Obesity and the economics of food choice

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Is obesity an economic issue?
First question

What is energy density of foods?

- Energy density defined as MJ/kg
- Energy values from database
- Energy density is the inverse of water content
Energy density (MJ/kg) depends on the water content of foods

- Fats
- Sweets
- Grains
- Oils
- Butter
- Grains
- Soft drinks

Energy density (MJ/kg) depends on the water content of foods

- Meats
- Dairy
- Cheese
- Meats
- Milk
Energy density (MJ/kg) depends on the water content of foods.
Energy density (MJ/kg) depends on the water content of foods

How people choose foods

Cost

Food choices

Obesity

Energy density

Taste

Convenience

Health

Variety
Second question

Do energy-dense foods cost less?

• Energy density defined as kcal/100g
• Energy cost defined as €/1000 kcal
• Energy values from databases
• Mean national food prices in France
Energy density (kcal/100g) and energy cost (Euros/1000kcal) – INCA study

- Oil
- Butter
- Sugar
- Desserts
- Soft drinks
- Grains
- Bread
- Pasta
- Soft drinks

Chart showing the relationship between energy density and energy cost for various food items.
Energy density (kcal/100g) and energy cost (Euros/1000kcal) – INCA study
Energy density (kcal/100g) and energy cost (Euros/1000kcal) – INCA study

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Energy density (kcal/100g) and energy cost (Euros/1000kcal) – INCA study
Energy density (kcal/100g) and energy cost (Euros/1000kcal) – INCA study
Same price hierarchy in Seattle as in France

Are “junk” foods simply cheaper?
Third question:

Do energy-dense diets cost less?

- French INCA study conducted by AFSSA
- Sample of 1,985 adults; 7-day food diaries
- National prices for 650 foods supplied by French government (INSEE); by market research agencies (SECODIP)
- Diet costs estimated in €/d
- Energy cost estimated as €/10MJ
- This is a measure of monetary exposure

At each intake quintile, higher energy density = lower cost (€/wk)
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INCA data 1998
At each intake quintile, higher energy density = lower cost (€/wk)

INCA data 1998
A drop in dietary energy density means higher diet cost (€/wk)

Fourth question:
Do nutrient-rich diets cost more?

- French INCA study conducted by AFSSA
- Sample of 1,985 adults; 7-day food diaries
- National prices for 650 foods
- Vitamin C intakes from nutrient data base
- Diet costs estimated in €/d
- Measures of dietary and monetary exposure
At each intake quintile, More vitamin C = higher cost (€/wk)

INCA data 1998
At each intake quintile,
More vitamin C = higher cost (€/wk)

INCA data 1998
At each intake quintile, More vitamin C = higher cost (€/wk)

Fifth question:
Are low-cost energy-dense diets preferentially consumed by low income persons?
The relation between food, health and income is nothing new

Engel’s Law (1867)
As incomes rise, so do food expenditures – but the share spent on food declines

Boyd Orr: UK 1937

USDA 2000

USDA’s Economic Research Service Food Review, 23, 2000
Foods as luxury goods: Boyd Orr 1937

More education and income = better diets
(USDA/CNPP data cited in Drewnowski & Specter, 2004)

The USDA Healthy Eating Index (HEI) is a measure of diet quality

HEI score 1994-96

Income as % of poverty

Education (years)
Are food costs the key?
Are poverty and obesity linked by the low cost of energy-dense foods?

Drewnowski & Specter, Am J Clin Nutr 2004;79:6-16

Can living in the wrong neighborhood make you fat?
Median incomes in King County
King County Census Tracts 2000 aggregated by zip codes

Fewer Starbucks more fast foods in South County

Data source: Washington State Geospatial Archive
Density of grocery stores in Seattle-King County, WA

Legend
Kernel Density of Grocery Stores

Data source: Washington State Geospatial Archive, Corporate Websites and United States Census Bureau

Density of convenience stores in Seattle-King County, WA

Legend
Number of Conv Stores Per Mile

Data source: Washington State Geospatial Archive
Obesity rates by zip code (BRFSS data)

King County Zip Codes

Obesity

Diabetes deaths

Obesity rates and real estate

BRFSS data aggregated from 1999-2002, Courtesy of PHSKC Planning and Evaluation

Madison Park and Capitol Hill, 98112: Median house value $466,000 Obesity rate 5.9%

Burien, 98168: Median house value $142,500 Obesity rate 24.9%

Bellevue, 98005: Median house value $343,400 Obesity rate 5.1%

Kent, 98031: Median house value $182,900 Obesity rate 23.1%
Obesity rates and SEP (as measured by real estate)

Data source: PHSKC Planning and Evaluation Unit and United States Census Bureau

Seven-fold disparities in diabetes-related mortality rates by zip code

Data from WA State death certificates
Courtesy of PH-SKC, Tacoma/Pierce Co Health Dept; Snohomish Health District
A complex story

Food choices

Convenience

Cost

Variety

Taste

Energy density

Pleasure

Health

Obesity

Obesity: biology, behavior, society – and economics

Obese people eat unhealthy diets

Thin people eat healthier diets

Grains, fats, sugars cost less

Nutrient-dense foods cost more

Energy-dense diets cost less

High quality diets cost more

Poor people eat cheaper diets

Rich people eat more costly diets

Poor people exercise less

Rich people exercise more

Poor people have few resources

Rich people have more resources

Poor people are obese

Rich people are thin

So what led to obesity? Poverty or excess _____ food?
Are the people of the UK inexorably becoming heavier simply by living in the Britain of today?

The Foresight Report: Tackling Obesities: Future Choices