

Are high-sugar diets conducive to obesity?

Evidence from epidemiology

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Outline

- Definitions: what are we measuring?
- Intakes and sources of sugar
- The sugar/fat see saw.
- Associations with overweight.
- Under-reporting.
- Research needs.

Outline

- Definitions: what are we measuring?

Some definitions

Obesity

Proxy = Body mass index

- BMI \neq body fat
- BMI says nothing about distribution of weight (apples vs. pears)

Overweight > 25kg/m²

Obesity > 30kg/m²

Abdominal obesity is more of a health risk



Prevalence of overweight and obesity in Adults (NDNS 2004)

BMI		Men	Women
Obese	Over 30	25%	20%
Overweight	Over 25-30	41%	33%
Normal	Over 20-25	31%	40%
Underweight	18.5 or less	1%	3%

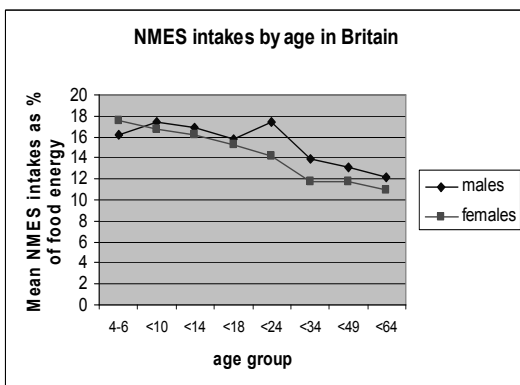
Some definitions

NMES (non-milk extrinsic sugars)
includes

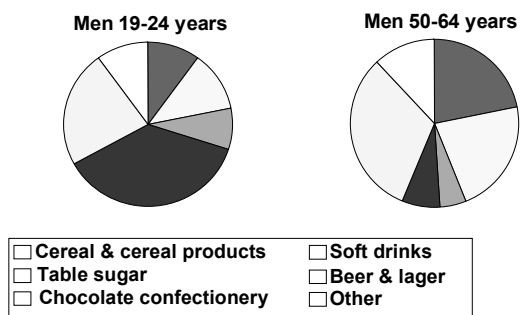
- added sugars
- fruit juice
- 50% of sugars in cooked/processed fruit

Outline

- Definitions: what are we measuring?
- Intakes and sources of sugar



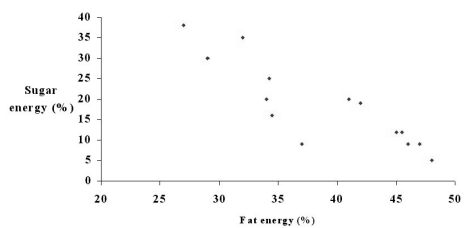
Comparison of Sources of NMEs in Adult survey 2000



Outline

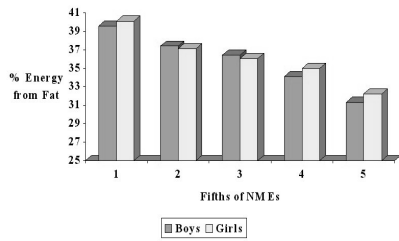
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Relation between percent of energy from fat and sugar in cross-sectional samples



Source: Hill & Prentice 1995

% Energy from fat in the diets of British Pre-school Children by fifths of NMEs intake



Source: Gibson 1997

High-fat diets vs low-fat diets (Belgian males 25-45 yrs)
(De Henauw, 1999)

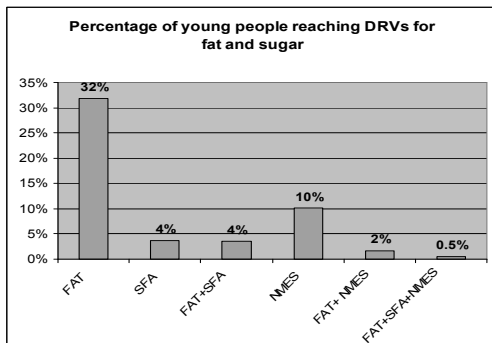
More

- margarine/butter
- meat
- meat products
- cheese
- pastry

Less

- potatoes
- pasta/rice
- fruit
- soft drinks
- sugar
- alcohol

Are the guidelines feasible?



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Scientific consensus...?

- "... The available evidence is insufficient to establish a link between sugars intake and the development of obesity" *(COMA 1989)*
- "... There is no indication that sugar is associated with excessive food intake" *(FAO/WHO 1998)*
- "... There is little scientific support for the commonly-held perception that consumption of high amounts of simple sugars contributes to obesity" *(FAO/WHO 1998)*
- "...Free sugars contribute to the overall energy density of diets. Free sugars promote a positive energy balance *(WHO/FAO Technical report Series 916 2004)*

Epidemiology of obesity & nutrient intake

Most studies show:

- a positive correlation with % fat in the diet,
- a negative correlation with % sugar in the diet

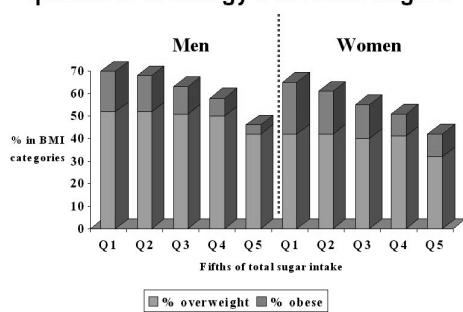
- Positive or nil association with energy intake?

Sugar intake and BMI

population studies that show an inverse association:

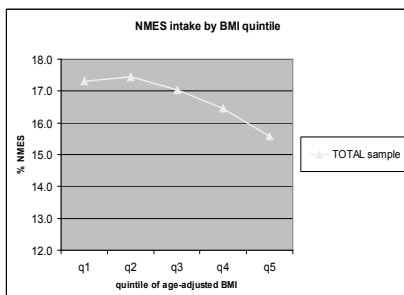
- Scottish Heart Health Study : (Bolton-Smith & Woodward, 1994).
- DHSS survey of British schoolchildren aged 10-15years (DH, 1989)
- Dietary and Nutritional Survey of British Adults (Gibson, 1996)
- NDNS of children aged 1.5 to 4.5 yrs (Gibson 1998).
- NDNS of young people aged 4 to 18 yrs (Gibson, in prep)

Percent overweight or obese according to quintile of % energy from total sugars



Source: Bolton-Smith & Woodward 1994

NDNS of Young people aged 4-18 yrs
(further analysis : Gibson 2004)



Sugar intake and BMI: other studies

(Overby et al 2004) positive association between BMI and added sugars intake in 4 yr olds (but negative in 11 yr olds)

(Ludwig et al, 2001) : prospective study over 19m reporting a positive association between BMI and soft drink consumption at baseline and change in intake

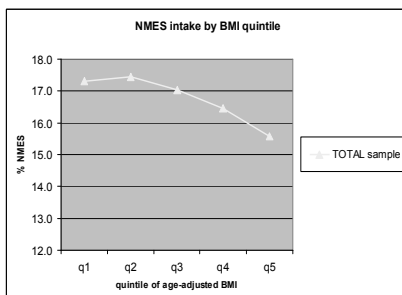
James et al, 2004: RCT of education to reduce fizzy drink consumption reduced prevalence of overweight children compared with controls

Sahota et al, 2001: Controlled intervention of education in children to prevent obesity. Little impact on behaviour (overweight in intervention gp ate more high sugar foods!)

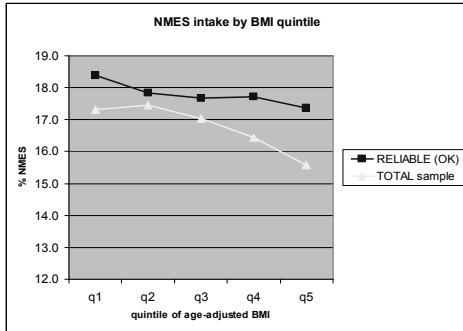
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NDNS of Young people aged 4-18 yrs
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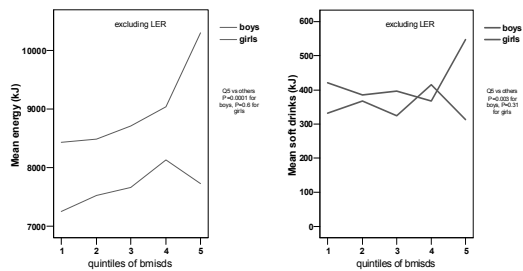
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Independent predictors of overweight
in young people (NDNS)

	P value	OR*	95 % Confidence interval	
			Lower	Upper
Energy intake (MJ/d)	<0.0001	1.58	1.42	1.77
Moderate or vigorous activity (hrs/d)	0.0005	0.71	0.58	0.86
TV watching etc.# (hrs/d)	0.032	1.11	1.01	1.23

Association between soft drinks and BMI in NDNS 4-18yrs



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Research needs

How to know what people are really eating ?

- Better dietary assessment methods? (aim to reduce/prevent misreporting)
- Identify /correct for MR (biomarkers?)
- Is MR general or macronutrient-specific/food specific?

Research needs

- Is energy density the key to obesity?
- How do food patterns differ in normal weight vs. overweight?
- Is the form of sugar (liquid or solid) important?
- Do people adapt their eating habits to changes in composition?
- How is activity level affected by diet? (& vice versa)

Are high-sugar diets conducive to obesity?

Any source of energy can be conducive to obesity if excess to requirements...

Emphasis on lowering sugar intake to 10% energy may be counterproductive
