

## Swiss NGO Alliance Nutrition and Physical Activity

16th European Congress on Obesity, Geneva, May 14 - 17, 2008

# Financial Incentives in the Prevention of Obesity

## Workshop Report

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## Contents

1.	Introduction	3
2.	Workshop Contributions	4
3.	Financial incentives to change dietary behaviour - a Public Health Nutrition point of view: Summary and conclusions	4
4.	Financial incentives to change physical activity: Summary and conclusions	6
5.	Financial incentives to prevent obesity: Summary and conclusions	9

### Appendices

Appendix I: Abstracts of the presentations

Appendix II: Handouts of the presentations

Appendix III: Biographies of the speakers

## 1. Introduction

A well balanced diet and sufficient physical activity are key determinants of population health. Availability, type, quantity and quality of food, choices in the supermarket, the preparation of food and individual eating behaviour determine how healthy and well balanced a diet is. For physical activity behaviour, personal factors such as attitudes and motivation are important, but also an activity friendly physical environment and a supportive social environment.

There are thus determinants of healthy dietary behaviour and sufficient physical activity on the individual and the environmental level. Countless attempts addressing individual determinants have been undertaken to prevent or reduce overweight and obesity - some of them were successful, many others failed. These experiences demonstrate that information, campaigns and calls for more self-responsibility have their role, but are clearly not sufficient to stabilise - or ideally - reduce the overweight epidemic. Approaches to create environments and conditions that support healthy choices regarding diet and physical activity need to be explored.

Financial incentive measures are widely used and recognised as a tool for altering behaviour patterns that are potential threats to human health and the environment (e. g. charges on tobacco products, motor fuels, chemicals). Also in the prevention of overweight and obesity, financial incentives have moved to the centre of attention. Specific measures can be financial disincentives such as taxes or charges, they can also be positive incentives, like tax reductions, subsidies or a bonus for desired behaviours. These economic interventions can be conceptualised to target either dietary or physical activity behaviour or directly the reduction of body weight.

But is there any scientific evidence for positive effects of such measures on dietary behaviour, physical activity or body weight? - In fact, the scientific literature is still very scarce. Therefore, the Swiss NGO-Alliance Nutrition and Physical Activity undertook a first effort to document the current state of knowledge regarding selected topics for interested partners in the field. A workshop with international experts was organised in the context of the 16th European Congress on Obesity held in May 2008 in Geneva. This report summarises the key results and conclusions. Both selected results and conclusions represent the view of the authors of this report. Furthermore, the report provides the abstracts and handouts of the presentations.

## 2. Workshop Contributions

Agricultural policies and obesity in the international context	Panos Konandreas, PhD, M.S. Food and Agriculture Organisation United Nations Geneva, Switzerland
Taxes and subsidies on food, problems of implementation	Sean B. Cash, Ph.D., M.S., M.A. Department of Rural Economy University of Alberta, Canada and Department of Consumer Science, University of Wisconsin – Madison, USA
Financial incentives in mobility management	Tom Rye Reader in Transport, SEBE/TRI Napier University Edinburgh, UK
The potential to promote physical activity through mobility management	David Ogilvie, PhD FFPH MRC Epidemiology Unit Institute of Public Health Cambridge, UK
Financial incentives on life insurance fees in US products	Dieter Gaubatz, FSA, FCIA, MAAA Swiss Reinsurance Company Zurich, Switzerland
Financial incentives in treatments for obesity and overweight: a systematic review of randomised controlled trials	Virginia Paul-Ebhohimhen, MD Health Services Research Unit University of Aberdeen, UK

## 3. Financial incentives to change dietary behaviour - a Public Health Nutrition point of view: Summary and conclusions

### Presentations

- *Panos Konandreas: Agricultural policies and obesity in the international context*
- *Sean B. Cash: Taxes and subsidies on food, problems of implementation*

Panos Konandreas presented the effects of taxes and subsidies on primary agricultural products, Sean B. Cash discussed taxes and subsidies on products on the consumer level.

### Effects of taxes on consumer behaviour

Influencing eating behaviour via taxes on food is often discussed as a promising way of counteracting the obesity epidemic. Different taxes are suggested such as fat taxes, soft drink taxes and “couch potato” taxes, even a tax on an elevated Body Mass Index.

Both presentations named the main problems of taxes on food: Food is necessary to live, therefore changes in prices are not likely to have the desired effects on consumption - the price elasticity is small for most food items. Therefore taxes will only have substantial impacts on diets if the price increases are large and for poor consumers who spend a substantial part of their income on food. Also, in developed countries the bulk of final food expenditure (80% in the EU) results from marketing, processing etc. Therefore even substantial taxes on primary agricultural products will be masked.

Any new taxes on food are necessarily regressive, in that the largest relative impact will be on lower-income consumers. Taxing food with the concept of value added tax (VAT) and excluding basic food items could reduce the regressive effects; but to have some effect, the price increases of taxed foods would have to be substantial. In addition, taxes targeted on specific “undesirable” food items may shift consumption away from these items without actually improving dietary quality, as consumers may increase consumption of other foods in ways that may not be healthy.

### **Effects of subsidies on consumer behaviour**

Subsidies could be used to make healthy foods cheaper and to enhance their consumption. Subsidies are progressive: it is known that low-income people who buy less fruit and vegetables are more often overweight or obese but they also respond more to price signals. By influencing consumer behaviour, subsidies may also have a positive impact on producers who would respond to increased and sustained demand and shift production to more healthy foods.

Subsidies may be more effective and are likely to be more acceptable to the public than taxes. However, careful targeting is necessary either in terms of the foods being subsidized and/or the beneficiary consumers.

There are some positive examples for subsidies:

- Lowering fresh fruit prices in a worksite cafeteria by 50% increased sales 3-fold.
- Price reductions of 10%, 25%, and 50% on low-fat snacks in vending machines combined with informational material increased sales by 9%, 39%, and 93%, respectively.

### **Some considerations**

There are some questions regarding taxes and subsidies to be considered:

- Which food should be taxed/subsidised and to what extent?
- Are taxes effective in changing consumption habits of the target population? Low income people are likely to be affected more by taxes than rich individuals. What are the substitutes among those who can not afford the taxed foods?
- What is the goal of a tax: should it achieve a reduction of the prevalence of disease by changing consumption patterns, in which case tax rates would have to be large? Or should taxes be more modest and levied in order to raise revenue which can be used to run health promotion programs or pay for food subsidies?
- How will the producers react to taxes and subsidies on foods? Will they produce more of the desirable foods? Should incentives be offered to producers in order to produce more of the desirable foods?
- Are there any interactions with other regulations or programs?
- Will there be any undesired reactions? For example, in the last 30 years Canadian consumers reduced their whole milk consumption and drank more low-fat milk. At the same

time, the consumption of cream and cheese increased. Obviously, the fat removed from the milk appears on the market in other products. What will happen with a fruit and vegetable subsidy? Will consumers eat more fruits and vegetables or will they spend the money they have saved on more expensive products or more unhealthy foods?

- The Common Agricultural Policy of the European Union (CAP) taxed mainly “bad” foods associated with adverse health effects, notably sugar, dairy products and meat and subsidized amongst other things fruits and vegetables. Yet the energy supply to EU citizens has strongly increased in the past 40 years, also the supply of fat, saturated fat, cholesterol and sugar; the ratio of n-6- to n-3 fatty acids worsened and obesity has increased.
- One study suggests that a sustained one-percent subsidy of all fruits and vegetables could avoid 10,000 fatalities of heart disease and stroke for US \$1.3 million each (the value of a statistical life is estimated to be between US \$4 and \$9 million), further highlighting that the focus should perhaps be on encouraging healthy eating rather than penalizing consumption of “bad” foods.
- Finally, the idea of taxing an elevated BMI is very problematic: Health does not steadily decrease with higher BMI (it even increases within some ranges and for specific cases); The BMI is determined jointly by behavioural factors and genetics (- should we tax our genes?); increased muscular mass also increases the BMI.

## Conclusions

- The current agricultural policy of the EU isn't the main culprit for EU's dietary problems. And it isn't an efficient instrument to curb obesity. If anything, future CAP reforms, making food cheaper than in the past, are likely to worsen EU's nutritional problems.
- Food taxes as a stand-alone measure to reduce food intake are not desirable.
- Subsidies might be a promising way to influence eating behaviour in a positive way, but they require high funding and careful design of interventions to ensure effective targeting.
- Subsidies and taxes might encourage consumers to switch away from one close substitute for another, for example Coke to Diet Coke.
- Food taxes on certain products combined with subsidies on desired foods like fruits and vegetables may play a role in future nutrition policy. Food taxes might also be of value to raise funds which could be used for nutrition education and prevention programs.
- Perhaps taxing food via VAT is a viable option if basic food items are excluded and therefore regressive effects minimised.
- Governments subsidize many unhealthy programs. A “health filter” on these programs could prevent harmful effects on health and release funds for more healthy interventions.

## 4. Financial incentives to change physical activity: Summary and conclusions

### Presentations

- *Tom Rye: Financial incentives in mobility management*
- *David Ogilvie: The potential to promote physical activity through mobility management*

Both presentations covered the potential of financial measures to change individual mode choice in the transport domain. The topic was introduced by Tom Rye, a transport researcher specialised e.g. in mobility management and the development of travel plans. Then David

Ogilvie, a public health physician interested in the relationship between the environment, transport, physical activity and health made the link to physical activity promotion. This summary integrates the key messages of both presentations.

### Financial incentives in transport interventions

The workshop focused only on interventions attempting to influence transport choices (for getting from A to B) - even though financial measures to enhance physical activity could also be applied in interventions addressing leisure time activities (e. g. free entrance to swimming pools for children).

In the transport domain, there are different levels where decisions that may have an impact on physical activity could be influenced by financial measures (Frank et al, Am J Prev Med 2004):

1. Regional and local transportation investment decisions
2. Location choice decisions (for workplaces, services, housing) made by institutions, developers on the organisational level and finally end-users
3. Individual travel choice decisions

The workshop concentrated mainly on the third level, because this is the level at which financial incentives could most easily be applied to the individual, and also because it is the topic about which the most published research exists.

Mobility management addresses individual travel choices and covers a broad range of measures among them for example mobility plans for companies or schools. There are further measures to influence mode choice using financial incentives, e.g. parking space management or congestion charging. To alter mode choice, usually financial disincentives to use cars are applied (e.g. parking fees, taxes, charges), but sometimes also financial incentives to make alternative modes of transports more attractive are offered (e.g. bonus for not requesting a parking space, subsidies for public transport, free bikes at employment sites).

When studying the effectiveness of interventions in the transport sector (using financial incentives - but also other measures) one has to be aware that outcome measures used in transport research are often different from those outcomes that would be most relevant for physical activity promotion (*fig. 1*). While transport research often uses traffic counts to evaluate interventions, walking and cycling behaviour (and - ideally - total physical activity) would be most relevant in physical activity promotion and the prevention of overweight and obesity. Changes in traffic counts or modal shifts can be some indication of a development in the desired direction but more evidence is needed to demonstrate the effectiveness of such measures to increase physical activity.

### Effectiveness of interventions using financial incentives

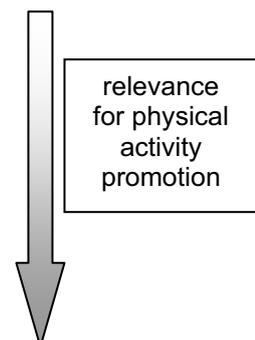
**Figure 1. Studying the effectiveness of transport interventions: different outcomes**

*Traffic counts*  
Number of: cars / bicycles / pedestrians

*Modal split (regarding duration of trips or distances covered)*  
Percentage of care use / public transport use / cycling / walking

*Transport behaviour (duration of trips or distances covered)*  
Transport cycling behaviour / transport walking behaviour

*Physical activity behaviour (duration, frequency and intensity of activities)*  
- Cycling behaviour / walking behaviour  
- Total physical activity behaviour



It seems that until today little evidence is available to demonstrate that financial incentives targeting individuals to change their mode choice can - or cannot - increase physical activity. However, for other outcomes, some statements can already be made:

- Usually transport interventions (not only those using financial incentives and disincentives) aim at inducing a modal shift, primarily away from car use or a reduction of cars in absolute numbers. There seems to be good evidence that it is possible to reduce car use and change modal splits by a variety of measures including financial disincentives or incentives. And it seems, that the most successful travel plans to reduce car use all include financial incentives and disincentives.
- Substitutes for using one's own car can be public transport, car sharing, active modes of transport or new combinations of modes. Thus, reducing car use does not automatically result in an increase of active transport.
- There seems to be some weaker evidence, that financial disincentives, such as parking fees can increase the number of cyclists (and pedestrians); increases seem to be highest in locations where there is appropriate infrastructure for active transport.
- Moreover, after the introduction of the congestion charge in London the number of cyclists entering the city centre increased by some 50% between 2002 and 2006.
- Usually, walking has not been assessed in transport interventions using financial incentives (neither pedestrian counts nor walking behaviour).
- A shift from car use to public transport can result in an increase in walking, but – depending on the location of the destinations an individual usually visits - this is not automatically the case.
- Therefore, it does not seem possible to date to estimate the potential of financial incentives to increase the number of pedestrians or improve walking behaviour, at least within the context of site-based mobility management.

### **General considerations**

It is obvious, that positive incentives are more acceptable than disincentives. However, the funds to offer incentives have to be raised first, before the money can be distributed. The advantage of applying disincentives is that the money collected can be redistributed as positive incentives or used for other purposes.

Furthermore, it has to be considered that disincentives have regressive properties: They may primarily have an effect among individuals with low incomes by forcing them to change their behaviour whereas those with higher incomes are not affected because they can easily pay the fees or taxes.

### **Conclusions**

- There is sufficient evidence for using financial incentives at the population level in mobility management for the reduction of car use. The effects on cycling and walking are less clear (because often not assessed), other factors like access, quality/availability of infrastructure and motivation might be at least as important.
- The potential of financial incentives to influence decisions at the organisational level regarding location choices should be explored.
- More pilot interventions linking financial incentives with behaviour change that are properly evaluated are needed.

## 5. Financial incentives to prevent obesity: Summary and conclusions

### Presentations

- *Dieter Gaubatz: Financial incentives on life insurance fees in US products*
- *Virginia Paul-Ebhohimhen: Financial incentives in treatments for obesity and overweight: a systematic review of randomised controlled trials*

### 5.1 Financial incentives on life insurance fees in US products

Dieter Gaubatz works with Swiss Re USA on preferred risks schemes in US life insurance products. The basic principle of preferred risk schemes is that the lower the health risks of a potential client, the lower the costs of his or her life insurance policy. A vast majority of the insurance plans sold in the US have a preferred risk design.

#### Preferred risk schemes

In this presentation, criteria related to nutrition and physical activity used to define prices of life insurance products - among other criteria - were discussed. These are blood pressure, treatment for hypertension, cholesterol level, treatment for high cholesterol, family presence of non communicable diseases (cancer, cardiovascular diseases, diabetes, stroke; either death from or diagnosed with the disease) and BMI. After the inclusion of all criteria (related to nutrition and physical activity as well as other factors) the best risk profile can result in a discount of up to 40%. Not all criteria are used by each insurance company, but BMI is an important factor. The importance of BMI varies depending on which other factors are included in any particular company's specific product design. It should also be noted that the effect varies by gender, smoking status and along the age spectrum.

The life insurers are able to quantify real health risks, not for scientific, but for commercial purposes based on their broad data bases. These data capture cross sectional associations between risk factors and mortality very accurately, producing premium rates which are consistent with the insured's particular risk profile. The overall effects are a mixture of causal relationships between health risks and mortality and the selection of the population with a specific risk profile.

#### Conclusions

- Criteria related to nutrition and physical activity - particularly BMI - are important factors in the estimation of an individual's health risk profile.
- It has to be emphasised that the economic mechanisms of preferred risk schemes are not designed to induce behaviour change in potential clients and can therefore not be regarded as financial incentives to change dietary and physical activity behaviour.
- Nevertheless, they demonstrate how the economic consequences of health risks can be modelled in a way that the system is in balance for a private enterprise. And the models demonstrate what the financial bonus for an individual could be if he or she had lower health risks.

## **5.2 Financial incentives in treatments for obesity and overweight: a systematic review of randomised controlled trials**

Virginia Paul-Ebhohimhen has trained in Medicine and Health Services Research. She has special interest in delivery of complex interventions, and systematic reviews. Nine studies were included in a systematic review of randomised controlled trials of treatments for obesity and overweight in adults, involving the use of financial incentives [1]. These studies reported follow up of at least one year.

### **Types of interventions**

- Apart from financial incentives, all intervention groups were offered behaviour change support and diet/physical activity advice, coordinated by psychologists.
- In seven of the nine studies, the financial incentives were provided from the participants' deposited money; refunds were made for weight loss or compliance to the behaviour change programme. In two studies, the incentives were freely supplied.
- The monetary value of the incentive ranged from 0.2% to 10.2% of the personal disposable income (PDI) per year.
- Duration of use of incentives ranged from 8 weeks to 18 months (typically, incentive use discontinued after about 16 - 24 weeks).
- Participants were mainly recruited through media advertisements.
- All trials were conducted in North America.
- Participants were mostly women, mean age ranged from 35.7 to 52.8 years.
- Mean BMI ranged from 29.3 to 31.8kg/m<sup>2</sup>.

### **Effectiveness of interventions**

A meta-analysis could be conducted with seven of the nine studies. Results showed no significant effect of use of financial incentives on weight loss at 12 months and 18 months. However, some clinically relevant weight changes were observed. Further sub-analysis by mode of delivery and amount of incentives revealed some weak trends - although not statistically significant: Interventions using incentives greater than 1.2% of the personal disposable income, rewards for behaviour change rather than for weight change, and rewards based on group performance rather than for individual performance seem to be most promising to support weight loss. Based on the available data base, no cost-effectiveness calculations were possible.

### **Conclusions**

- Only a few studies with limited effects were conducted until today.
- Chances of effectiveness seem more likely if monetary rewards are applied for behaviour change rather than for weight loss, if applied at the group level and if the proportion of the personal disposable income employed was an amount perceived to be of sufficient motivation.
- Future studies should use discrete choice experiments to elucidate patients' preferences regarding amount, frequency and administration for financial incentives schemes that are sufficiently motivating in weight loss programmes.

[1] Paul-Ebhohimhen V, Avenell A. Systematic review of the use of financial incentives in treatments for obesity and overweight. *Obes Rev* 2007; 9: 355-367.

## **Appendix I: Abstracts of the presentations**

### **Panos Konandreas. Agricultural policies and obesity in the international context**

The paper examines first global trends in food consumption and the rapid transition of diets in many countries, including developing countries where undernourishment coincides with an increasing problem of obesity. How agricultural policy effects food prices is considered next, differentiating between rich consumers and poor consumers. The conclusion is that, unlike poor consumers, taxation of food has little effect on the total food consumption of rich consumers because of the low elasticity in their demand for food.

The paper then turns to some empirical evidence by focusing on the Common Agricultural Policy (CAP) of the European Union and how EU diets have been influenced by the CAP. Long-term trends in the EU diet reveal that generally it has become less healthy over time, despite the high food prices paid by EU consumers relative to other countries.

The paper concludes that the CAP is not to be blamed for EU's dietary problems. If at all, it may have contributed to an improved diet by taxing certain "bad" foods. However, the CAP as a food tax is not an efficient instrument to curb obesity. Higher farm prices are ineffective means to change final consumer prices due to high margins in vertical price transmission and low price elasticities for food demand. They are also regressive on consumers with high calorie needs. But food taxes could have some role to play in addressing the obesity problem, as a specific, targeted tax on unhealthy foods combined with a small subsidy on healthy substitutes. Also, taxation of foods can raise funds (low elasticities mean high tax revenues) which could be used for nutrition education, prevention, and other more effective measures.

### **Sean B. Cash. Taxes and subsidies on food to address rising obesity rates**

Many observers have suggested that tax policy and/or food subsidies can be used to change the relative prices of foods in ways that will produce desirable health outcomes. I briefly review the economic evidence regarding such claims, and discuss several conceptual and pragmatic issues surrounding the use of such interventions to achieve public health objectives. The low price elasticity of many food items means that "fat taxes" may be a good way to raise revenue for health promotion activities or other social goals, but will only have substantial impacts on diets if the price changes are large. Furthermore, any new taxes on food are necessarily regressive, in that the largest relative impact will be on lower-income consumers. Fat taxes may also be difficult to target, possibly in ways that will lead to perverse outcomes. "Thin subsidies" on beneficial food items are progressive and are more easily targeted, but require large government outlays. Both taxes and subsidies are subject to the criticism that they target individual food items rather than overall dietary composition. There are also many programs, such as agricultural price supports and production programs, that currently affect food prices in ways that may not be in accordance with public health goals. In some circumstances, reducing existing distortions may be preferable to creating new financial incentives. Finally, there are important issues of both consumer and producer behaviour that, if ignored, are likely to reduce the efficacy of any attempts to influence health outcomes through food price interventions.

### **Tom Rye. Financial incentives in mobility management**

This presentation will first introduce the concept of mobility management as defined by the European Platform on Mobility Management (EPOMM), and will highlight within that the areas in which financial incentives can be used. There is a general paucity of monitoring data in the area, but the presentation will draw on that limited data that is available evaluating the impacts of more "established" mobility management measures, such as travel plans. This will consider the degree to which there is evidence that those travel plans giving financial incentives to use non-car alternatives and/or financial disincentives to car use, registered any increase in walking and cycling and, if so, how much. The relative importance of financial incentives/disincentives compared to physical infrastructure improvements will also be dis-

cussed. Whilst not affecting end-users financially, regulatory requirements on companies and developers to manage mobility to their sites has acted as an important driver of mobility management activity in the UK and Switzerland especially, and these results will also be explored.

There are other mobility management measures that also have a financial element to them, including company car taxation and the taxation of commuting benefits provided by employers, including subsidised bicycle purchase. As far as is possible, evidence to illustrate the modal shift associated with changes in these factors will be presented, although it is unlikely to show definitively that they increase walking and cycling for trips to work or on works' business. Evidence of the impacts of parking management on modal share for travel to large employment sites, and within cities, will also be presented. Finally, the impacts of London and Stockholm's congestion charging schemes on walking and cycling will be considered – particularly in London, there have been very significant increases in cycling although not all of this can be attributed to the congestion charge. All findings will be subject to the caveat that the relatively poor quality data make it difficult to be precise about the overall physical activity impacts of such measures.

### **David Ogilvie. The potential to promote physical activity through mobility management**

It has been established in principle that health-related behaviour can be influenced by financial considerations such as the price of cigarettes or the provision of monetary rewards for adhering to treatment. However, the evidence from intervention studies suggests that in general, financial incentives are more effective in encouraging simple, short-term, discrete actions than in promoting sustained changes in lifestyle, and few such studies have examined changes in physical activity as the outcome of interest. Of all the domains of physical activity, that associated with mobility (transport) may be particularly appropriate for economic intervention because mobility largely depends on state provision of public goods (transport infrastructure and, to some extent, services) and because using motor vehicles creates externalities such as congestion, injuries and pollution. The effect of offering people financial incentives specifically to walk or cycle does not appear to have been studied very often; there is, however, more evidence about the potential effects of financial disincentives to use cars. Econometric studies indicate that car use is sensitive to changes in the price of fuel, and a handful of intervention studies suggest that congestion charging or financial disincentives related to parking may help to promote active travel. Increasing the cost of using cars therefore has the potential to contribute to promoting a shift towards using active modes of transport. However, the outcome measures used in existing studies are weak proxies for physical activity and it remains an open question whether interventions of this kind necessarily bring about an increase in overall physical activity in practice. Measures such as congestion charging may also produce inequitable effects in certain circumstances. The debate should therefore be broadened to consider the potential to influence structural constraints on individual mobility through financial incentives applied to developers, employers and transport providers to influence decisions about where new housing and workplaces are built and how they are linked.

### **Dieter Gaubatz. Financial incentives on life insurance fees in US products**

Preferred risk products are the standard in the United States. In 2007, 62% of individual life insurance face amounts sold in the U.S. was through term insurance policies (no cash values). Of this, 97% of the business sold for face amounts of USD100,000 and larger had a preferred risk design. A significant proportion of the other popular plan types also used this structure.

This presentation will discuss the design features of preferred risk products. Individuals who are healthy receive significant premium discounts. One of the main elements of determining the health of applicants is their Body Mass Index.

**Virginia Paul-Ebhohimhen and Alison Avenell. Financial incentives in treatments for obesity and overweight; a systematic review of randomised controlled trials**

We systematically reviewed randomised controlled trials of treatments for obesity and overweight in adults, involving the use of financial incentives, with reported follow up of at least one year.

Nine trials met the criteria. There was no mention of sample size justification or blinding, or analysis on an intention to treat basis in any study. Three studies described attrition rates and reasons. Participants were mostly women recruited through media advertisements. Mean age ranged from 35.7 to 52.8 years, and mean body mass index from 29.3 to 31.8kg/m<sup>2</sup>.

Financial incentives were associated with huge attrition rates when employed in the absence of a structured weight programme. Meta-analysis showed no significant effect of use of financial incentives on weight loss or maintenance at 12 months and 18 months but sub-analysis by mode of delivery and amount of incentives were suggestive of trends for effectiveness in certain settings than others. We recommend that future research involving use of financial incentives in treatments for obesity is conducted within the context of a complex intervention such as is informed by discrete choice experiments.

## **Appendix II: Handouts of the presentations**

## **Agricultural policies and obesity in the international context**

**16th European Congress on Obesity 2008**

*Workshop on Financial Incentives*

Swiss NGO-Alliance Nutrition and Physical Activity, with the support of the Swiss Federal Office of Health and the Swiss Federal Office of Sport

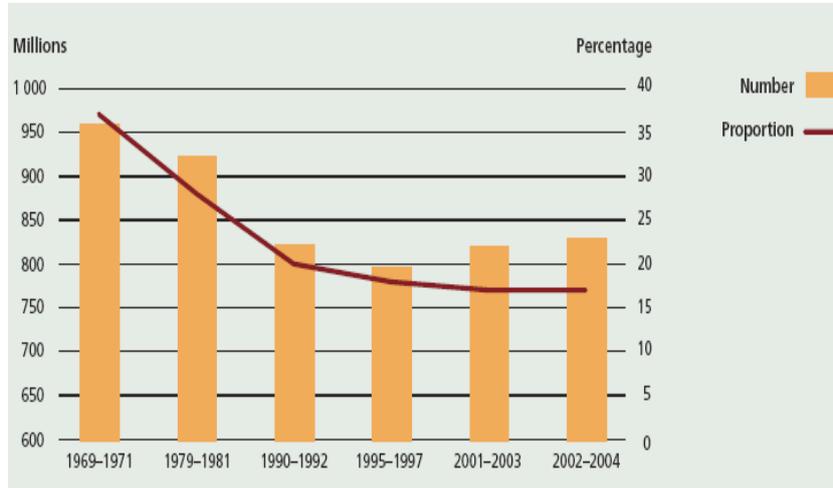
May 16, 2008

Panos Konandreas and Josef Schmidhuber  
FAO

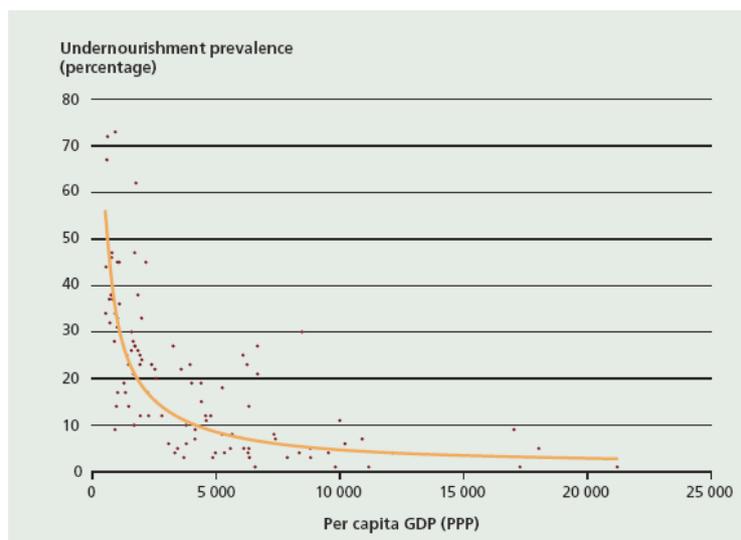
## **Overview**

- **Global trends**
  - from undernourishment to obesity?
- **Food policy impacts on consumption**
  - is taxation efficient/effective?
- **Case study: the EU CAP**
  - taxation of consumers
  - what impact of CAP on consumer prices?
- **Worsening diets in the EU**
  - taxation not the answer
- **Conclusions**

## The undernourished

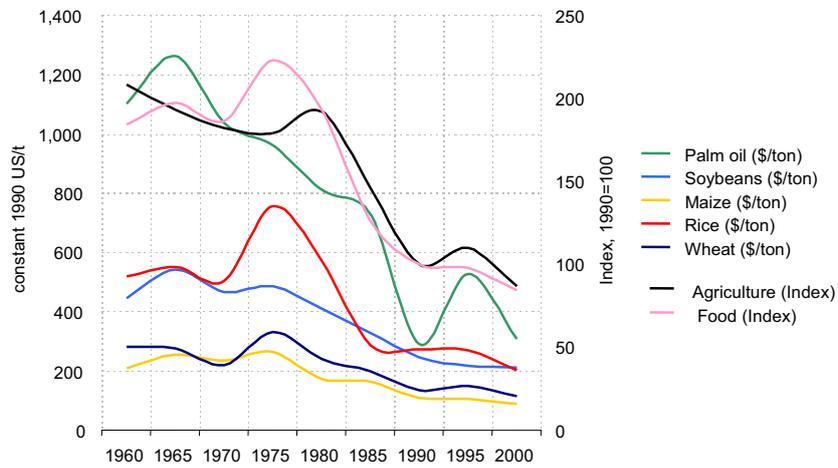


## Driving forces: income



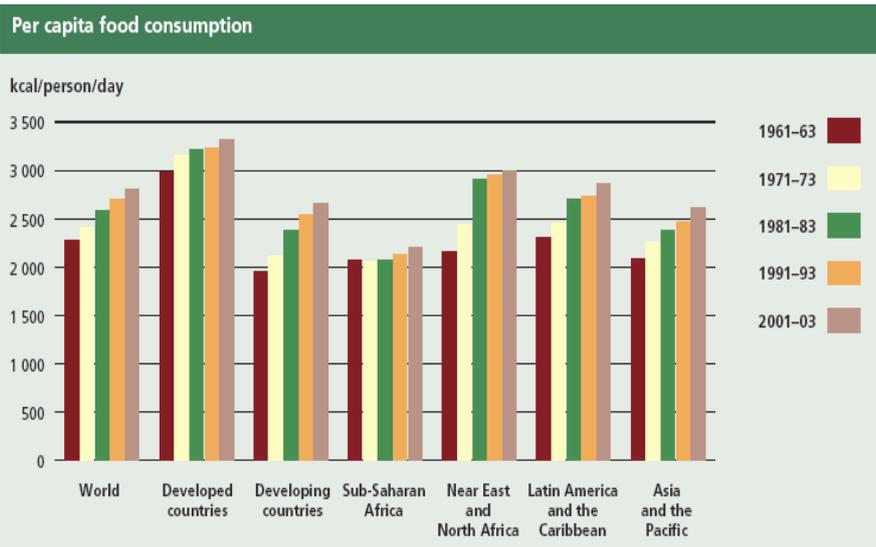
# Driving forces: declining prices

Long-term drastic decline in real prices



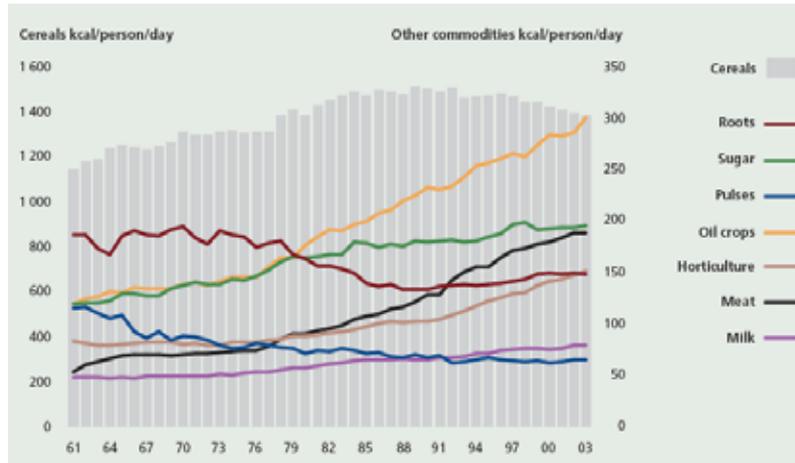
Source: World Bank, "Pink Sheets"

# Dev'g world catching up

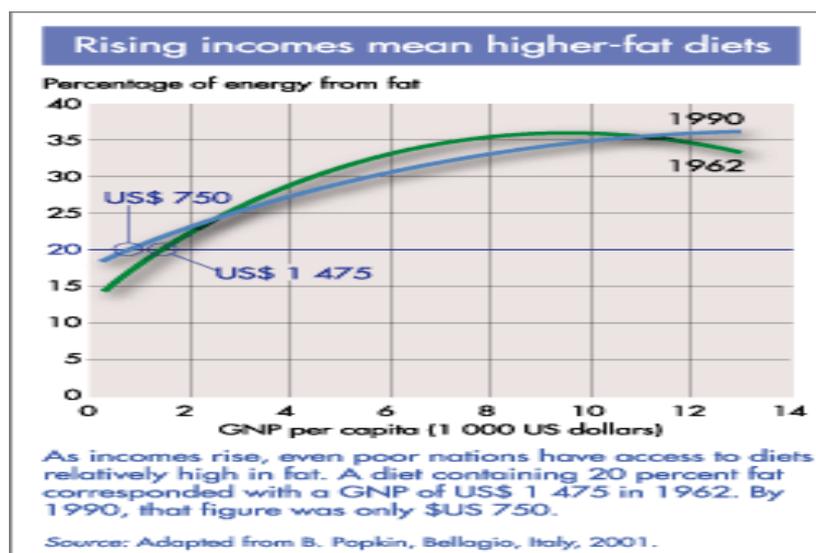


## ... not only in calories

Consumption of different food commodities in developing countries

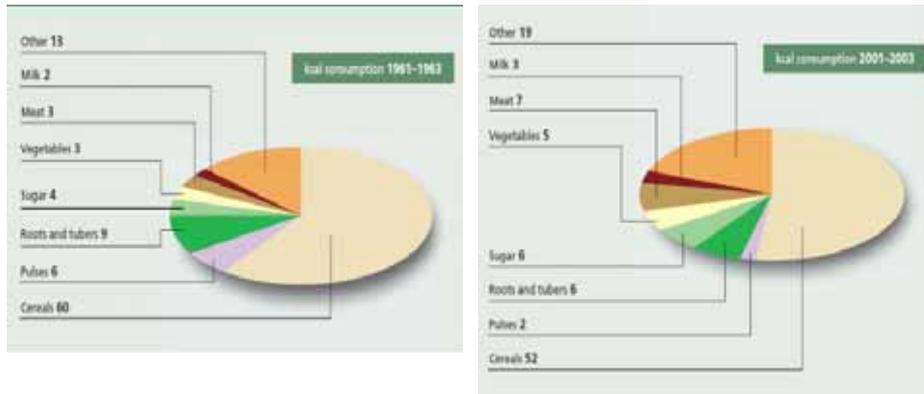


## ...higher-fat diets



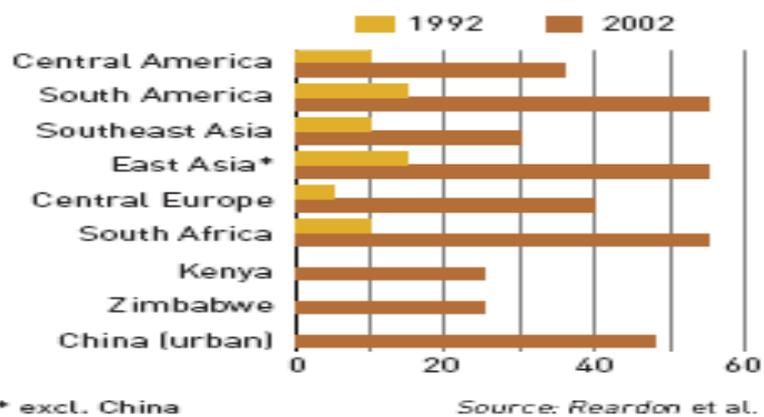
## ...higher-fat diets

Composition of food consumption in developing countries (%)

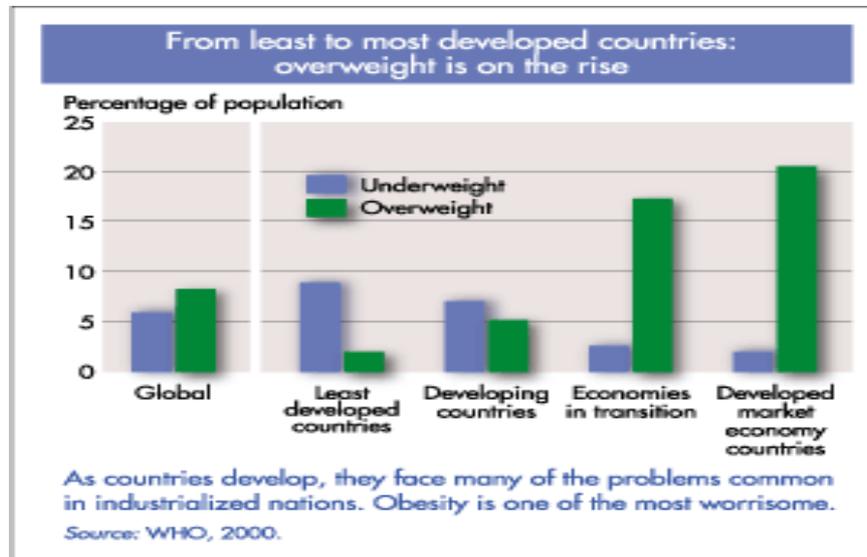


## ... more from the supermarket

Supermarket share of retail food sales

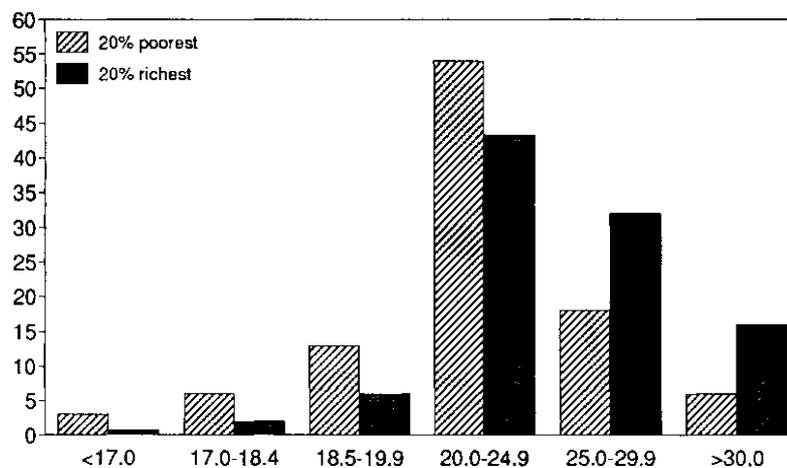


## Less hunger = more obesity?



## ... bulging with income

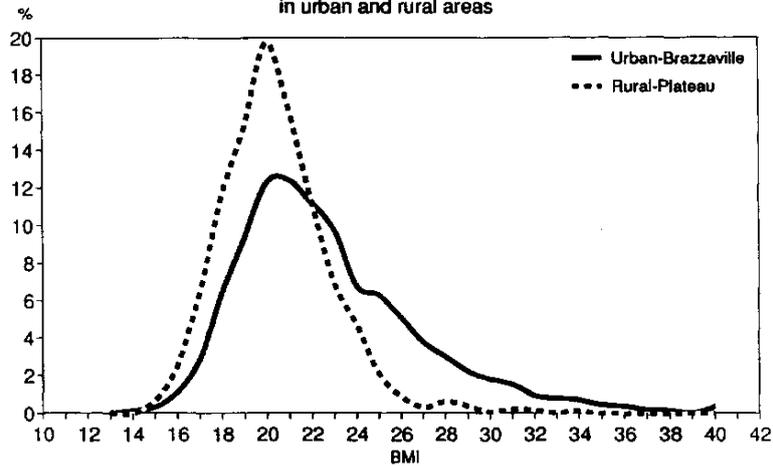
(BMI distribution in Brazil among the poorest and wealthiest segments of the population (PNSN Survey 1989))



Source: de Vasconcelos, 1992, based on data presented at a meeting "Functional Significance of Low Body Mass Index (BMI)", Rome, 4-6 November 1992.

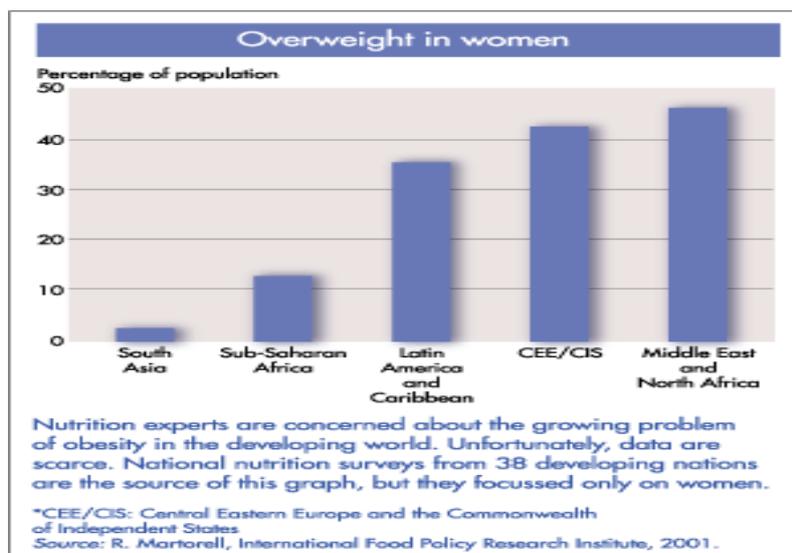
## ...bulging with inactivity

(BMI Distribution among Congolese adults)  
in urban and rural areas



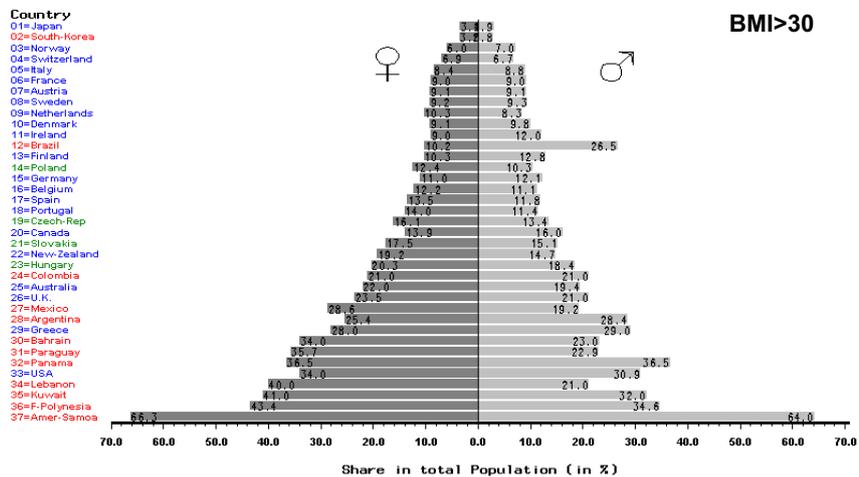
Source: Delpeuch, 1992, based on data presented at a meeting "Functional Significance of Low Body Mass Index (AMI)", Rome, 4-6 November, 1992.

## ...women more vulnerable



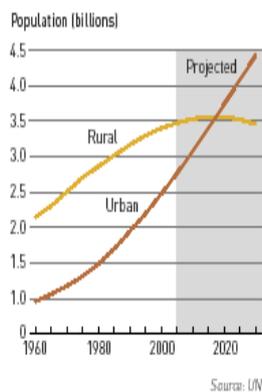
# The obesity pyramid

Obesity in Industrial, Developing and Transition Economies  
Prevalence differentiated by Sex

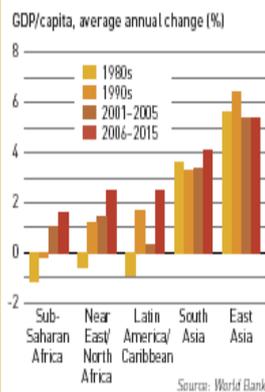


## ... trends to continue

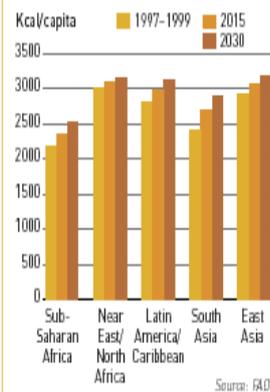
Urbanization in developing countries, 1960-2030



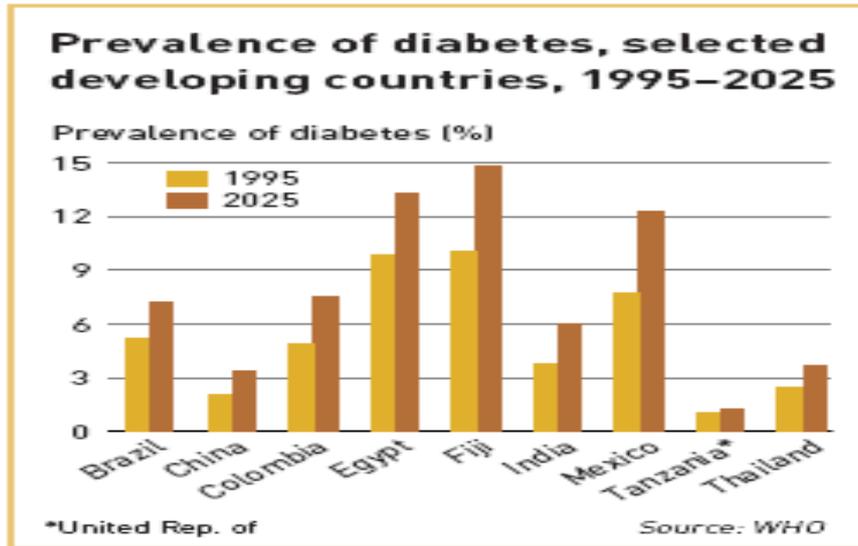
Changes in GDP per capita by region, 1980-2015



Average daily caloric intake by region, 1997-2030

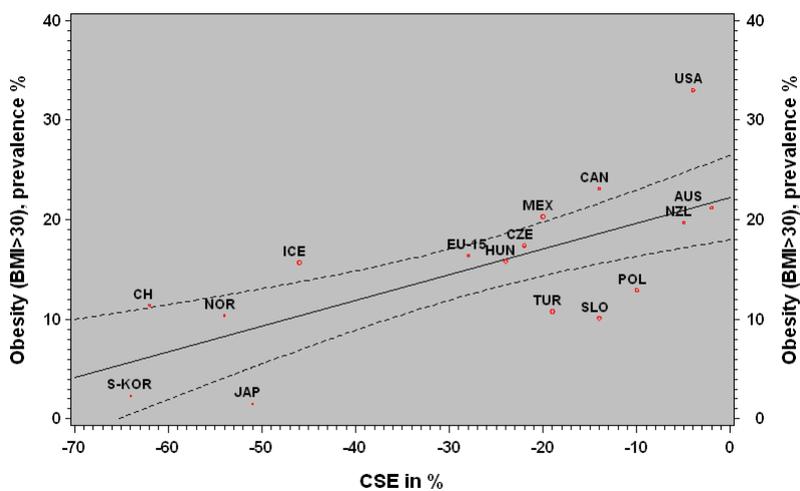


## ... towards a less healthy future?



## Ag policy and obesity: a link?

Obesity and agricultural policies: is trade protection an antidote to obesity?  
BMI>30 and consumer support through agricultural policies in 2002

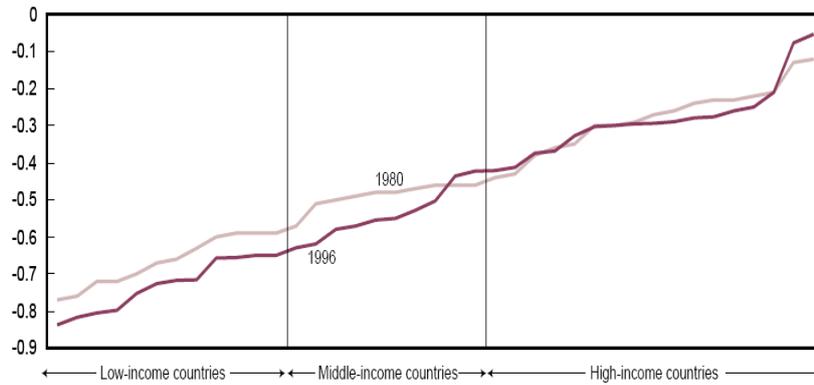


Sources: WHO-Infobase and OECD PSE/CSE Database  
FAO, Global Perspectives Studies Unit, 2006

## Elasticity of demand: key concept

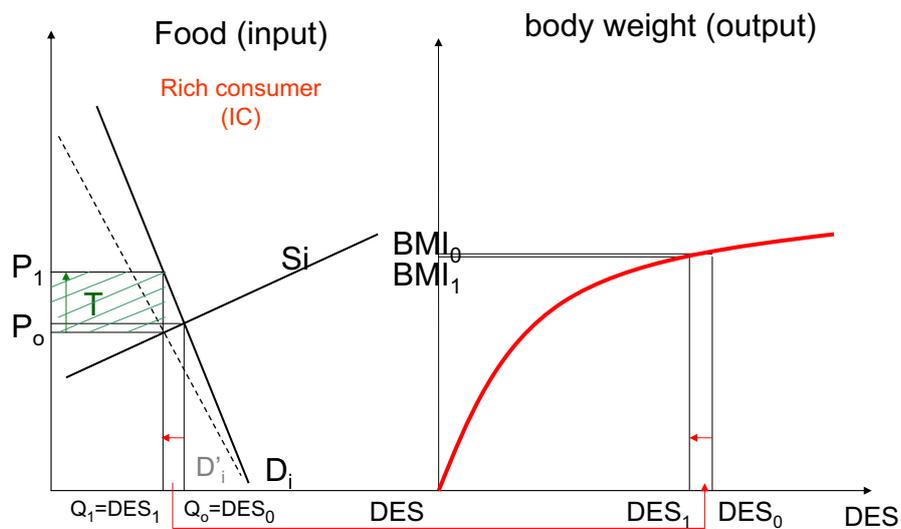
### Own-price elasticity for food

Elasticity

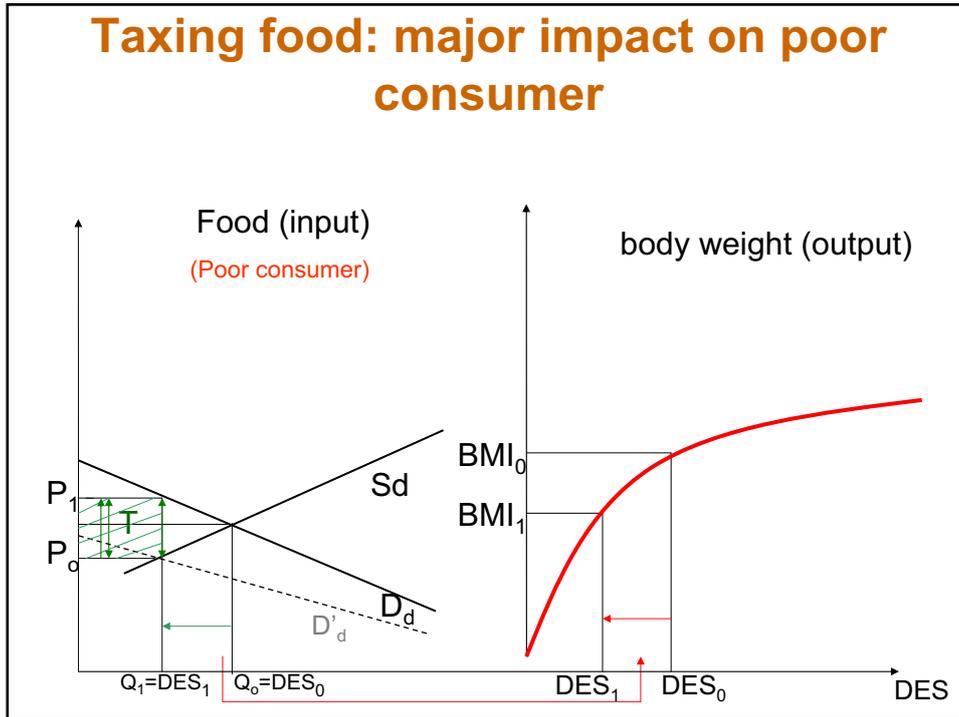


Source: 1996 data are ERS/USDA estimates based on International Comparison Project data. 1980 data are from Theil, Henri, Ching-Fan Chung, and James L. Seale, Jr., International Evidence on Consumption Patterns (1989).

## Taxing food: minor impact on rich consumer



## Taxing food: major impact on poor consumer



## Principal policy effects of the CAP 2001/03

	MILLION €	€/PERSON
<b>1. Taxes</b>		
• Taxes through higher prices than world prices	-51,904	-136.8
• Other taxes on consumers	-698	-1.8
<b>2. Subsidies</b>		
• Subsidies from taxpayers to consumers	3,762	9.9
• Excess feed cost (not relevant as a food tax/subsidy)	570	1.5
<b>Net effect (total tax)</b>	<b>-48,271</b>	<b>-127</b>

Source: own calculations (JS) based OECD

## Most taxed: sugar, dairy and meat

	1986-88		1994-96		2001-03	
	Total (million €)	per person (€)	Total (million €)	per person (€)	Total (million €)	per person (€)
Oilseeds	0	0.0	0	0.0	0	0.0
Eggs	900	2.7	262	0.7	0	0.0
Wheat	6254	18.4	1343	3.7	157	0.4
Rice	377	1.1	317	0.9	180	0.5
Potatoes	619	1.8	900	2.5	444	1.2
Coarse grains	7043	20.7	2703	7.4	559	1.5
Sheep	2497	7.4	1376	3.8	1113	2.9
<b>Sugar</b>	<b>2699</b>	<b>7.9</b>	<b>2100</b>	<b>5.8</b>	<b>2739</b>	<b>7.2</b>
Poultry	2950	8.7	3995	11.0	3179	8.4
Pork	4473	13.2	2973	8.1	4401	11.6
<b>Beef</b>	<b>10208</b>	<b>30.1</b>	<b>7205</b>	<b>19.8</b>	<b>10470</b>	<b>27.6</b>
<b>Milk</b>	<b>16667</b>	<b>49.1</b>	<b>17278</b>	<b>47.4</b>	<b>16373</b>	<b>43.2</b>
<b>Total</b>	<b>54686</b>	<b>161</b>	<b>40452</b>	<b>111</b>	<b>39615</b>	<b>104</b>

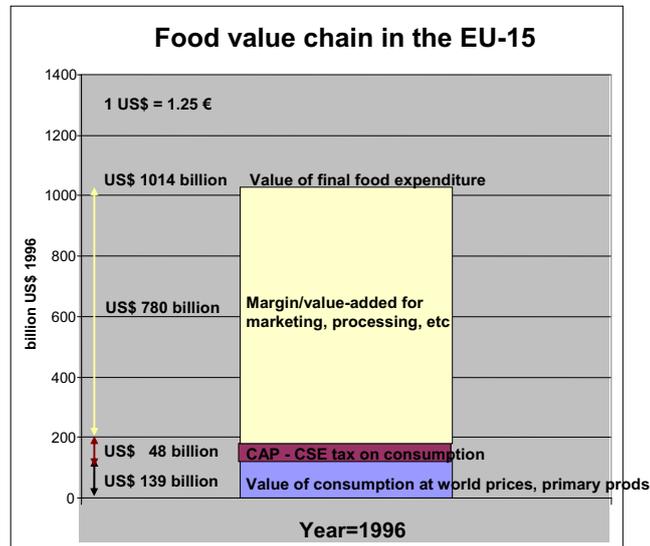
Source: own calculations (JS) based OECD

## ... two-three times world levels

	Domestic price distortions Ratios of EU prices to international ones		
	1986-88	1994-96	2001-03
Wheat	2.14	1.14	0.98
Rice	2.43	1.84	1.32
Coarse grains	2.33	1.41	1.05
Oilseeds	1.0	1.0	1.0
Potatoes	1.17	1.15	1.1
<b>Milk</b>	<b>2.76</b>	<b>2.14</b>	<b>1.84</b>
<b>Beef</b>	<b>2.25</b>	<b>1.63</b>	<b>2.54</b>
Pig meat	1.38	1.17	1.25
Poultry	1.79	2.07	1.55
Sheep meat	2.86	1.59	1.36
Eggs	1.4	1.22	1.04
<b>Sugar</b>	<b>3.32</b>	<b>2.13</b>	<b>2.75</b>

Source: own calculations (JS) based OECD

## ... but huge margins dampen tax impact



## What would be expected?

- CAP has not encouraged over-consumption
  - if anything, discouraged it by taxing food
  - more importantly, CAP taxed much more ‘bad’ foods associated with adverse health effects, notably sugar, dairy products and meat, particularly beef
  - little or no taxation of ‘good’ foods: unsaturated fats (olive oil)
  - also some positive incentives (subsidization of fruits and vegetables)
- a positive policy from a nutrition perspective
  - not by design but a windfall benefit from pursuit of (unrelated) ag policy goals
- a priori, a healthier diet in the EU
  - is that the case?

## Guidelines for a healthy diet (1)

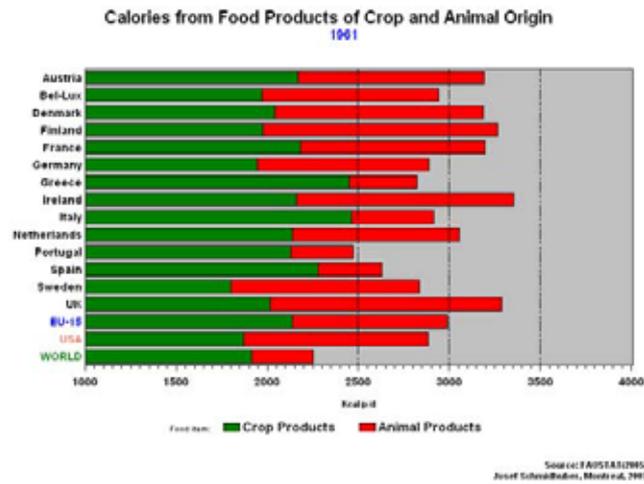
Dietary Intake Ranges (1) (as a share of total energy intake)	
Dietary Factor	FAO/WHO Recommendations
Total Fat	15 - 30%
Polyunsaturated FA	6-10 %
Saturated FA	<10 %
Trans FA	<1 %
Total Carbohydrate	55 – 75 %
Free sugars*	<10 %
Protein	10 - 15%

\* "Free sugars" refers to all monosaccharides and disaccharides added to foods, plus sugars naturally present in honey, syrups and fruit juices

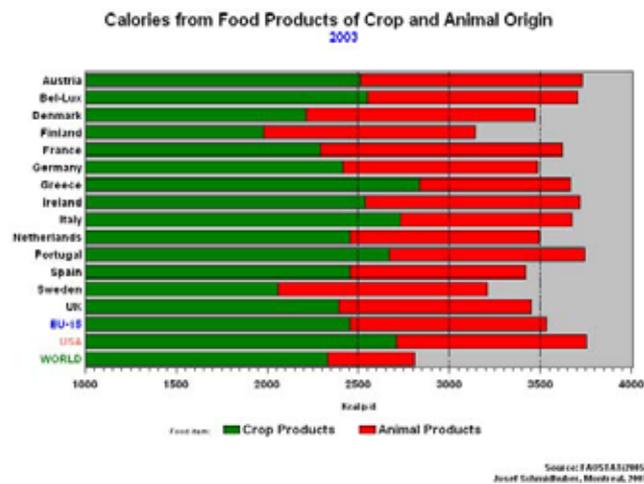
## Guidelines for a healthy diet (2)

Dietary Intake Ranges (2) (in g or mg/person/day)	
Dietary Factor	FAO/WHO Recommendations
Cholesterol	< 300 mg/day
Sodium chloride (sodium)	<5 g/day (<2 g/day)
Fruits and vegetables	≥ 400 g per day
Total dietary fiber/Non-starch polysaccharides (NSP)	(>25 g, or 20g/d of NSP) from whole grain cereals, fruits, and vegetables

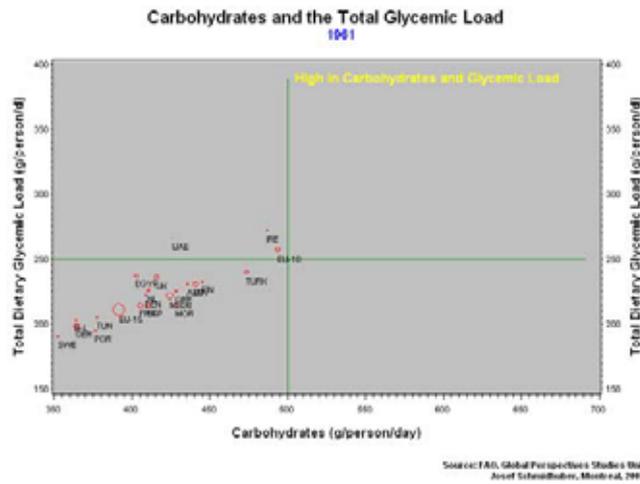
## Too many calories (1961)



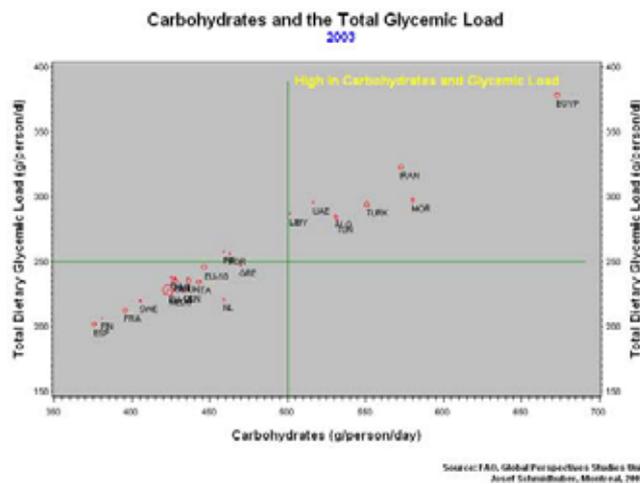
## Too many calories (2003)



## Rising glycemic load (1961)

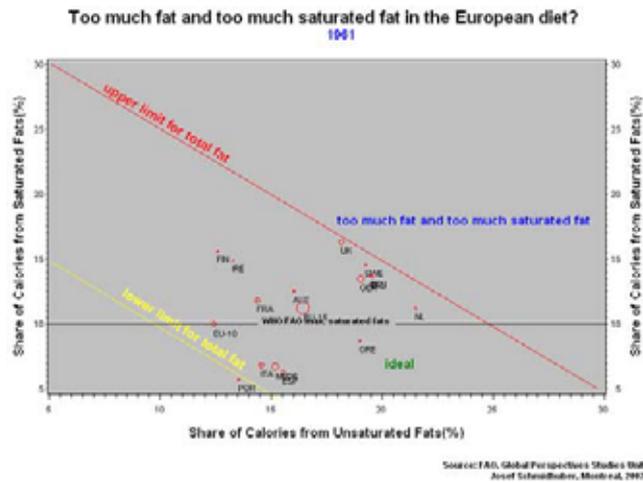


## Rising glycemic load (2003)

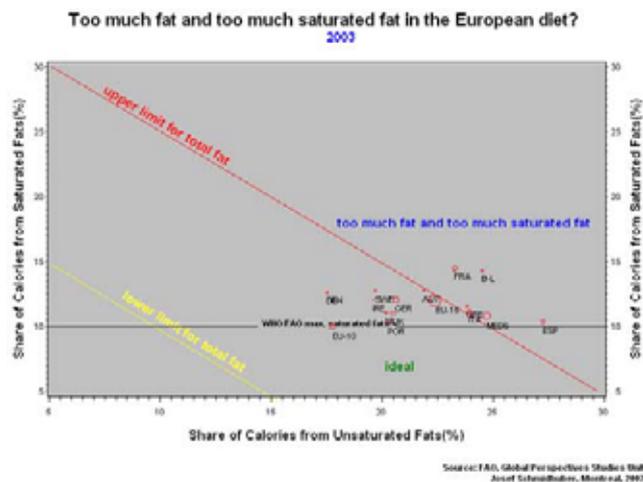




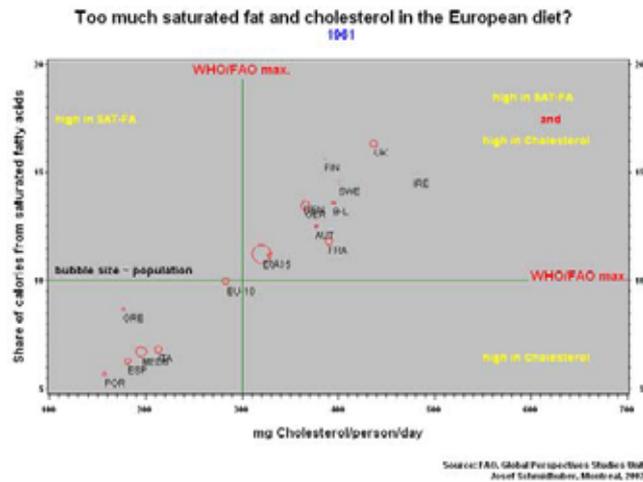
## Too much saturated fat (1961)



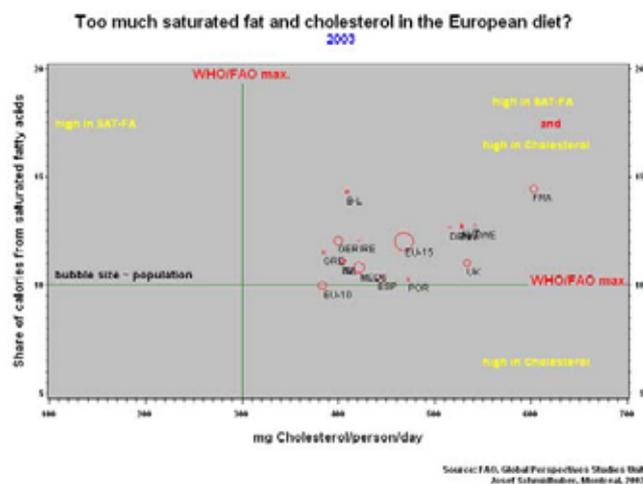
## Too much saturated fat (2003)



## Too much cholesterol (1961)

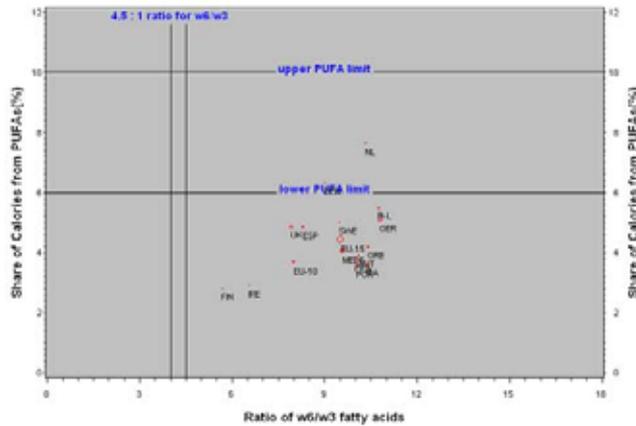


## Too much cholesterol (2003)



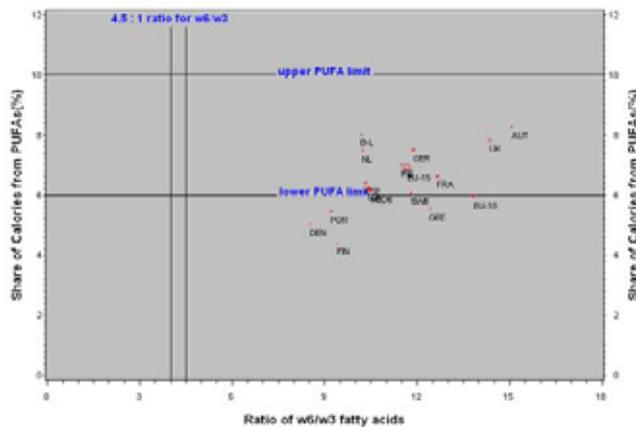
## Rising PUFAs but also Omega-6/3 ratio (1961)

Rising shares of Poly-unsaturated Fatty Acids - but also a widening Omega-6/3 ratio  
1961

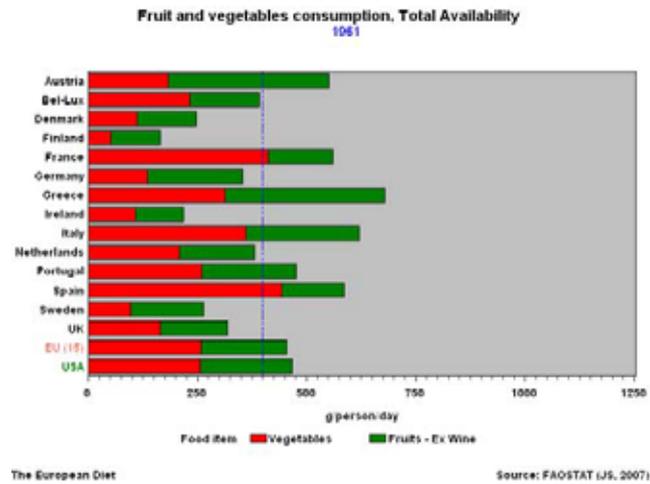


## Rising PUFAs but also Omega-6/3 ratio (2003)

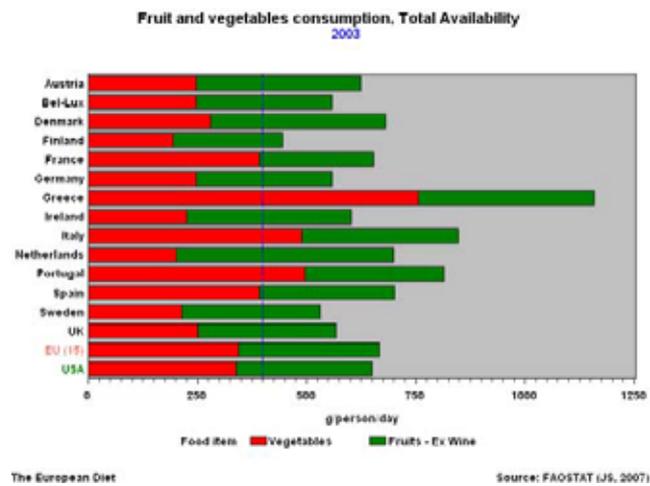
Rising shares of Poly-unsaturated Fatty Acids - but also a widening Omega-6/3 ratio  
2003



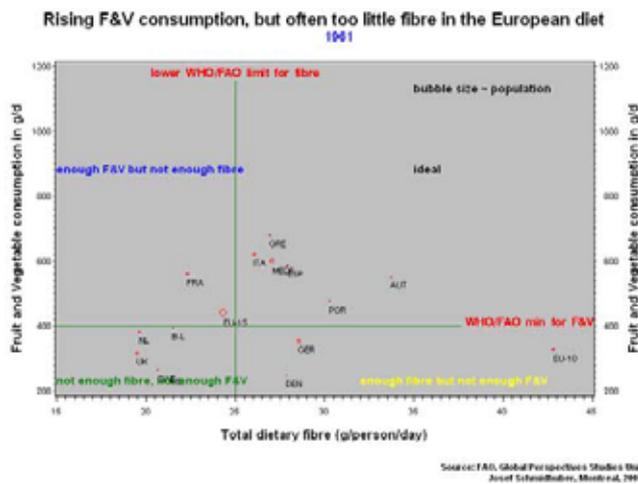
## Fruits and Vegetables up (1961)



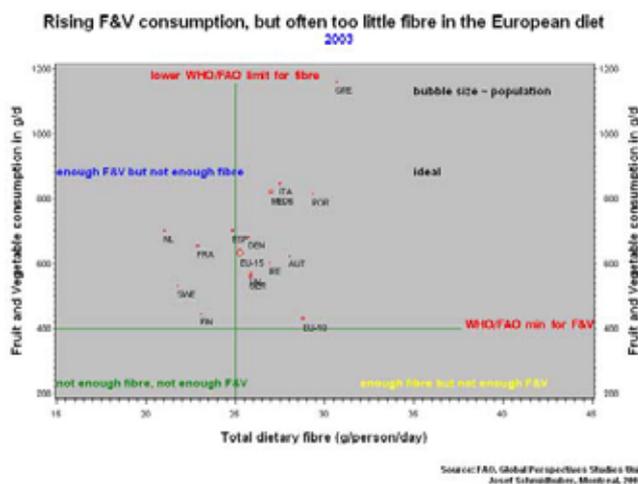
## Fruits and Vegetables up (2003)



## Enough F&V but not enough fibre (1961)



## Enough F&V but not enough fibre (2003)



## Conclusions

Is the CAP the main culprit for EU's dietary problems?

NO (clear and resounding)

Is the CAP an efficient instrument to curb obesity?

NO (equally clear and resounding)

Higher farm prices ineffective means to change final consumer prices

- high margins in vertical price transmission
- low price elasticities => no impact on consumption
- regressive on consumers with high calorie needs
- unfair: all consumers are affected and not only the obese (violates the "polluter pays principle")

Will CAP reforms help address EU's nutritional problems?

NO, likely the contrary!

Do food taxes have role to play at all?

NO, as a stand-alone measure to reduce food intake

YES, as a specific, targeted tax on unhealthy foods combined with a small subsidy on healthy substitutes

YES, to raise funds (low elasticities mean high tax revenues) which could be used for nutrition education, prevention, and other measures

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DEPARTMENT OF RURAL ECONOMY

## Taxes and subsidies on food to address obesity

Sean B. Cash, Ph.D.  
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University of Alberta, Edmonton, Canada  
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*Workshop on Financial Incentives*  
16<sup>th</sup> European Congress on Obesity  
Geneva, Switzerland  
May 16, 2008

## Obesity: An Inherently Economic Issue (at least, to an economist it is!)

- Obesity is the result of choices about food and physical exertion
- Limited time and income
- Competing goods and activities
- Competing goals

*Economics studies people's choices under precisely these circumstances.*

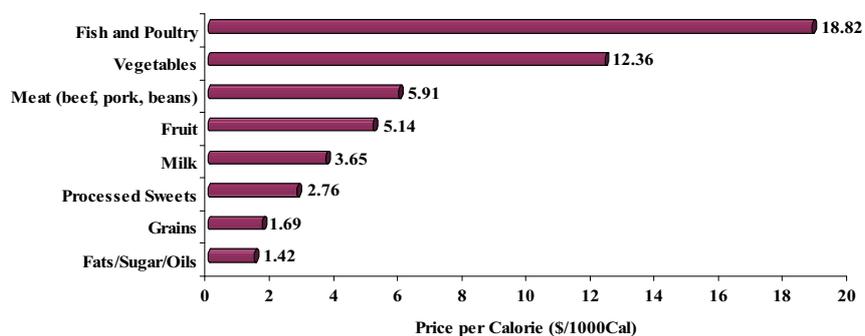
Philipson *et al.*, 2004

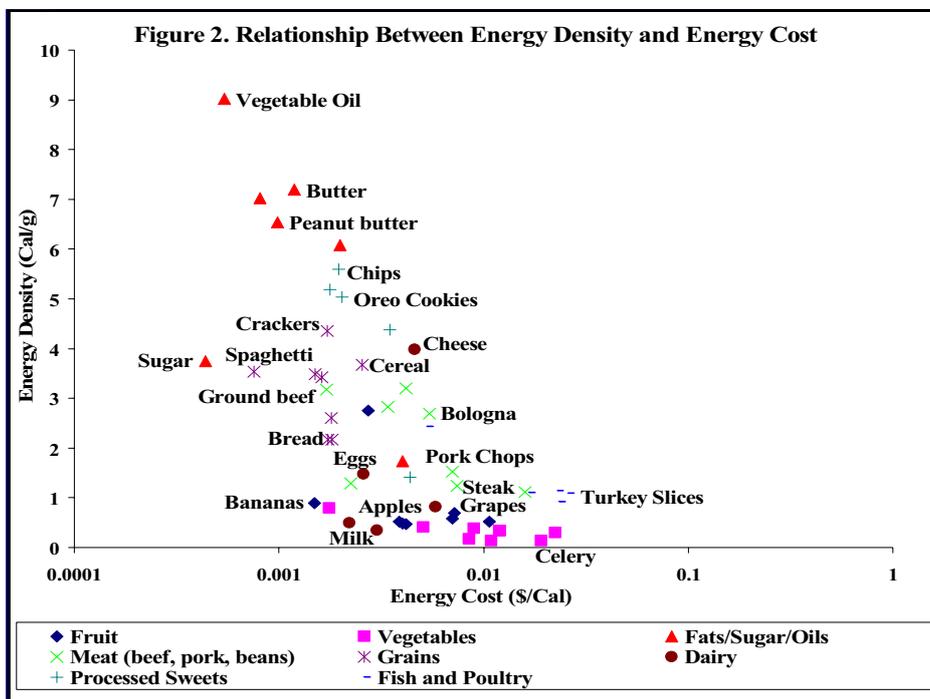
## Energy Density and Price

- What if your primary concern is meeting daily energy needs?
- Collected data from several grocery stores
- Recorded price and energy data
- Calculated price per calorie

## Price per Calorie

Figure 1. Average Price per Calorie for Each Food Basket





## WHO Recommendations

- Limit energy intake from fat and shift consumption from saturated and trans-fats
- Increase consumption of fruits, vegetables, whole grains, legumes, nuts
- Limit consumption of free sugars
- Limit salt and ensure that it is iodized
- Achieve energy balance for weight control
- Engage in adequate physical activity

## Policy Instruments

- R&D policy
- Advertising and social marketing
- Marketing restrictions
- Process restrictions
- Taxes and Subsidies
- Agricultural Policy

## Policy Instruments

- R&D policy
- Advertising and social marketing
- Marketing restrictions
- Process restrictions
- **Taxes and Subsidies**
- Agricultural Policy

## Fat Taxes in North America

- BMA, CMA calls for fat taxes
- Failed Ontario proposal to extend PST to restaurant meals under \$4.00
- Maine soda tax, San Francisco HFCS soft drink tax proposal
- New York “couch potato” tax proposal
- Double dividend argument (Jacobsen and Brownell, 2000)

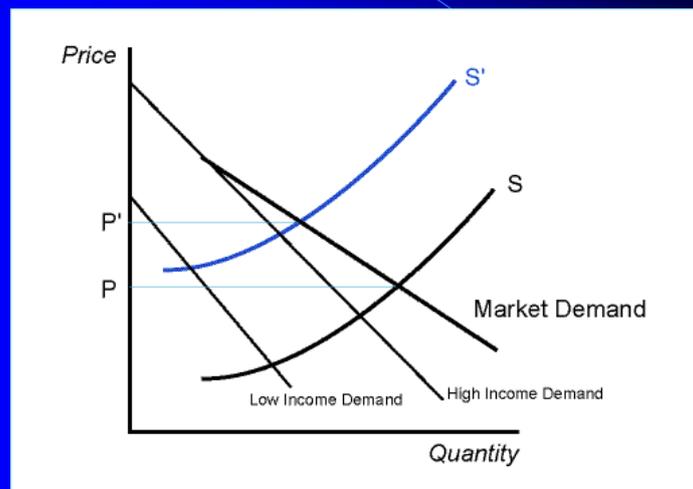
## Can They Work?

- Consumers are responsive to price – so can indeed decrease consumption
- Low price elasticities of demand for most food items ( $\ll 1$ )
- Small taxes can raise revenue, but can they lower incidence of disease?

## Problems with Fat Taxes

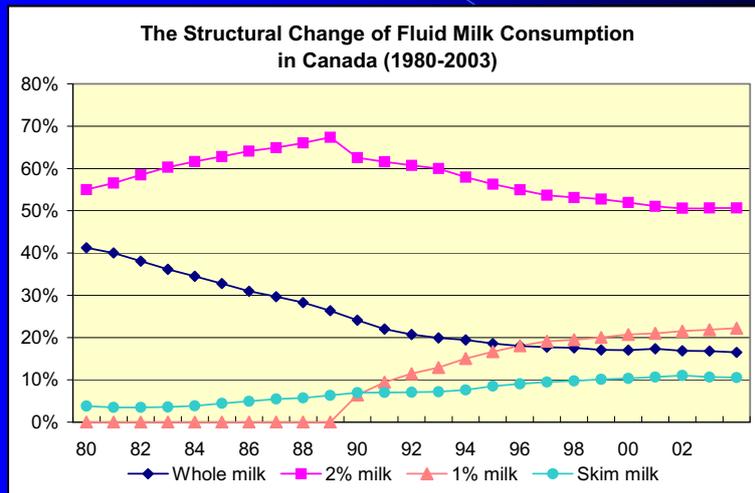
- Unlike addictive products (e.g., nicotine), snack foods can be safely consumed in moderation
- What's the "optimal" tax?
- Involves a reduction in real consumer income
- Regressive distributional effects

## Distributional Implications

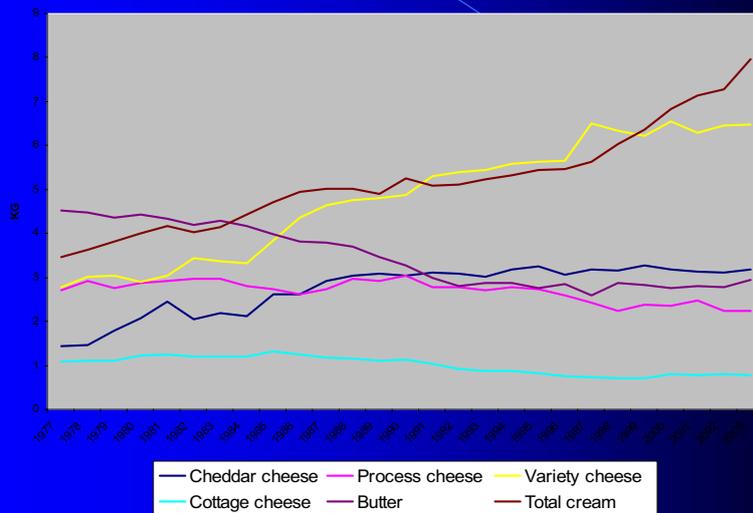




## Health-Conscious Consumers: A Dairy Example



## Health-Conscious Consumers???



## BMI Tax

- Schmidhuber (2004) argues this can function as a Pigovian tax
- Addresses energy balance, not just inputs
- British restaurant critic Giles Coren proposes following formula:

$$F_{tax} = \left( \frac{\sqrt{BMI}}{100} \right) \times L_{tax}$$

## Give Me a Break!

- Health does not steadily decrease with higher BMIs (and even increases in some ranges)
- BMI determined jointly by behavioural factors and genetics – tax your genes!
- Increased muscular structure also increases BMI
- Larger families pay more?

## Agricultural Policy

We have policies to:

- increase fluid milk prices
- increase poultry prices
- grade beef on fat content
- reduce export of grains
- subsidize sugar beet production
- encourage corn syrup production

## What About Subsidies?

- Easier to target
- Progressive, not regressive
- Will encourage more beneficial producer responses
- BUT – require large government expenditures!

## Are Subsidies Worth It?

### Fruit and Vegetable Subsidy Study Results

- A one-percent subsidy of all fruits and vegetables can save 10,000 lives for US \$1.3 million each
- Value of a statistical life estimated to be between US \$4 and \$9 million (passes benefit-cost test)
- Compare to \$65 million per cancer case for (U.S.) toxics and pesticide programs

Source: Cash, Sunding and Zilberman. 2006. Fat Taxes and Thin Subsidies: Prices, Diet, and Health Outcomes. *Food Economics* 2: 167-174.

## Distributional Costs of Subsidies

(millions of dollars US)

by Avoiding Heart Disease and Strokes through Subsidies

Health Outcome	All Incomes	Low Income	Medium Income	High Income
Fruits and Vegetables	1.29	1.02	1.19	1.45
Fruits	2.19	1.82	2.17	2.31
Vegetables	1.80	1.33	1.62	2.12

Present Value of a forty-year subsidy of one percent of retail price. Low income refers to families below 130% of the poverty income guidelines, and high income households are above 300% of this level. All numbers are in millions of U.S. dollars.

## Experimental Evidence

- Lowering fresh fruit prices in a worksite cafeteria by 50% increased sales 3-fold (Jeffery *et al.* 1994)
- Similar results in high school cafeteria (French *et al.* 1997)
- Vending machine study (French *et al.* 2001)
  - 55 vending machines, 4 price levels
  - informational treatments
  - Price reductions of 10%, 25%, and 50% on low-fat snacks increased sales by 9%, 39%, and 93%, respectively

## Food Insecurity

- “Limited or uncertain availability of nutritionally adequate and safe foods or limited and uncertain ability to acquire acceptable food in socially acceptable ways” (HHS, 2000)
- Not just a poor country problem – North American estimates of 7 – 11%

## Food Insecurity and Obesity

- “Mildly” food insecure women in CSFII 30% more likely to be overweight than food secure (Townsend *et al.*, 2001)
- Even stronger findings in sample from California Women’s Health Survey, but with racial confounds (Adams *et al.* 2003)
- Finnish sample exhibits a “curvilinear” relationship between food insecurity and BMI (Sarlio-Lähteenkorva and Lahelma, 2001)

## Toward Better Policy

- Western governments subsidize many things that aren’t healthy – why not put a “health filter” on programs?
- “Sensible” health information policies may help, but only to a point
- Taxing in the absence of market failures causes other problems

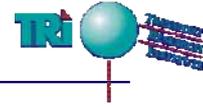
## Toward Better Policy

- Subsidies are progressive and may be easier to target, but require outlays
- As we learn more about diet-health links, we should factor them into our regulatory decision-making process

## Acknowledgements

David Zilberman, UC Berkeley  
David Sunding, UC Berkeley  
Ryan Lacanilao, University of Alberta  
Ellen Goddard, University of Alberta  
Mel Lerohl, University of Alberta

Questions? [scash@ualberta.ca](mailto:scash@ualberta.ca)



# Financial incentives in mobility management (MM)

Tom Rye,

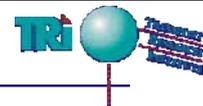
Professor in Transport, Napier University, Edinburgh, UK

***Workshop on financial incentives at ECO  
2008***

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## Structure of presentation

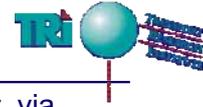


- ▶ Definitions
- ▶ Theoretical link MM to physical activity
- ▶ Effects of MM on travel choices
- ▶ Influence of financial measures on effectiveness of MM
- ▶ Some other financial transport measures:
  - Congestion charging
  - Parking charging
  - Transport and personal taxation
- ▶ Relative impact financial vs other measures

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## Definitions



- ▶ MM tries to change travellers' attitudes and behaviour, via "soft" measures like information and communication, organising and coordinating services and activities. To the user, MM could mean:
  - campaigns and promotions for walking, cycling and public transport
  - personalised travel assistance to help people reduce car use
  - employers paying for public transport tickets as part of travel (mobility) plan for work trips
  - carsharing service on street
  - mobility plans at schools so parents use cars less to drop kids
  - local mobility centre to advise on sustainable travel
  - building permits conditional on minimising mobility impact of the new development, e.g. mobility plan for site
- ▶ More info – see [www.max-success.eu](http://www.max-success.eu)

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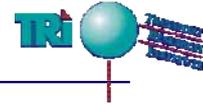
## Links (in theory...)



- ▶ MM to physical activity:
  - Less car use, more cycling and walking
- ▶ Financial incentives to physical activity:
  - Financial incentives within MM have greatest effect on change to active travel
- ▶ Both links hard to demonstrate in practice
- ▶ Most MM includes no financial measures!

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## Measuring effectiveness of MM

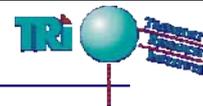


- ▶ Evaluation data limited (< 200 cases in Europe) and poor quality
- ▶ Weak quasi-experimental one-group pre-post test design
- ▶ No control groups, no significance testing, evidence of sampling bias and presentation only of positive results
- ▶ Most “robust” data for workplace travel plans
- ▶ Moeser and Bamberg (2008) meta-analysis found average 12% (point) decrease in car use from these

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## What makes workplace MM effective?



- ▶ Various Dutch, UK, US studies conclude:
  - Parking management, parking charging
  - Financial incentives
  - Provision of quality alternative modes
  - Regulation
  - Location
- ▶ Hard to isolate effects of each
- ▶ Hard to link to active travel

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## Effect of financial incentives on active travel



- ▶ 21 UK MM case studies – incentives and parking reduced car use most

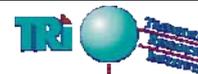
Table 5.2.2 Parking charges/incentives at the time of latest monitoring of staff travel

Organisation	Cars per 100 staff		Charge those entitled to park	Weekly parking cost		Payments for using alternatives
	After	Change		On site	Off site	
Orange (Temple Point)	27	-52	-	-	N/a	Yes
Bluewater	31	-38	-	-	/	-
University of Bristol	35	-9	Yes	£2.50-£18.75	N/a	-
Government Office for the East Midlands	<38	>-7	-	-	High	-
Egg	53	-9	Yes	£3.75	£2.50	-
Plymouth Hospitals NHS Trust	<54	>-24	Yes	£2.50	/	Yes
Oxford Radcliffe Hospitals NHS Trust (JR site)	54	-4	Yes	£0.43	Free	-
Buckinghamshire County Council	56	-15	-	-	£10.00	-
Addenbrooke's NHS Trust	<60	>-14	Yes	£1.50	Free	-
Nottingham City Hospital NHS Trust	61	-12	Yes	£1.20	/	-
Boots	62	-3	-	-	/	-
Agilent Technologies	65	-6	-	-	Free	-
Wycombe District Council	65	-12	-	-	£20.00	-
Pfizer	68	-7	-	-	/	-
BP	72	-12	-	-	Free	-
Computer Associates	74	-15	-	-	/	Yes
Vodafone	<75	>-9	-	-	/	Yes
Orange (Almondsbury Park)	80	-12	-	-	Free	-
AstraZeneca	<82	>-8	-	-	/	-
Marks and Spencer Financial Services	<83	>-12	-	-	/	Yes for car sharing
Stockley Park	<84	>-4	-	-	/	-

- ▶ Walking and cycling increased most at sites with good walk/cycle access and marketing

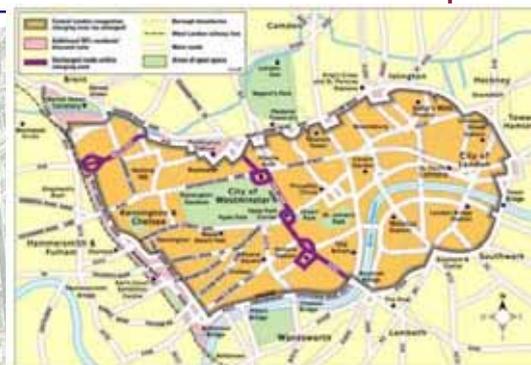
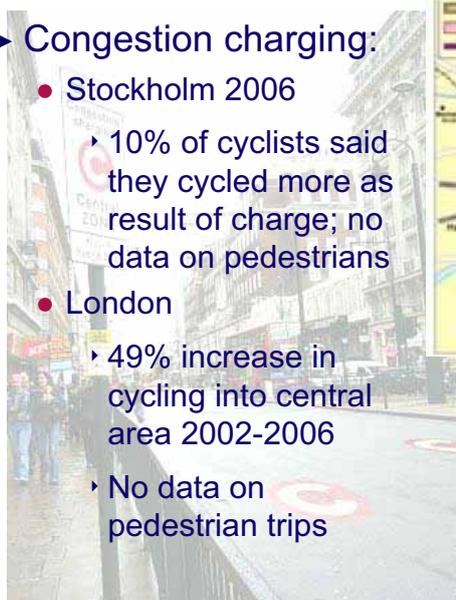
NAPLES UNIVERSITY

## Other financial measures to influence travel



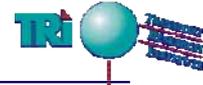
### ▶ Congestion charging:

- Stockholm 2006
  - ▶ 10% of cyclists said they cycled more as result of charge; no data on pedestrians
- London
  - ▶ 49% increase in cycling into central area 2002-2006
  - ▶ No data on pedestrian trips

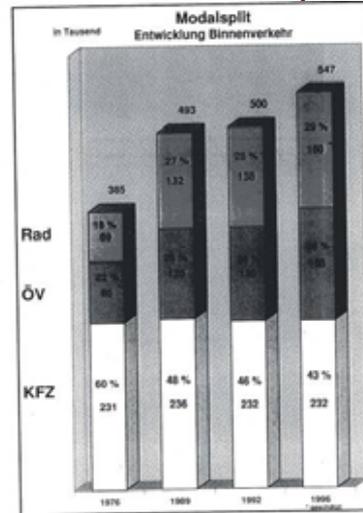


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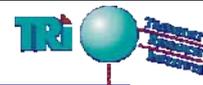
## Other financial measures to influence travel



- ▶ Parking management/pricing
  - At municipal level
    - Cycling in Freiburg
    - Cycling in Netherlands (Rietveld and Daniel, 2004)
  - At company level
    - Hague, closure of 200 space company car park (16% reduction) – main impact on PT use but walking distance from car park increased 200m per parker per day
  - Nottingham Workplace Parking Levy
    - All 37000 staff parking spaces in city taxed at £185 per space, from Apr 2010
- ▶ Personal taxation changes – no data



## Conclusions



- ▶ Evaluation of MM measures – methodologically weak
- ▶ Many MM measures – not financial
- ▶ Where MM measures include financial elements – more effective
- ▶ BUT – difficult to link this to increases in cycling/walking
- ▶ At city level, parking and congestion charging increases cycling
- ▶ As usual, almost no data on walking
- ▶ And, just one more slide...

## Sustainable transport online resource



ELTIS [www.eltis.org](http://www.eltis.org)

Case studies

Tools for practitioners

News

Events

Calls and tenders

EU initiatives &  
policies



NAPLE : UN

## The potential to promote physical activity through mobility management

David Ogilvie, MRC Epidemiology Unit, Cambridge

Workshop on financial incentives, ECO 2008

## Is there any evidence?

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'Economic interventions to increase physical activity have received little consideration to date, and almost no evidence exists regarding the efficacy of these strategies.'

Pratt et al, Am J Prev Med 2004.

## Intervention ladder

---

Eliminate choice  
Restrict choice  
Guide choice through disincentives  
Guide choice through incentives  
Guide choice through changing default policy  
Enable choice  
Provide information  
Do nothing

Nuffield Council on Bioethics 2007

## Intervention ladder

---

Eliminate choice  
Restrict choice  
**Guide choice through disincentives**  
**Guide choice through incentives**  
Guide choice through changing default policy  
Enable choice  
Provide information  
Do nothing

## Financial incentives and physical activity

---

	Incentives	Disincentives
Domestic	Green	Red
Leisure	Green	Red
Mobility	Green	Red
Work	Green	Red

MRC | Medical Research Council

## Financial incentives and physical activity

---

	Incentives	Disincentives
Domestic		
Leisure		
Mobility	Green	Red
Work		

MRC | Medical Research Council

## Time is a limited resource

---

'While public health advocates may encourage people to exercise [...] people will only exercise when it is the best use of their scarce time.'

Cawley, Am J Prev Med 2004

'By interpreting travel time as a disutility or burden, transport policy has been driven by the goal of quicker journeys.'

Jain and Lyons, J Transport Geogr 2008

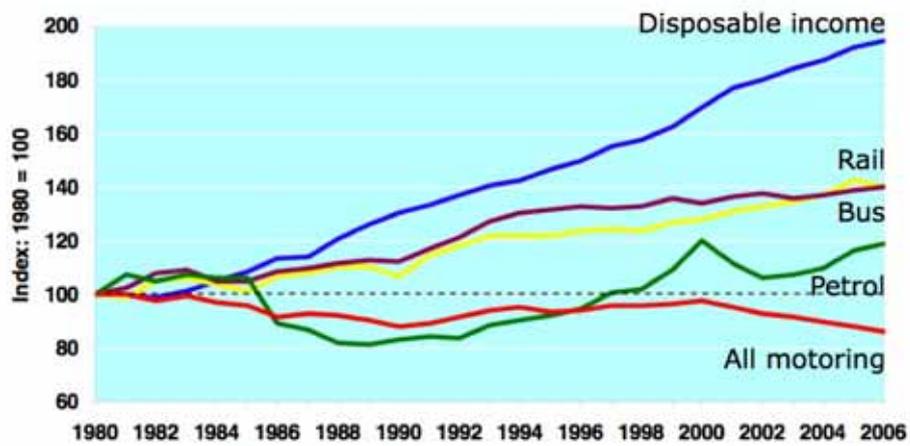
## Levels of intervention

---

- Regional and local transportation investment decisions
- Location choice decisions made by institutions, developers and resulting end-users
- Individual travel choice decisions that result from the marginal cost and convenience of walking or cycling versus other modes of transport

Frank et al, AJPM 2004

## Declining real cost of car travel



Department for Transport 2004

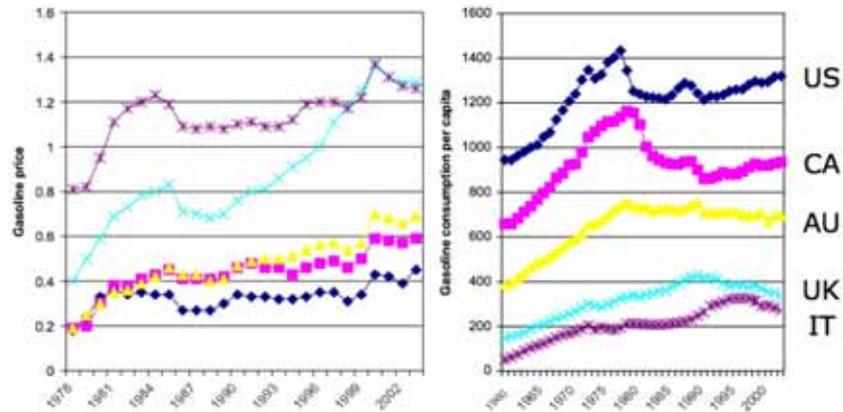
MRC | Medical Research Council

## Increasing the cost of using cars



MRC | Medical Research Council

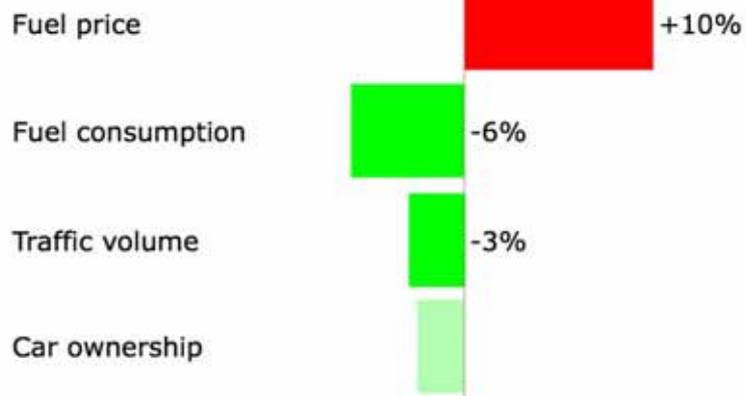
## Price and consumption of gasoline



Sterner, Energy Policy 2007

MRC | Medical Research Council

## Econometrics of fuel use



Goodwin et al, Transport Rev 2004

MRC | Medical Research Council

## Parking

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Cashing-out workplace parking in California was associated with an increase in the proportion of commuting journeys made by walking or cycling from 3% to 4%

Shoup, Transport Policy 1997

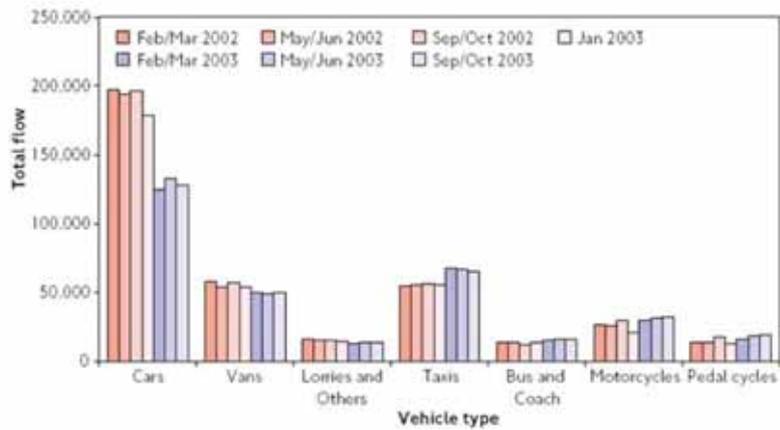
UK workplace travel plans that included parking measures were more effective in reducing solo driving than those that did not

Cairns et al, Department for Transport 2002

## Congestion charging

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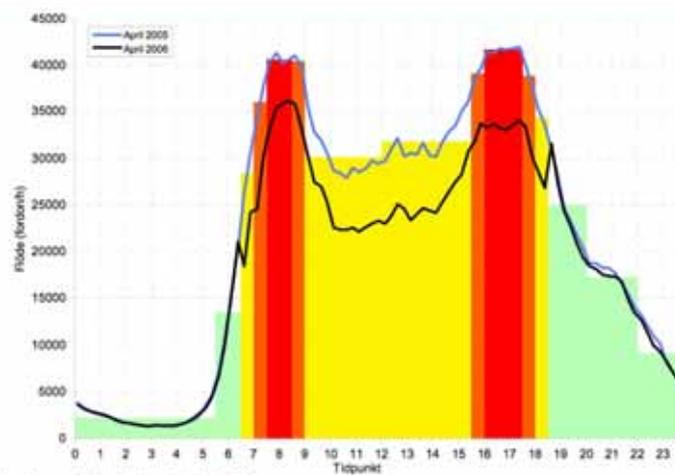
## Traffic flows into central London



### Transport for London 2004

MRC | Medical Research Council

## Traffic flows into central Stockholm



### Stockholmsförsöket 2006

MRC | Medical Research Council

## Caveats

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### **Data**

- Reduction in car use  $\neq$  increase in active travel
- Vehicle counts are not sufficient
- Main mode of travel is not sufficient

### **Impacts**

- Increase in active travel  $\neq$  increase in physical activity
- Potential for inequitable effects

## Conclusions

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- Financial incentives, particularly those which increase the cost of using cars, could contribute to promoting a shift towards using active modes of transport
- This is a desirable goal on multiple public health grounds

## But...

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- Further research is needed to quantify the benefits in terms of an increase in physical activity
- The needs of people who cannot walk, cycle or use public transport must be considered
- People's travel choices are constrained by locational and infrastructural factors beyond their control
- The debate should be therefore be broadened to consider the use of economic incentives to influence developers, employers and transport providers

## Selected references

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- Cairns et al, Department for Transport <[www.dft.gov.uk](http://www.dft.gov.uk)> 2002
- Cawley, Frank et al, Kane and Pratt et al, Am J Prev Med 2004; 27 (3)
- Graham and Glaister and Goodwin et al, Transport Rev 2004; 24 (3)
- Ogilvie et al, BMJ 2004; 329: 763-766
- Transport for London <[www.tfl.gov.uk](http://www.tfl.gov.uk)> 2004 to 2007
- Ogilvie et al, J Epidemiol Community Health 2005; 59: 886-892
- Stockholmsförsöket <[www.stockholmsforsoket.se](http://www.stockholmsforsoket.se)> 2006
- Nuffield Council on Bioethics <[www.nuffieldbioethics.org](http://www.nuffieldbioethics.org)> 2007
- Ogilvie et al, BMJ 2007; 334: 1204-1214
- Sternier, Energy Policy 2007; 35: 3194-3202
- Jain and Lyons, J Transport Geogr 2008; 16: 81-89

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Cambridge

[dbo23@medschl.cam.ac.uk](mailto:dbo23@medschl.cam.ac.uk)

	<p>Swiss Re </p> <h1>Financial Incentives in Life Insurance (Preferred risk products)</h1>		
	<p><b>16th European Congress on Obesity Geneva, Switzerland May 16, 2008</b></p> <p><b>Dieter Gaubatz, FSA, FCIA, MAAA</b></p>		

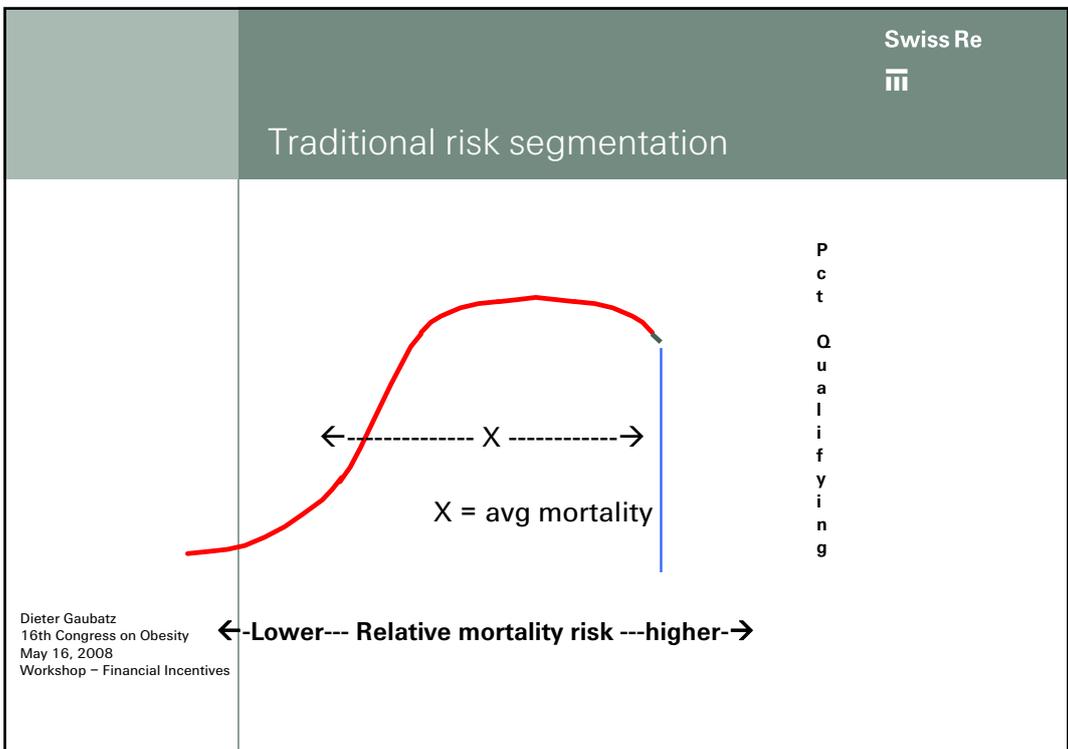
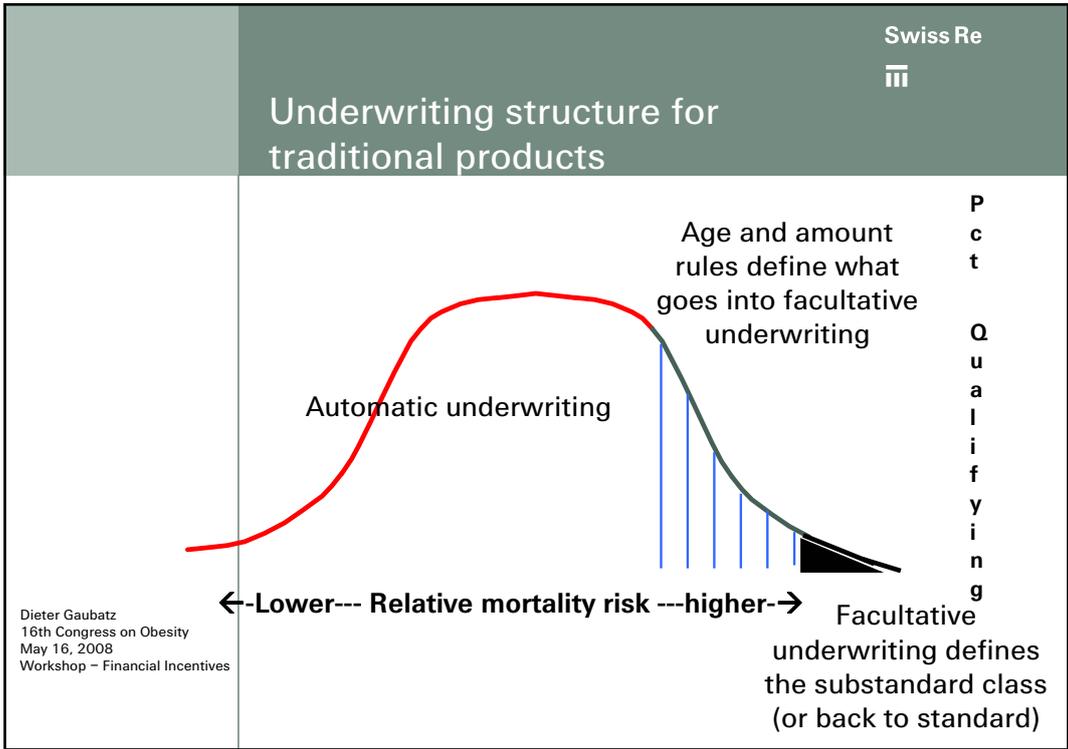
	<p>Swiss Re </p> <h2>Agenda</h2>	
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 2</p>	<ul style="list-style-type: none"><li>■ Overview</li><li>■ History</li><li>■ Product design</li></ul>	

	<p data-bbox="1145 320 1241 342">Swiss Re</p>  <p data-bbox="528 416 839 454">Impact on mortality</p>
<p data-bbox="280 904 491 972">Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p data-bbox="293 1003 341 1021">Slide 3</p>	<ul data-bbox="528 510 1294 645" style="list-style-type: none"><li data-bbox="528 510 1294 577">■ Impact of obesity on mortality expectations is significant and well documented</li><li data-bbox="528 611 995 645">■ Not the focus of this presentation</li></ul>

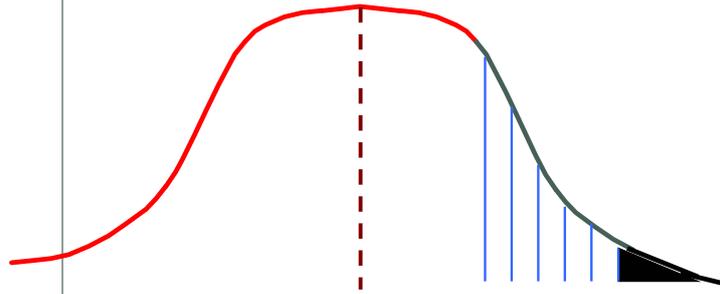
	<p data-bbox="1145 1211 1241 1234">Swiss Re</p>  <p data-bbox="528 1308 826 1346">Financial incentive</p>
<p data-bbox="280 1794 491 1861">Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p data-bbox="293 1892 341 1910">Slide 4</p>	<ul data-bbox="528 1402 1286 1603" style="list-style-type: none"><li data-bbox="528 1402 975 1435">■ As individual becomes healthier</li><li data-bbox="528 1469 1286 1536">■ Opportunity to purchase life insurance policy at reduced rate</li><li data-bbox="528 1570 1182 1603">■ Protection part of insurance premium decreases</li></ul>

	<p style="text-align: right;">Swiss Re </p> <p style="text-align: center;">Experience in USA</p>
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 5</p>	<ul style="list-style-type: none"> <li>■ Preferred plans are very popular in USA</li> <li>■ Term insurance policies with face amounts of \$100,000 and higher             <ul style="list-style-type: none"> <li>– Plans are usually para-medically underwritten (nurse)</li> <li>– Verifies measurements</li> <li>– Almost all new sales are on a “Preferred risk” structure</li> </ul> </li> <li>■ Common in other plan structures             <ul style="list-style-type: none"> <li>– Whole life</li> <li>– Universal/variable life</li> </ul> </li> </ul>

	<p style="text-align: right;">Swiss Re </p> <p style="text-align: center;">Experience in USA</p>
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 6</p>	<ul style="list-style-type: none"> <li>■ Term ins accounts for 62% of U.S. individual life ins sales (by face amount) in 2007, steadily increasing trend, 97% of sales \$100K+ use preferred structure</li> <li>■ Preferred plan structures started in the 1980s</li> <li>■ Became popular in the early 1990s</li> <li>■ For larger size policies, now the main structure for life policies with a significant “protection” component</li> <li>■ 2008 CSO - new standard USA insurance mortality table             <ul style="list-style-type: none"> <li>– project almost completed</li> <li>– recognizes preferred plan structures</li> </ul> </li> </ul>



## Adding a preferred risk class structure



Dieter Gaubatz  
16th Congress on Obesity  
May 16, 2008  
Workshop – Financial Incentives

## Medical information - preferred criteria range of max criteria used to qualify

- Blood pressure systolic (80 – 160)
- Blood pressure diastolic (50 – 105)
- Accept / reject / modify if being treated for hypertension
- Cholesterol level (121 – 330)
- Cholesterol ratio (2.0 – 9.5)
- Accept / reject / modify if being treated for cholesterol
- Build (BMI) (19 – 40)

Dieter Gaubatz  
16th Congress on Obesity  
May 16, 2008  
Workshop – Financial Incentives

Slide 10

	<p style="text-align: right;">Swiss Re </p> <h2 style="text-align: center;">Family history - preferred criteria</h2> <h3 style="text-align: center;">types of criteria – qualification standards</h3>
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 11</p>	<ul style="list-style-type: none"><li>■ Family presence of<ul style="list-style-type: none"><li>– Cancer</li><li>– Cardiovascular disease</li><li>– Diabetes</li><li>– Stroke</li></ul></li><li>■ Is presence defined as “Death” or “Diagnosis”</li><li>■ Maximum age at which presence was determined</li><li>■ Does family include only parents or also siblings</li></ul>

	<p style="text-align: right;">Swiss Re </p> <h2 style="text-align: center;">Personal history – preferred criteria</h2> <h3 style="text-align: center;">types of criteria – qualification standards</h3>
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 12</p>	<ul style="list-style-type: none"><li>■ History of alcohol abuse</li><li>■ History of substance abuse</li><li>■ History of non-melanoma cancer</li><li>■ Length of time in the past in which this last occurred (last 2 years, 5 years, ever, etc)</li></ul>

	<p style="text-align: right;">Swiss Re </p> <p>preferred risk qualification criteria Other standards</p>
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 13</p>	<ul style="list-style-type: none"> <li>■ <b>Motor vehicle history</b> <ul style="list-style-type: none"> <li>– Driving under the influence</li> <li>– Moving violations</li> <li>– Reckless driving violations</li> <li>– No. of incidences allowed</li> <li>– Length of period of history</li> </ul> </li> <li>■ <b>Hazardous avocations</b></li> <li>■ <b>Private aviation exclusions</b></li> </ul>

	<p style="text-align: right;">Swiss Re </p> <p>Definition of smoker</p>
<p>Dieter Gaubatz 16th Congress on Obesity May 16, 2008 Workshop – Financial Incentives</p> <p>Slide 14</p>	<ul style="list-style-type: none"> <li>■ <b>Cigarette smoker or Tobacco user (use of any nicotine products)</b></li> <li>■ <b>Classification of cigar only user for preferred class qualification</b></li> <li>■ <b>Length of time since quit smoking</b></li> </ul>

## Preferred plans - product design

- A large variety of plan structure differences among companies

- No. of non-smoker classes
- No. of smoker classes
- Criteria used
- Qualifying level (or definition) of criteria
- Preferred criteria structure
  - must meet all qualifications; or
  - scoring system which gives a score to the various criteria values; qualification depends on total score

Dieter Gaubatz  
16th Congress on Obesity  
May 16, 2008  
Workshop - Financial Incentives

Slide 15

## Build

- Body Mass Index (BMI) is only one of the indicators
- Correlations
  - Usually factors have positive correlation
- Not necessary to have all factors
- Multiple factors provide better mortality evaluation

Dieter Gaubatz  
16th Congress on Obesity  
May 16, 2008  
Workshop - Financial Incentives

Slide 16



## Value of financial incentives

- Overall best financial incentives vary significantly based on design definitions
  - It could reach up to a 40% discount
- BMI value varies based on
  - whether other factors are included
  - by issue age, gender and smoking status
  - relative to overall average standard mortality
    - 70% - 200%

Dieter Gaubatz  
16th Congress on Obesity  
May 16, 2008  
Workshop – Financial Incentives

Slide 17



# Long term effects of financial incentives in treatments for obesity

Virginia Paul-Ebhohimhen and  
Alison Avenell

Health Services Research Unit  
University of Aberdeen



HSRU is funded by the Chief Scientist Office of the Scottish Government Health Directorates. The author accepts full responsibility for this talk.

## Background

- Economic theory suggests people can be motivated for behaviour change by changing the costs and benefits associated with a specific behaviour
- Some systematic reviews support the use of financial incentives for some clinical behaviours and conditions
  - screening, compliance with medication (Giuffrida *BMJ* 1997; 315: 703-07)
  - hypertension, depression (Weingarten, *BMJ* 2002; 325:925)



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## **A priori criteria**

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**To systematically review**

- randomised controlled trials**
- of obesity treatments using financial incentives**
- in adults (mean age  $\geq$  18 years)**
- BMI group  $\geq$  28kg/m<sup>2</sup>**
- at least one year follow up**
- outcome including weight**



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## **Methods**

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**We searched**

**MEDLINE, EMBASE, CINAHL, PsychINFO, SPORTDiscus, Cochrane Register of Controlled Clinical Trials and Cochrane Database of Systematic Reviews, hand-searched journals and reviewed reference lists from 1966 until May 2008**

**First author performed quality assessment and data extraction and the second checked the data**



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## **Studies and participants**

---

- 9 trials (8 in U.S, 1 in Canada)
- all included behaviour change, diet and physical activity advice
- recruited through the media
- financial incentives freely provided in 2 studies
- mainly female (only one all male study)
- age 36 to 53 years
- body mass index 29 to 32 kg/m<sup>2</sup>



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## **Quality of studies**

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### **No included studies:**

- described power calculations
- mentioned concealment of allocation or blinding
- analyzed results on an intention to treat basis

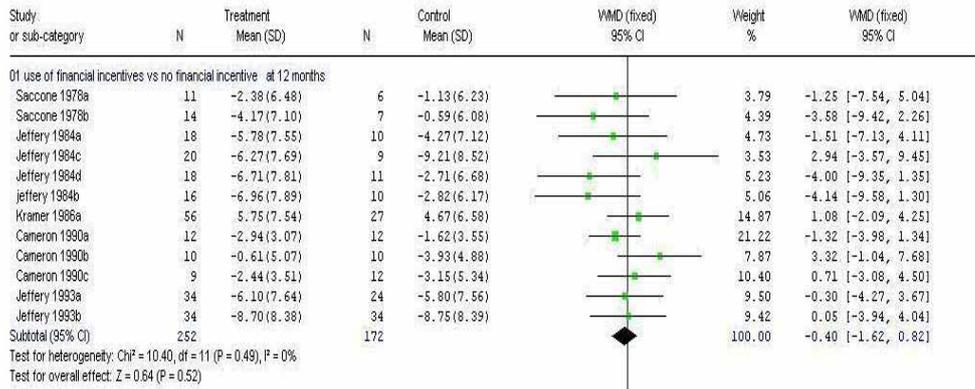
**Only three studies described dropouts with reasons**



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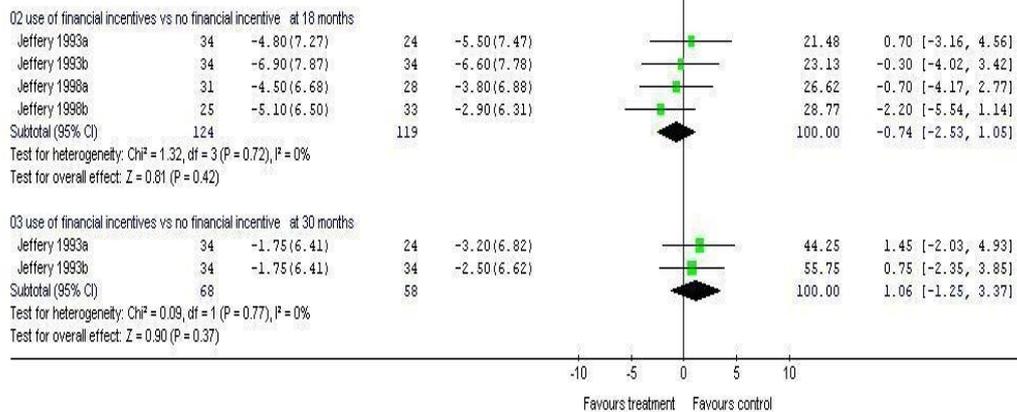
# Effect of financial incentives on weight at 12 months



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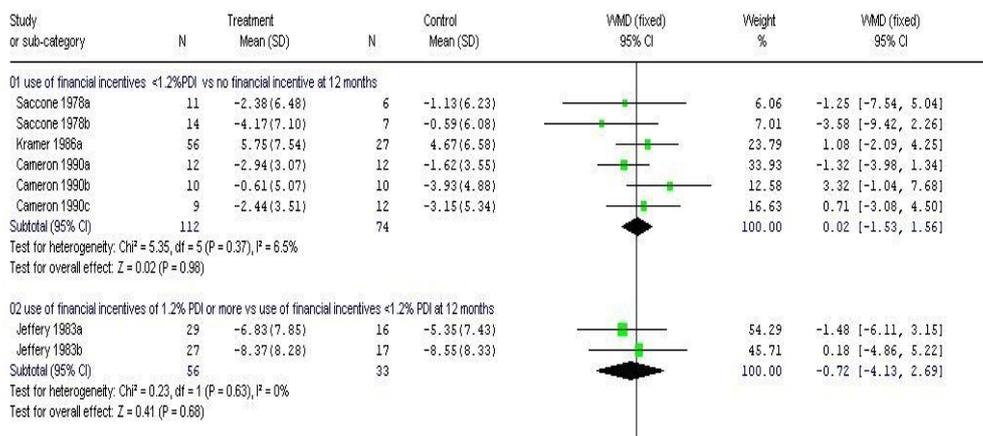
# Effect of financial incentives on weight at 18 and 30 months



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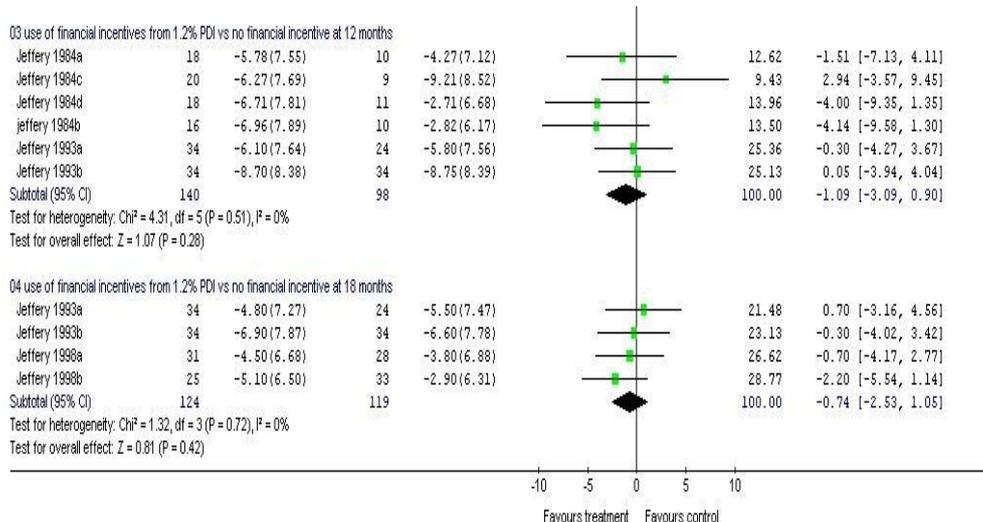
## Effect of financial incentives by percent of PDI (1)



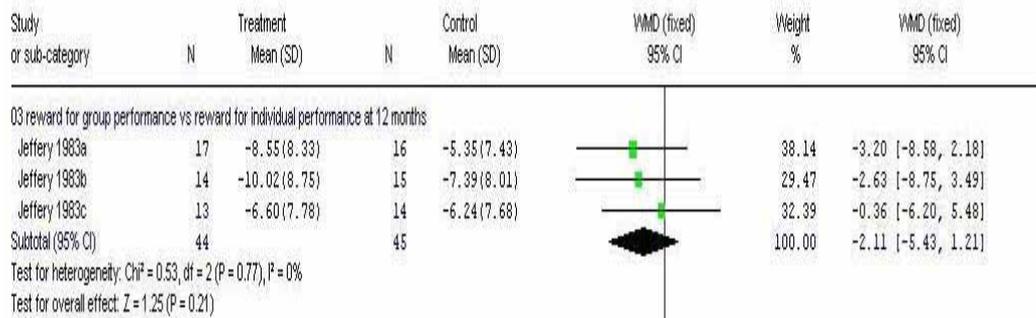
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## Effect of financial incentives by percent PDI (2)



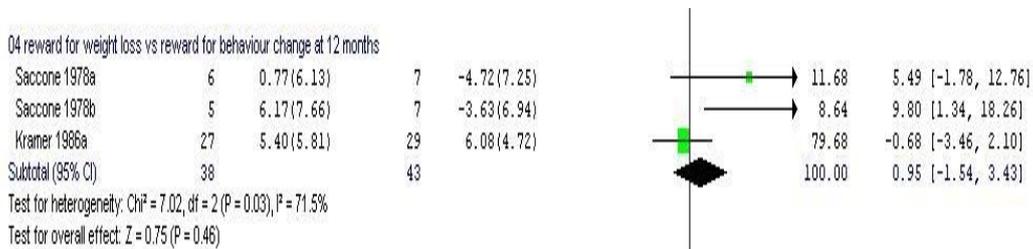
## Effect of financial incentives by mode of delivery (1)



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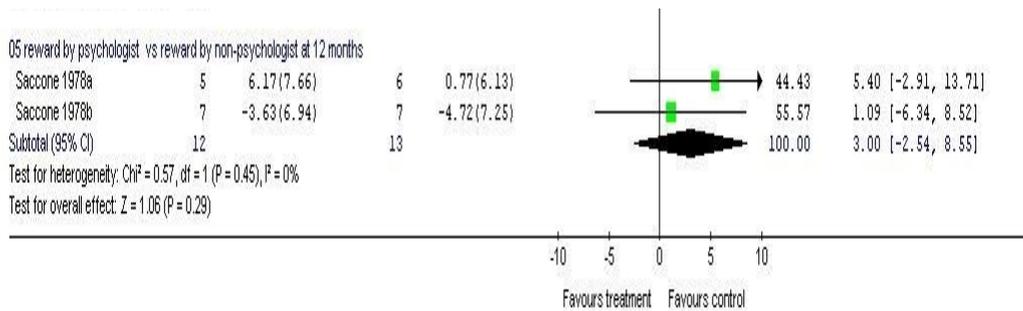
## Effect of financial incentives by mode of delivery (2)



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## Effect of financial incentives by mode of delivery (3)



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## Limitations

- **Few studies with small numbers**
- **Methodological issues of trials**
- **No trials involving use in drug or surgical treatments**
- **All conducted in North America**
- **Possible interaction from other motivators (e.g. food provision/personal trainers)**



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## Further evidence

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- (Finkelstein, *JOEM* 2007; 49:981-9)
  - trials employing financial incentives are associated with greater weight loss
  - the larger the financial incentive, the greater the weight lost (6 months)
- (Paul-Ebhohimhen, ECO2008; poster T2:36)
  - significant weight loss ( $p=0.04$ ) in studies employing monetary reward
  - no difference ( $p=0.40$ ) in studies not employing financial incentives



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## Further evidence 2

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- (Jochelson, *King's Fund* December 2007) suggests use
  - for clearly defined, time-limited, simple behavioural tasks
  - can encourage participation in programmes
  - does not always translate to long term behaviour change



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## Conclusion 1

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- **Not recommended in the absence of structured weight program (Harris, *Behav. Res. & Ther* 1971; 9: 347-354**
- **Although trials employing financial incentives are associated with greater weight loss....**
- **...there was no statistically significant effect of use of financial incentives in the long term (>1year)**



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## Conclusion 2

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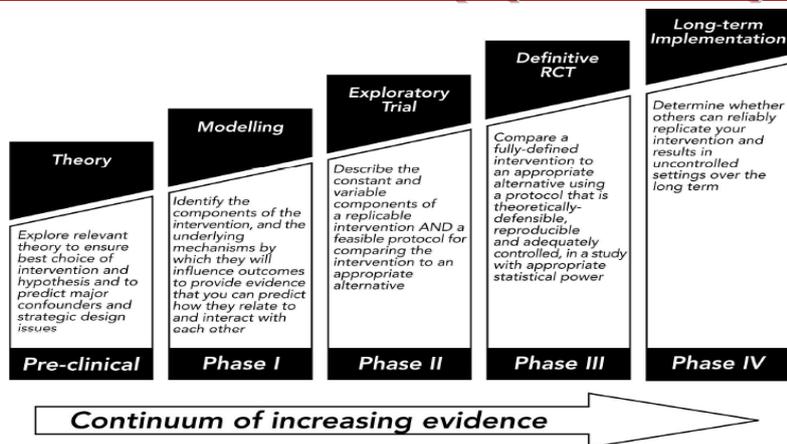
- **Confidence intervals of subgroups suggests could include worthwhile clinically significant effects**
- **Effective in settings employing social support (group setting)**
- **Future trial(s) should use within the context of a complex intervention (MRC framework)**



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## MRC framework for complex interventions (April 2000)



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## Research recommendations (1)

### Discrete choice experiments:

- How much?
- What form?
- Which (socioeconomic) groups?
- Source?
- How long?
- How to reward?



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## **Research recommendations (2)**

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- who to deliver reward?**
- frequency of reward?**
- effects of social setting?**
- reward for weight vs reward for self-reported behaviour?**



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## **Acknowledgements**

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- This work was funded by the Chief Scientist Office, Scottish Government Health Directorates (the views expressed here are those of the authors)**
- Luke Vale (Health Economics Research Unit Aberdeen) for his very useful suggestions**



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## **Appendix III: Biographies of the speakers**

### **Panos A. Konandreas**

Panos A. Konandreas, a Greek national, has a Ph.D. in Agricultural Economics, University of California (Davis and Berkeley) and a M.S. in Electrical and Mechanical Engineering, National Technical University of Athens.

His career with FAO comes to an end in May 2008 as Acting Director of FAO's Liaison Office in Geneva, where he worked since 1998 on trade issues related in particular to the negotiations on agriculture under the WTO. He spent 16 years (1982-98) at the Commodities and Trade Division at the FAO in Rome, where he was Chief of the Trade Policy and Commodity Projections Service. Earlier positions include that of Principal Economist at the International Livestock Centre for Africa (1979-82) and Research Associate at the International Food Policy Research Institute (1976-79).

His main areas of research include international trade policy issues, commodity markets, food security and food aid policy, biofuel trends and development assistance. He has authored over 50 research works on these subjects, including individual research monographs, technical reports and articles in refereed professional journals and books. He was member of the Editorial Board of Food Policy for over 12 years and edited a special issue of this Journal on the Implications of the Uruguay Round for developing countries.

### **Sean B. Cash**

Sean Cash is an Associate Professor in the Department of Rural Economy, University of Alberta (Canada) and a Faculty Associate in the Department of Consumer Science, University of Wisconsin, Madison (USA). His research focuses on how food and nutrition policies affect both producers and consumers. Current and recent projects in this area include the efficacy of food price interventions as public health tools; the role of agricultural policies on nutrition; the relationship between food security and obesity; how consumers value social aspects of food relative to other attributes; and how health information impacts consumers' demand for food. He also conducts research in the areas of environmental regulation and resource conservation, and teaches in the agriculture and environmental conservation programs at the University of Alberta. He serves on the executive committees of the Canadian Agricultural Economics Society, the Alberta Agricultural Economics Association and Growing Food in Security Alberta.

Sean holds a Ph.D. and M.S. in Agricultural and Resource Economics from the University of California at Berkeley, as well as an M.A. in Economics from the University of Michigan and a B.A. in International Relations from the Johns Hopkins University. His work experience includes working as a researcher in the regulatory practice of a large Washington, D.C. law firm; internships in the U.S. Environmental Protection Agency and at D.C. think tanks; and consulting on food and resource issues.

### **Tom Rye**

Tom Rye is a Reader in Transport at Edinburgh Napier University where his research activities cover mobility management, parking management, travel plans, concessionary fares, public transport scheme development and evaluation, and the development of local and regional transport policy. He has also carried out previous work on cross-national comparisons of transport policy implementation. During much of his twelve years at Napier he was seconded part-time to the transport consultancy Colin Buchanan, and to the City of Edinburgh Council, and he maintains close links with government and industry. He is also well-known internationally, as chair of the US Transportation Research Board's Parking Management Sub-committee, and a regular participant in EU projects and as a member of the European Platform on Mobility Management's Task Force on mobility management in Europe. In his spare time, Tom enjoys travel, studying foreign languages, mountain biking, ski touring, origami and gardening.

**David Ogilvie**

David Ogilvie qualified in medicine from Cambridge and subsequently trained in general practice and then in public health medicine. He was a research fellow at the Medical Research Council Social and Public Health Sciences Unit in Glasgow before joining the MRC Epidemiology Unit in Cambridge in October 2007. He is a member of the Scottish Physical Activity Research Collaboration and served on the programme development group for physical activity and the environment at NICE. His research is mainly concerned with understanding how population health can be improved through efforts to influence the 'wider' (environmental or societal) determinants of health. He is particularly interested in the relationships between transport, the environment, physical activity and health, which he has explored both in systematic reviews and by establishing a study of health effects associated with a new urban motorway in Glasgow.

**Dieter Gaubatz**

FSA, FCIA, MAAA

Vice President, Life & Health Products

Swiss Re Life & Health America Inc.

Dieter Gaubatz works out of one of Swiss Re's office in the United States, but is currently on a 6 month project in Zurich. He has been with Swiss Re for 11 years. He has had responsibilities in experience studies, assumption setting, product development in International Markets and new product development for direct company clients of Swiss Re. He is a member of the Society Of Actuaries (SOA) Individual Life Experience Committee and a member of the oversight committee and various subcommittees of the Preferred Valuation Table Project effort jointly sponsored by the SOA and American Academy of Actuaries (AAA). This project will be publishing a new USA valuation table in 2008 which specifically recognizes preferred risks in anticipation of new valuation standards under the new Principles Based Approach being implemented for reserving in the USA.

Dieter has thirty-three years of experience in the life insurance business, including twenty-two years at a major direct life insurer where he held various actuarial positions in Canada and the U.S.

Dieter has a Bachelor of Mathematics degree with a major in actuarial science from the University of Waterloo (Canada).

**Virginia Paul-Ebhohimhen**

Virginia Paul-Ebhohimhen has trained in Medicine and Health Services Research. She is pursuing higher specialist training in Public Health and conducts health services research with special interest in delivery of complex interventions in public/primary care settings, and systematic reviews.