individually, JAZLYN BRADLEY, a child under the age of 18 years, by her Father and Natural Guardian ISRAEL BRADLEY, and ISRAEL BRADLEY, Individually, Plaintiffs, - against - **McDONALD'S CORPORATION, McDONALD'S RESTAURANTS OF NEW YORK, INC., McDONALD'S 1865 BRUCKERN BOULEVARD, BRONX, NEW YORK, McDONALD'S 2630 JEROME AVENUE, BRONX, NEW YORK,** Defendants.

02 Civ. 7821 (RWS)

UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK

237 F. Supp. 2d 512; 2003 U.S. Dist. LEXIS 707

January 22, 2003, Decided
 January 22, 2003, Filed

12:15 **Do Healthier Diets Cost More? Obesity and the Economics of Food Choice**

Dr. Adam Drewnowski, Director Center for Public Health Nutrition Professor of Epidemiology and Medicine University of Washington (Seattle, WA)

Peter Goss, Counsel Faegre & Benson (Minneapolis, MN)

- The "choice" in cost differential
- "You get what you pay for" and the impact of cost differential on litigation

BACKGROUND HISTORY: Counsel Amended January 23, 2003. Motion denied by Pelman v. McDonald's Corp., 215 F.R.D. 96, 2003 U.S. Dist. LEXIS 5674 (S.D.N.Y., Apr. 7, 2003)

OPINION: Complaint was dismissed in its entirety. Leave was granted to replead all claims based on New York City Administrative Code, Ch. 5, 20-700 et seq., which were prejudiced.

****1]** Attorney for Plaintiffs: SAMUEL HIRSCH & ASSOCIATES, New York, NY, HIRSCH, ESQ. Of Counsel.

Attorneys for Defendants: WINSTON & STRAWN, New York, NY, By: THOMAS J. QUIGLEY, ESQ., BRADLEY E. LERMAN, ESQ., BRUCE R. BRAUN, ESQ., Of Counsel. WILDMAN, HARROLD, ALLEN & DIXON, Chicago, IL, By: ANNE G. KIMBALL, ESQ., SARAH L. OLSON, ESQ., Of Counsel.

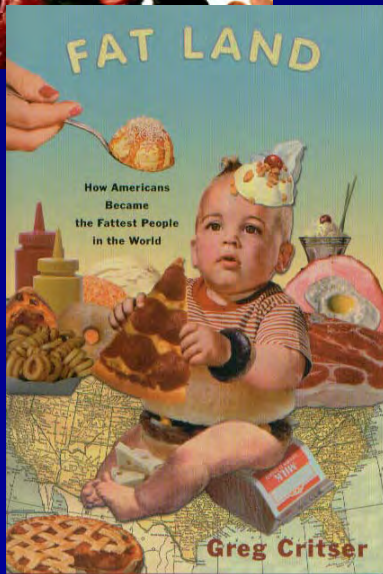
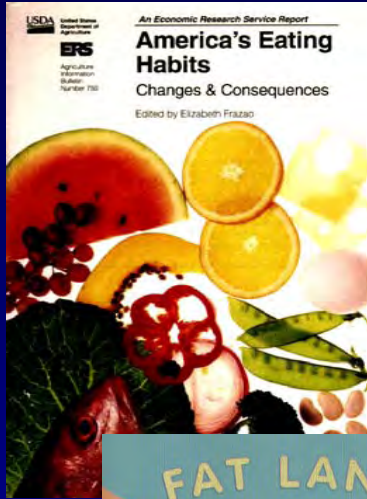
The Pelman claims

pursuant to New York Gen Bus Law §§ 349, 350

- Count 1:** Deceptive acts (claims of nutritional value, “supersizing”) and deceptive omissions (failure to warn or to disclose nutrient content)
- Count 2:** Representations targeted at children
- Count 3:** Inherently dangerous food (cholesterol, fat, salt and sugar)
- Count 4:** Failure to warn of unhealthy attributes and disease risk
- Count 5:** Sale of addictive products

Complaint dismissed in its entirety by Justice Sweet; leave granted to replead. Amended complaint dismissed 9/3/2003

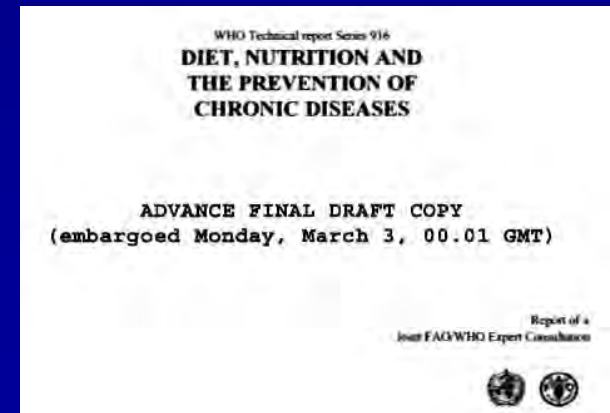
What is to be done?



The 2003 WHO Report

- High intake of **energy-dense** foods promotes weight gain
- Free **sugars** contribute to overall energy density of diets
- Sugar-sweetened **drinks** are energy-dense
- Sugar-sweetened drinks reduce appetite control
- Humans are ill-adapted to liquid foods
- **Energy in fluids** is not well detected by the body

- Consuming energy-dilute whole grains, legumes, vegetables and fruit will reduce energy intakes and stem the global obesity epidemic



Taste and energy density drive eating behavior

- **Taste**

Infants respond to sweet solutions at birth

Infants select sweeter sucrose over less-sweet lactose

Infants learn to consume sweet solutions

- **Energy density (ED)**

Children prefer familiar and energy-dense foods

Some of those foods are mixtures of sugar and fat

Soft drinks are energy-dilute; whole grains are not



Innate preferences for sugar and fat are a fact of life

Are energy-dense foods less satiating?

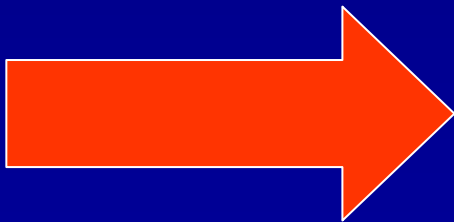
**There should be more studies on
the satiating power of foods**

**We also need studies on the
relationship between diet quality
and diet cost**

A new model to explain environmental influences on obesity in the US

What is the connection between obesity and

- Food palatability**
- Energy density**
- Food costs**
- Economic resources**
- Sugar and fat content of the diet**



Mediated by the social/financial resources and the economics of food choice (Drewnowski and Specter, AJCN 2004)