

The Obesity Epidemic

What caused it?
How can we stop it?

Content

- Part 1 – Wrong assumptions
(Things that we've got wronger than a very wrong thing)
- Part 2 – The Obesity Epidemic
(Why did an obesity researcher end up in the cholesterol debate?)
- Part 3 – Fat cats & fat people
(How widespread is conflict of interest?)
- Part 4 – How do we lose weight?
- Part 5 – Summary

Part 1 – Wrong Assumptions

1) The General Principle

“Eat less/do more”

2) The Calorie Formula

“To lose 1lb of fat you need to create a deficit of 3,500 calories”

Part 1 – The General Principle

The Laws of Thermodynamics

- 0) If object A is in thermal equilibrium with B and B is in thermal equilibrium with C then...
- 1) In a closed system, in thermal equilibrium, energy can neither be created nor destroyed. It shall be conserved.
- 2) Entropy – the law of common sense
- 3) As a system approaches absolute zero, all processes cease & the entropy of the system approaches a minimum value

Part 1 – The General Principle

“Eat less/do more”

- 1) Law 1 – Energy in does not equal energy out
- 2) Law 2 – A calorie is not a calorie
- 3) There is no direction of causation in the laws of thermodynamics
- 4) Energy in & Energy out are dependent, not independent, variables
- 5) We flit between weight and energy as if they are interchangeable

Part 1 – The General Principle

Energy balance

	EAT	BURN	DIFFERENCE
A	1,000 calories carbohydrate	1,008 calories fat	-8 calories
	Weight 250 grams	Weight 112 grams	+138 grams
B	1,000 calories fat	1,008 calories fat	-8 calories
	Weight 111 grams	Weight 112 grams	-1 gram
C	444 calories carbohydrate	1,008 calories fat	-564 calories
	Weight 111 grams	Weight 112 grams	-1 gram

	BURN	EAT	DIFFERENCE
D	1,008 calories fat	1,000 calories carbohydrate	-8 calories
	Weight 112 grams	Weight 250 grams (glycogen + 1kg water)	+1,138 grams

Part 1 – The Calorie Formula

“To lose 1lb of fat...”

“One pound of fat contains 3500 calories, so to lose 1lb a week you need a deficit of 500 calories a day.” (BDA)

- 1) 1lb does not equal 3,500 calories
- 2) The body is not a Bunsen burner
- 3) A repeated deficit of 3,500 calories will not lead to a loss of 1lb of fat (& nor will...)

Part 1 – The Calorie Formula

“1lb does not equal 3,500 calories...”

1) 1lb = 454g

2) 1g fat = 9 calories

3) 1lb adipose tissue = 87% lipid



$1\text{lb} = 454\text{g} \times 9\text{cals} \times 87\% = 3,555 \text{ calories}$

Part 1 – The Calorie Formula

“1lb does not equal 3,500 calories...”

1) 1lb = 454g

2) 1g fat = 8.7-9.5 calories (*)

3) 1lb adipose tissue = 72-87% lipid



1lb = 454g x 8.7cals x 72% = 2,843 calories (+84)

1lb = 454g x 9.5cals x 87% = 3,752 calories (-26)

Refs 79, 80, 81, 82, 83

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(*) 4.1, 4.1, 9.3

Part 1 – The Calorie Formula

Where does the formula come from?

- Diet & Health – Lulu Hunt Peters (1918)?
- Newburgh & Johnson (1930)?
- British Health Authorities (June 2009)?:
 - British Dietetic Association (BDA);
 - Dietitians in Obesity Management (DOM);
 - National Health Service (NHS);
 - National Institute for Clinical Excellence (NICE);
 - Department of Health (DoH);
 - National Obesity Forum (NOF);
 - Association for the Study of Obesity (ASO)

Part 1 – The Calorie Formula

Where does the formula come from?

Hunt Peters: “Five hundred Calories equal approximately 2 ounces of fat. Two ounces per day would be about 4 pounds per month, or 48 pounds per year. Cutting out 1000 Calories per day would equal a reduction of approximately 8 pounds per month, or 96 pounds per year.”

(About the words) “They are clever. *I wrote them myself.*” (her italics)

Newburgh & Johnson: “In conclusion we wish to commit ourselves to the statement that obesity is *never* directly caused by abnormal metabolism but that it is *always* due to food habits not adjusted to the metabolic requirement – either the ingestion of more food than is normally needed or the failure to reduce the intake in response to a lowered requirement.” (my italics)

Part 1 – The Calorie Formula

Where does the formula come from?

British Health ‘Authorities’:

BDA : “Unfortunately we do not hold information on the topic that you have requested.”

NHS: “Unfortunately our Lifestyles team do not hold this information and are unable to assist you with your enquiry. I would suggest you contact the Department of Health to see if they can help.”

NOF: “Contact ASO.”

“one less (sic) 50 calorie plain biscuit per day could help you lose 5lbs (2.3kg) in a year – and one extra biscuit means you could gain that in a year!”

Part 1 – The Calorie Formula

Where does the formula come from?

ASO: 1 study, 12 people, 600 cals-a-day deficit for 1 year. Should have been $600 \times 365 / 3,500 = 62.57$ pounds of fat lighter; were 11lbs lighter. a) Range 0.8-17.2lbs; b) fat vs water & muscle c) 1.1 billion overweight people in the world.

DoH : “The Department is unaware of the rationale behind the weight formula you refer to.”

NICE: “Whilst our guidance does contain reference to studies involving 500 calorie deficit diets we do not hold any information about the rationale behind the statement ‘one pound of fat contains 3,500 calories, so to lose 1lb a week you need a deficit of 500 calories a day’.”

Part 1 – The Calorie Formula

Where does the formula come from?

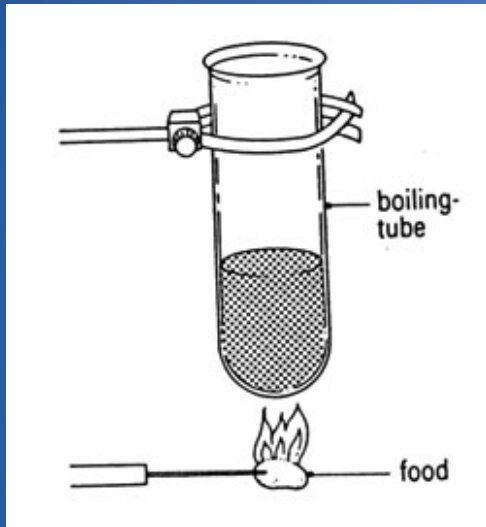
DOM: “It's a mathematical equation, 1gram of fat is 9kcal, therefore 1kg fat equals 9000kcal. There are some losses but **1 lb of fat is approximately 4500kcal** divide that by 7 days and its (sic) approximately 643kcal hence the deficit.”

“My understanding is that it comes from the thermodynamics of nutrition, whereby **one lb of fat is equivalent to 7000kcal**, so to lose 1 lb of fat weight per week you would need an energy deficit of 7000kcal per week, or 500kcal a day. In or around that, depending on whether or not you use metric system and your clinical judgement, some people use a deficit of **600kcal** a day and others **500kcal** a day. There is good evidence that this level of deficit produces weight differences of approx **5kg at 1 year.**”

“I guess a key to all of this is that weight loss doesn't appear to be linear, any more than weight gain is.”

Part 1 – The Calorie Formula

The body is not a Bunsen burner



- Body can 'choose' the energy source (it doesn't have to burn fat)
- Body can reduce the need for energy (it doesn't have to burn fat)
- Body can 'rob' from BMR & BMR+ (it doesn't have to burn fat)
- Body is not a cash machine for fat (it doesn't have to burn fat)!
- What happens when...

Part 1 – The Calorie Formula

The body is not a Bunsen burner

...we eat...

Water, sugar, glucose fructose syrup, skimmed milk powder, wheat flour, glucose powder, cocoa powder (2%), fructose syrup, milk chocolate (1.5%, sugar, cocoa butter, whole milk powder, cocoa mass, emulsifier – soya lecithin, natural flavouring), whey powder, inulin, chocolate (1%, cocoa mass, sugar, cocoa butter, emulsifier – soya lecithin, natural flavouring), vegetable oil, white chocolate (1%, sugar, cocoa butter, whole milk powder, whey powder, milk sugar, emulsifier – soya lecithin, natural flavouring), chocolate (1%, cocoa mass, sugar, cocoa butter, butter oil, emulsifier – soya lecithin, natural flavouring), dextrose, chocolate (1%, cocoa mass, sugar, cocoa butter, fat reduced cocoa powder, emulsifier – soya lecithin), stabilisers – pork gelatine, locust bean gum, guar gum, sodium alginate, carrageenan, xanthan gum, sorbitol syrup, egg powder, modified potato starch, barley starch, egg albumen, gelling agent pectin, natural flavourings.

Part 1 – The Calorie Formula

The body is not a Bunsen burner



with sweet toffee sauce
Enjoy!

DEFROST INSTRUCTIONS
Remove film seal. Allow to stand at room temperature for 10 minutes. For best results eat from pot.

INGREDIENTS
Water, Sugar, Glucose Fructose Syrup, Skimmed Milk Powder, Wheat Flour, Glucose Powder, Cocoa Powder (2%), Fructose Syrup, Milk Chocolate (1.5%), Sugar, Cocoa Butter, Whole Milk Powder, Cocoa Mass, Emulsifier - Soya Lecithin, Natural Flavouring), Whey Powder, Inulin, Chocolate (1%, Cocoa Mass, Sugar, Cocoa Butter, Emulsifier - Soya Lecithin, Natural Flavouring), Vegetable Oil, White Chocolate (1%, Sugar, Cocoa Butter, Whole Milk Powder, Whey Powder, Milk Sugar, Emulsifier - Soya Lecithin, Natural Flavouring), Chocolate (1%, Cocoa Mass, Sugar, Cocoa Butter, Butter Oil, Emulsifier - Soya Lecithin, Natural Flavouring), Dextrose, Chocolate (1%, Cocoa Mass, Sugar, Cocoa Butter, Fat Reduced Cocoa Powder, Emulsifier - Soya Lecithin), Stabilisers - Pork Gelatine, Locust Bean Gum, Guar Gum, Sodium Alginate, Carrageenan, Xanthan Gum, Sorbitol Syrup, Egg Powder, Modified Potato Starch, Barley Starch, Egg Albumen, Gelling Agent - Pectin, Natural Flavourings

CONTAINS
Gluten, Wheat, Barley, Egg, Milk, Soya
May contain traces of nuts.

DIETARY INFORMATION
✓ No artificial flavours
✓ No artificial colours
✓ No hydrogenated fat
A serving contains 0.6g of an adult's recommended daily salt intake of 6g.

Double Chocolate Brownies
2 indulgent chocolate brownies topped with Belgian chocolate and vanilla mousse, rich chocolate sauce and dark and white chocolate curls

NUTRITION INFORMATION

Typical values	Per 100g	Per Dessert	GDA*
Energy - kJ	800 kJ	688 kJ	2000
- kcal (Calories)	189 kcal	163 kcal	
Protein	5.1g	4.4g	45g
Carbohydrate (of which sugars)	33.7g (25.5g)	29.0g (21.9g)	230g 90g
Fat (of which saturates)	3.8g (2.6g)	3.3g (2.2g)	70g 20g
Fibre	2.4g	2.1g	24g
Sodium	0.3g	0.2g	2.4g
Salt equivalent	0.7g	0.6g	6g

*Guideline Daily Amounts for average adults.

Refs 89

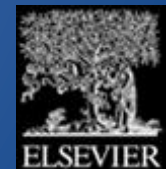
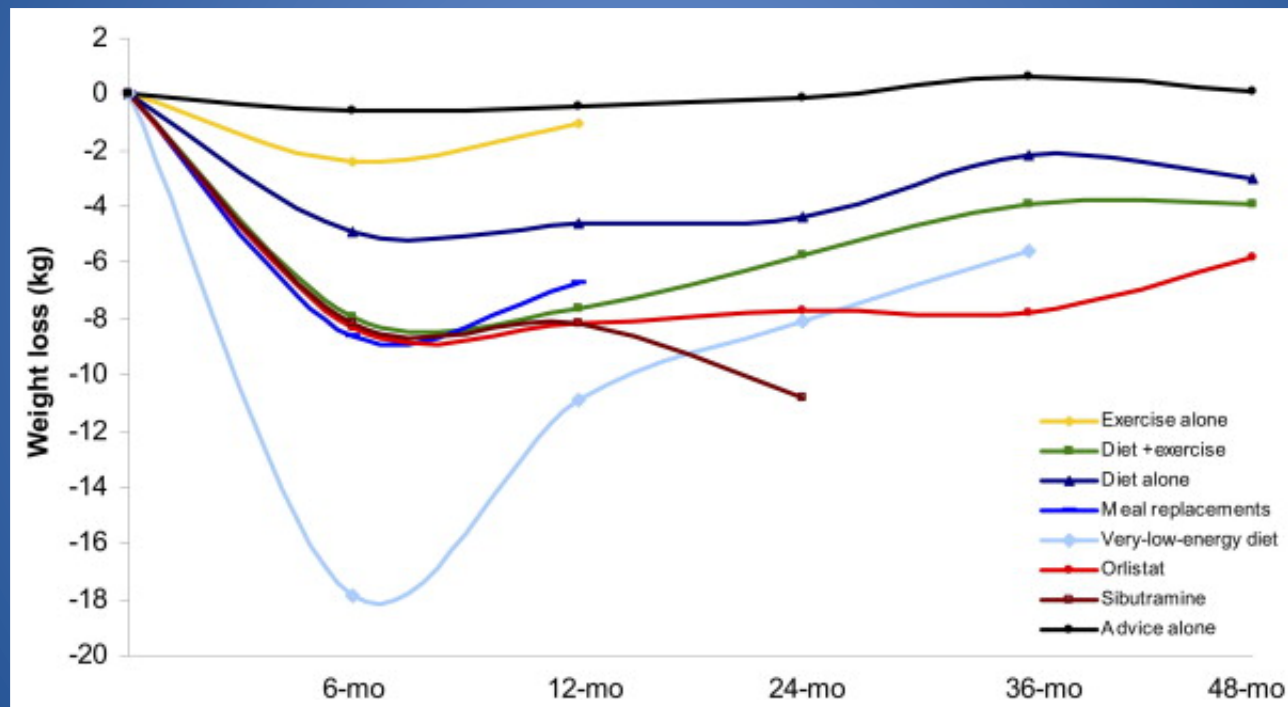
Part 1 – The Calorie Formula

- 3,500 cals does not lead to 1lb fat loss

- Benedict (1917)
- Keys (1945)
- Stunkard & McLaren Hume (1959)
- Bray (1970) “The myth of diet in the management of obesity.”
- Liebel & al (1995) “No current treatment for obesity reliably sustains weight loss.”
- Franz (2007)

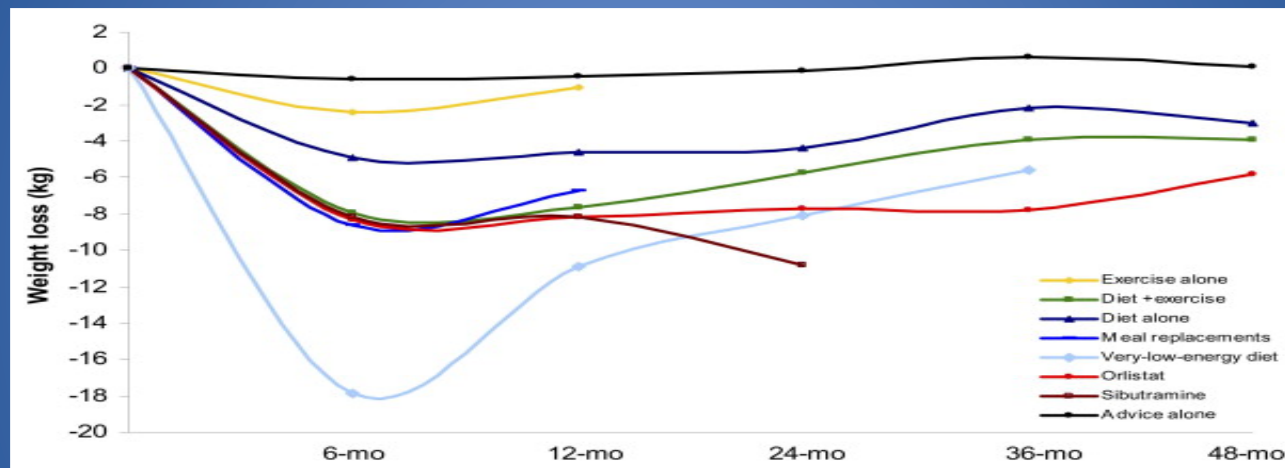
Part 1 – The Calorie Formula

Franz (2007)



Part 1 – The Calorie Formula

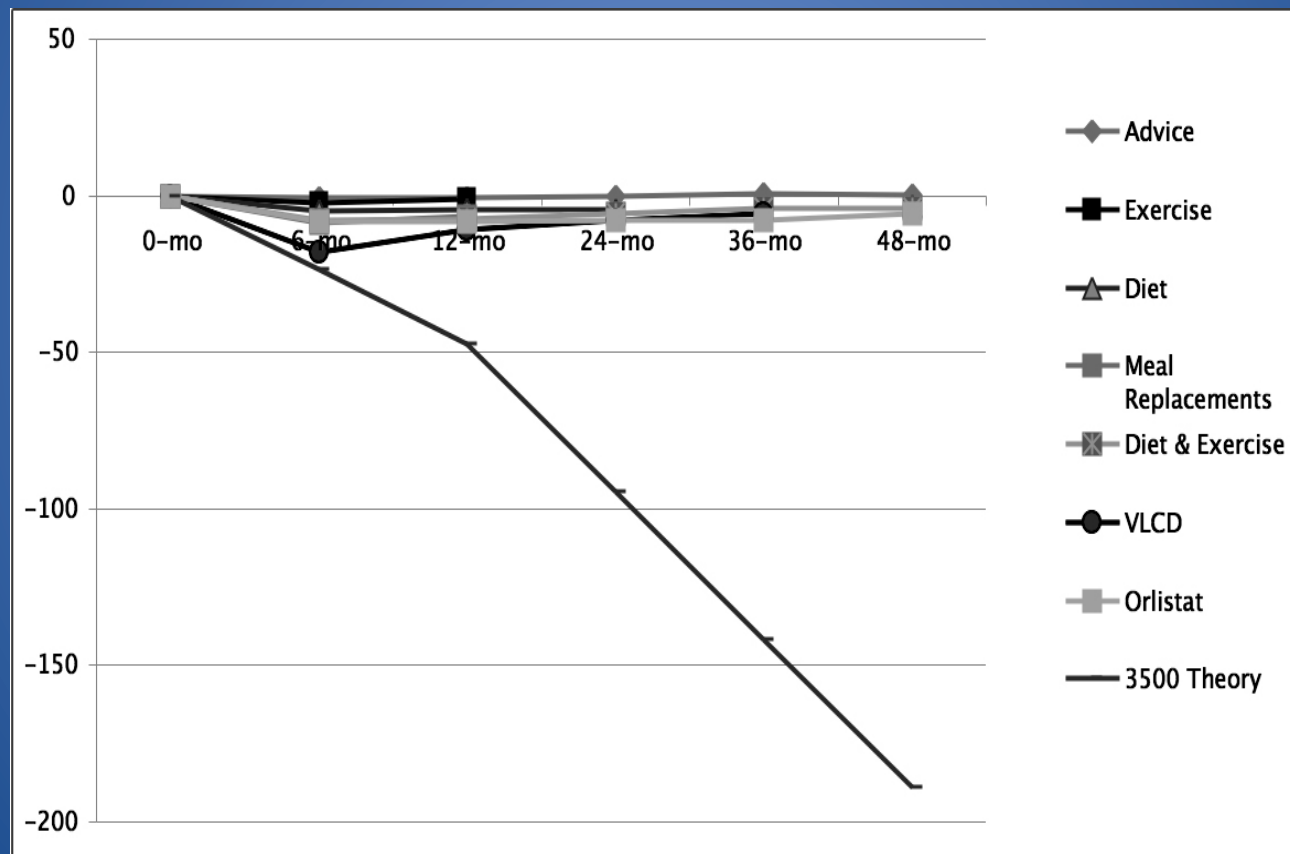
Franz (2007)



-23.6kg (52lbs)

Part 1 – The Calorie Formula

Franz vs calorie formula



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-94.4kg
-208lbs

-188.8kg (vs. 3-6kg actual)
-416lbs

Part 1 – Wrong Assumptions

Conclusion – The General Principle

- Energy in does not equal energy out
- Fat/protein has significant metabolic advantage over carbohydrate
- Does overeating cause obesity or vice versa?
- Eat less -> Eat more/do less (& carbs)
Do more -> Eat more/do less (& carbs)
- Energy is conserved – not weight

Part 1 – Wrong Assumptions

Conclusion – The Calorie Formula

- We have no idea where our central weight loss formula comes from
- This weight loss formula has only ever been proven wrong; never right
- The body simply doesn't behave in this way
- We will **not** lose 1lb of fat if we create a deficit of 3,500 calories (or 2,843 or 3,752)

Part 1 – Wrong Assumptions

The result of all the errors

General Principle

Assumes:

- 1) Closed system
- 2) Calories are =
- 3) Greedy/lazy
- 4) Eat less won't lead to eat more or do less
- 5) Flit between energy & weight



Calorie Formula

Assumes:

- 1) 1lb = 3,500
- 2) Bunsen burner:
 - BMR no change
 - Nor in 500
 - Body can & will burn fat
- 3) -3,500 -> -1lb

Eat less (500)

BMR 1,500 cals

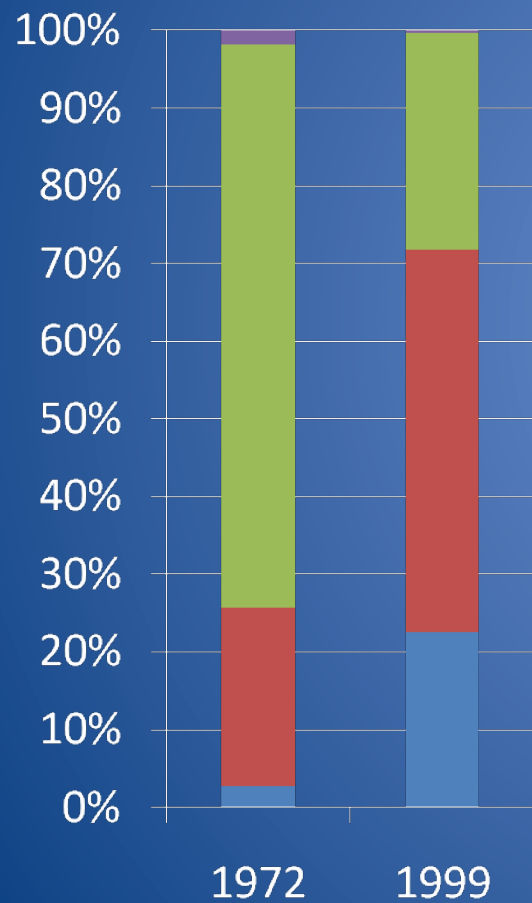
BMR+ 500 cals

Do more (200)

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Loss 1/5 lb fat?
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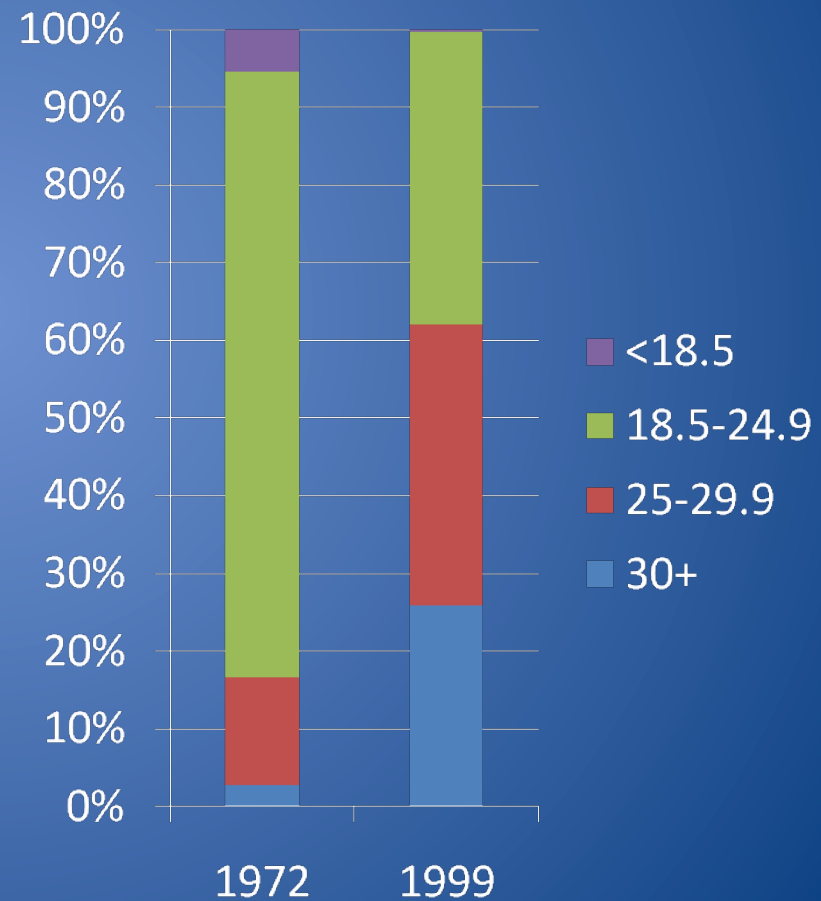
Part 2 – The Obesity Epidemic

UK BMI Statistics



Ref 3

MEN



WOMEN

Part 2 – The Obesity Epidemic

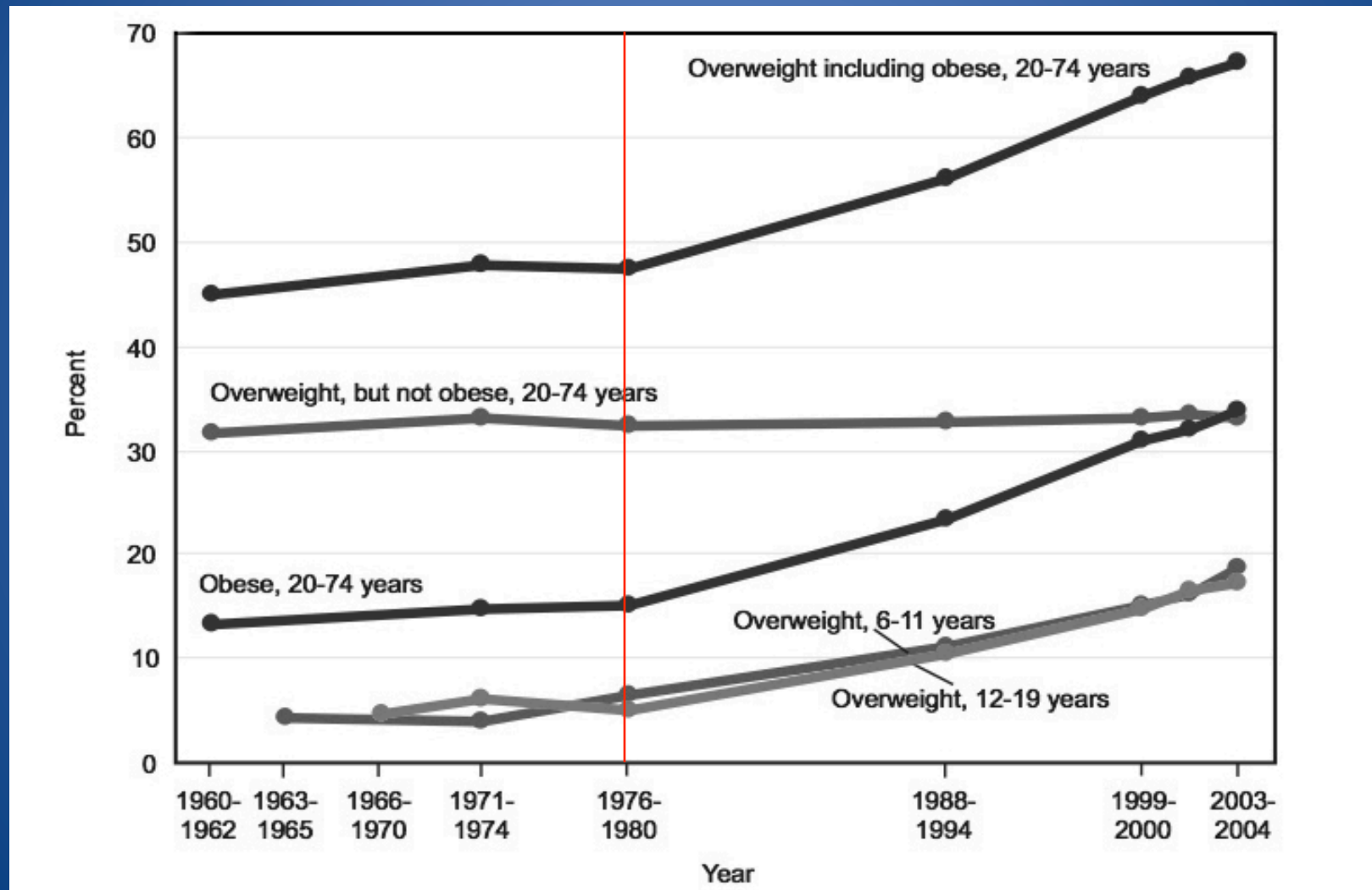
UK BMI Statistics

Men (%)	1972 (*)	1999	Women (%)	1972	1999
BMI <18.5	1.9	0.3	BMI <18.5	5.4	0.3
BMI 18.5-24.9	72.6	27.9	BMI 18.5-24.9	78.0	37.6
BMI 25-29.9	23.0	49.2	BMI 25-29.9	13.9	36.3
BMI >30	2.7	22.6	BMI >30	2.7	25.8

* doesn't add to 100% due to rounding

Part 2 – The Obesity Epidemic

USA BMI Statistics



Part 2 – The Obesity Epidemic

What happened c. 1980?

- We did a U-turn in our diet advice...
- 1977 Dietary Goals for the USA
- 1980 Dietary Guidelines for Americans
- 1983 Proposals for nutritional guidelines for health education in Britain (NACNE)
- 1984 Diet & cardiovascular disease policy paper (COMA)

Part 2 – The Obesity Epidemic

What happened c. 1980?

“The previous nutritional advice in the UK to limit the intake of all carbohydrates as a means of weight control now runs counter to current thinking and contrary to the present proposals for a nutrition education policy for the population as a whole... The problem then becomes one of achieving both a reduction in fat intake to 30% of total energy and a fall in saturated fatty acid intake to 10%.”

1983 Proposals for nutritional guidelines for health education in Britain
(NACNE)

Part 2 – The Obesity Epidemic

What happened c. 1980?

- **From:** “Farinaceous and vegetable foods are fattening, and saccharine matters are especially so”.
- **To:** “Base your meals on starchy foods.”
- **From:** “Life in all its fullness is mother nature obeyed”.
- **To:** “Profit in all its fullness is food manufacturers obeyed.”
- **From:** **2.7% obesity 1972**
- **To:** **25.8% obesity 1999**

Part 2 – The Obesity Epidemic

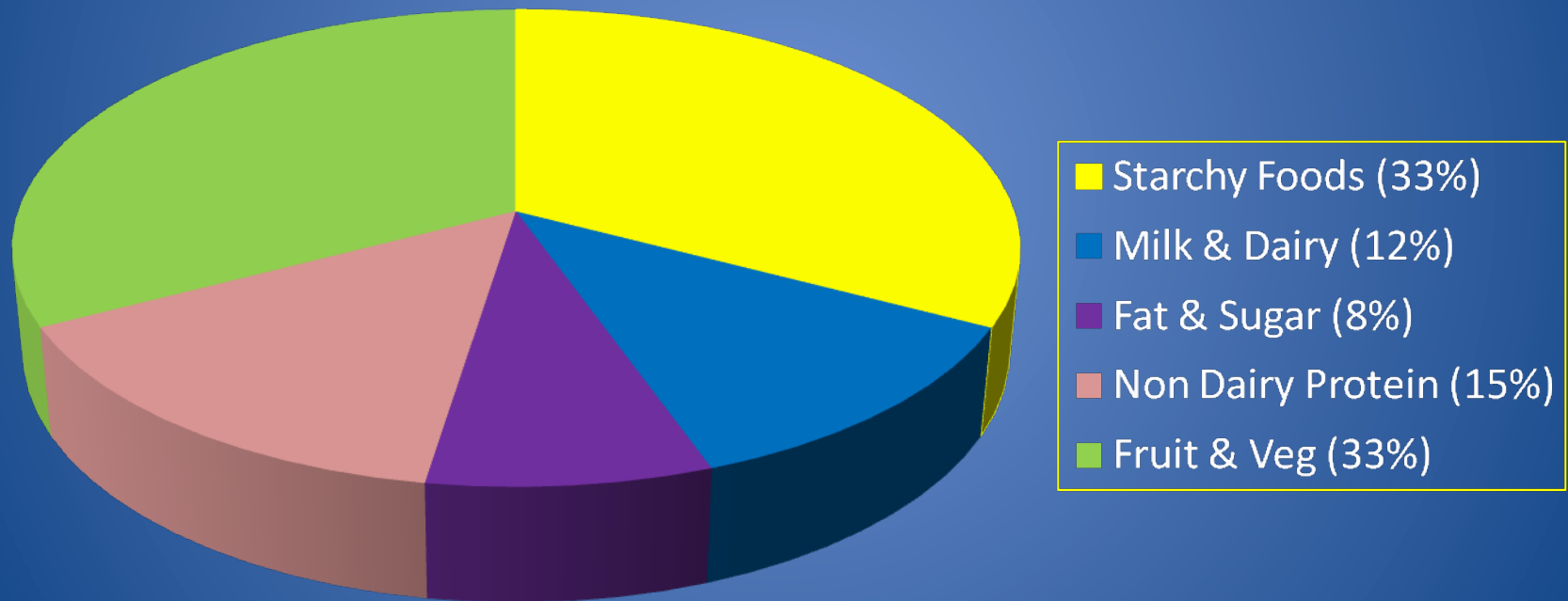
The eatbadly plate



Part 2 – The Obesity Epidemic

The eatbadly plate

Proportions by weight



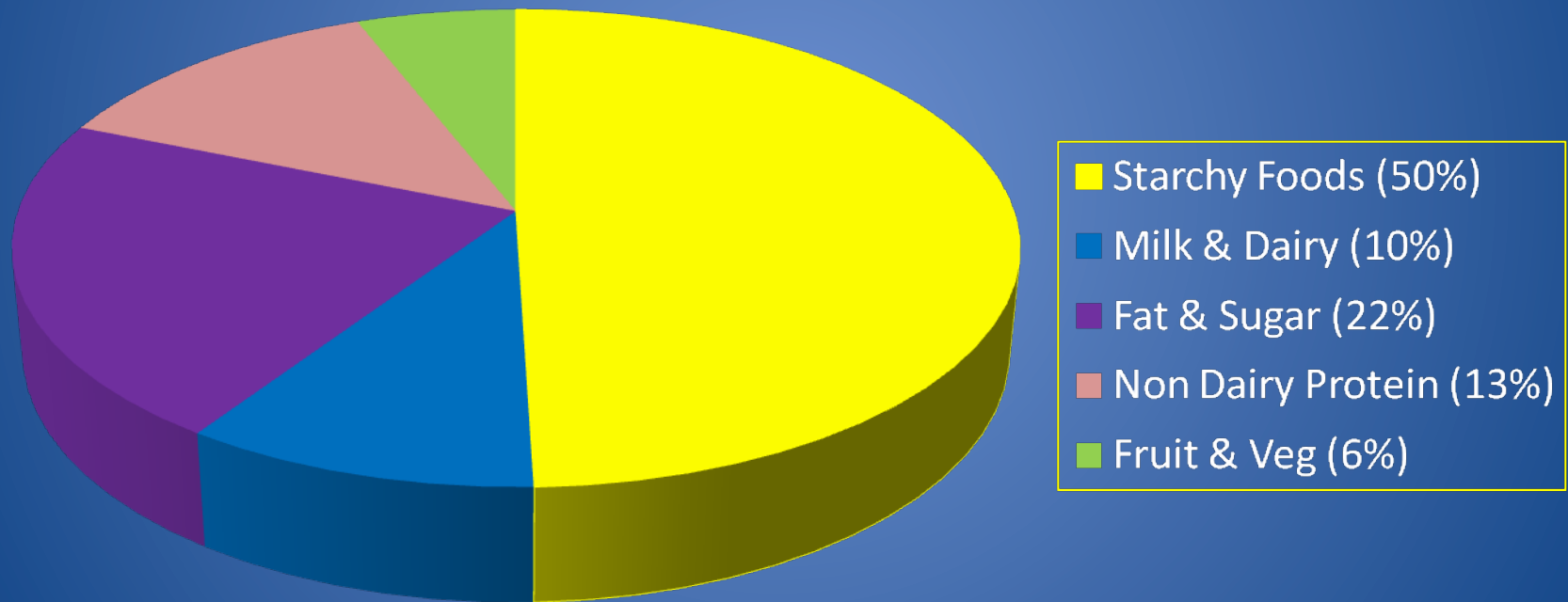
Ref 187 (101% due to rounding)

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Part 2 – The Obesity Epidemic

The eatbadly plate

Proportions by energy intake



Part 2 – The Obesity Epidemic

What are we eating?

- Sugar (400 calories/day; 731g/week)
- Flour (730 calories/day; 1,423g/week)
- 1,536 processed food calories/day
- Vitamins A (50%); D (25%); E (66%); K (?!)
- Calories 2,290 (1975) -> 1,690 (1999): -62.6lbs
- **Down:** Real meat, eggs, butter, whole milk, vegetables (fresh green)
- **Up:** Cereals, cereal products, confectionery & ice cream, fruit & fruit products, processed meat, processed potatoes & veg, soft drinks

Part 2 – The Obesity Epidemic

Why?!

- Fewer than 6 people in 1,000 dying from heart disease (vs. 4 in 10)



- £/\$ - food & drink & drugs

Part 2 – The Obesity Epidemic

Cholesterol logic

- "There's no connection whatsoever between cholesterol in food and cholesterol in blood. And we've known that all along. Cholesterol in the diet doesn't matter at all unless you happen to be a chicken or a rabbit."
- Only animal foods contain cholesterol
- All animal foods contain fat
- If cholesterol has no impact...

Part 2 – The Obesity Epidemic

The Seven Countries Study

- 1970; 7 countries (Finland, Greece, Italy, Japan, Netherlands, USA & Yugoslavia); 16 cohorts; 12,770 men aged 40-59 in 1956
- 1) CHD tends to be related to cholesterol
 - 2) Cholesterol tends to be related to sat fat
 - 3) CHD is as closely related to sat fat as it is to cholesterol
- $r = 0.72$ for CHD deaths at 25 years & cholesterol at start;
 - $r = 0.96$ for CHD deaths & latitude!

Part 2 – The Obesity Epidemic

The Seven Countries Study

- “The fact that the incidence of coronary heart disease was significantly correlated with the average percentage of calories from sucrose in the diets is explained by the inter correlation of sucrose with saturated fat.”
- Volume XVII The Diet: “The check list, aimed particularly at sources of fat, included milk, eggs, butter, cheese, cake, ice cream and so on.”
- Volume IV USA Railroad employees: there is **no information at all** on diet, food intake or fat.
- Volume V: Dalmatia is mentioned in the same sentence as “olive oil” and “fish”. Slavonia is noted for a diet with “animal fat, especially pork fat”, “meats and poultry in greater abundance than Dalmatia”.
- Volume VI Finland”: no description of diet was provided, other than the passing comment “butterfat was a prominent item.”

Part 2 – The Obesity Epidemic

The Seven Countries Study

	FSA/NHS list of Saturated Fat	What this really is
A	Fatty meats & meat products, such as sausages & pies	1) Processed food 2) Unsaturated fat Real or processed = 60% unsaturated
B	Butter, ghee & lard	Butter 33%, Lard 60% unsaturated
C	Cream, soured cream, crème fraîche & ice cream	Cream = calcium & fat vitamins Ice cream = processed carb
D	Cheese, particularly hard cheese	Vital source of calcium & fat vitamins
E	Biscuits, cakes & pastries	1) Processed carbs 2) Unsaturated fat
F	Some savoury snacks	1) Processed carbs 2) Unsaturated fat
G	Sweets & chocolate	1) Processed carbs 2) Unsaturated fat
H	Coconut oil, coconut cream & palm oil	World per capita consumption = 1/8 of 1 coconut p.a.!

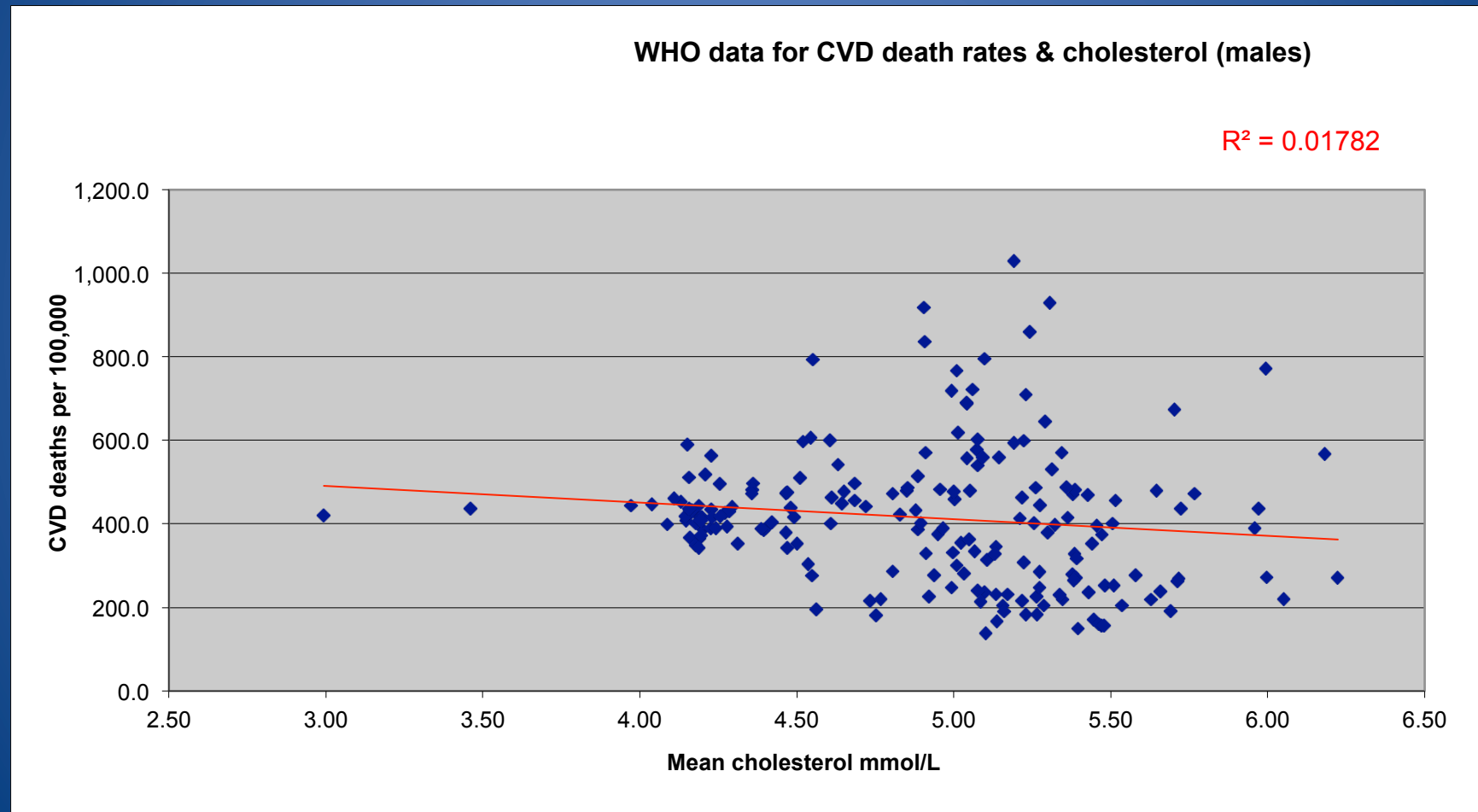
Part 2 – The Obesity Epidemic

The case against fat

- “Diets high in fat are *associated* with increased risk of cardiovascular disease (CVD), therefore it was recommended that people reduce their fat intake. It was advised that starchy carbohydrates should replace the reduction in fat as an energy source.”
- “the ideal controlled dietary trial for prevention of heart disease (a long-term intervention trial with differing levels of saturated fatty acids and measuring coronary disease endpoints) has not yet been done and it is unlikely ever to be done, due to huge cost and compliance and ethical issues.”
- “SACN, which has now replaced COMA, is currently reviewing the evidence of carbohydrate on cardio-metabolic health.”

Part 2 – The Obesity Epidemic

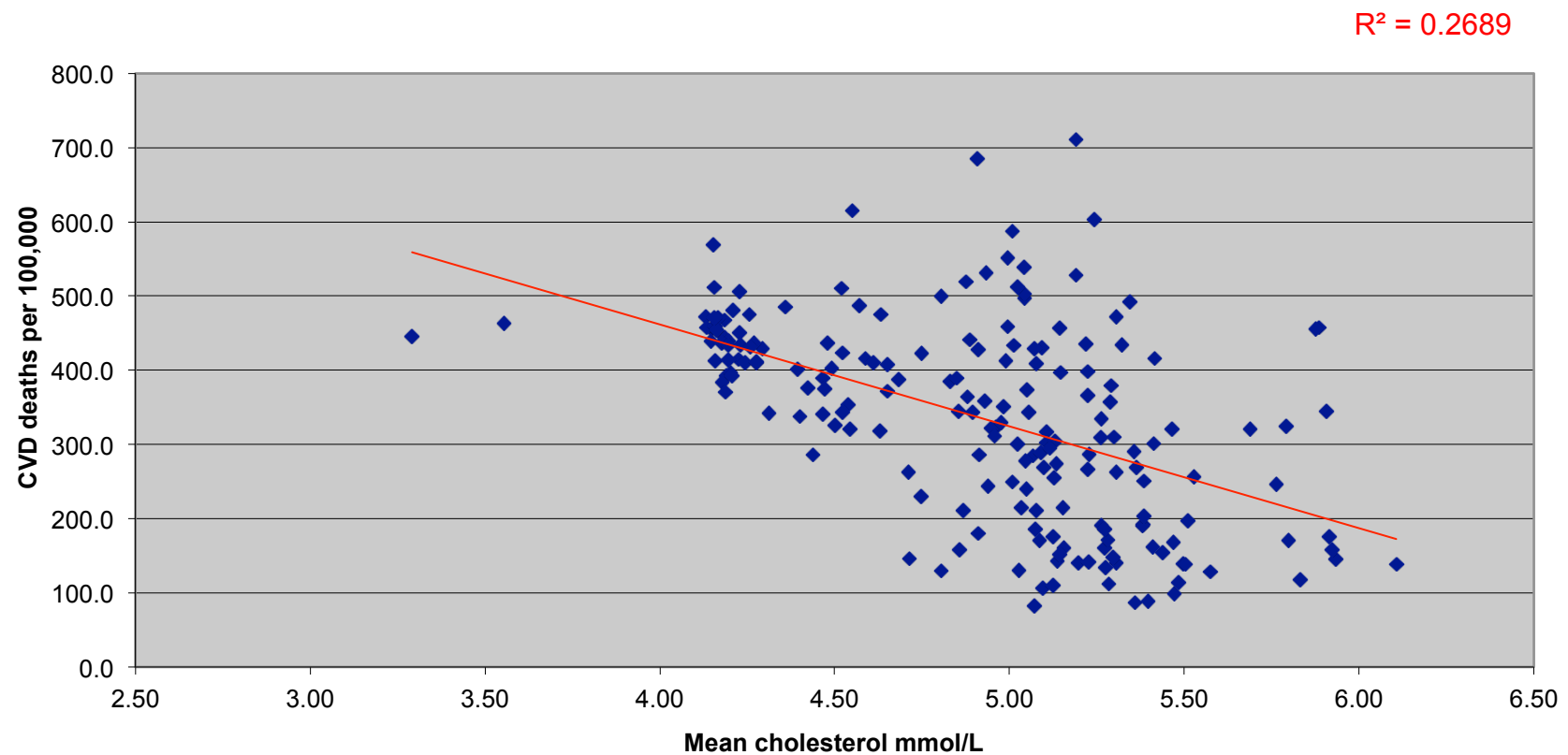
Cholesterol & Dying



Part 2 – The Obesity Epidemic

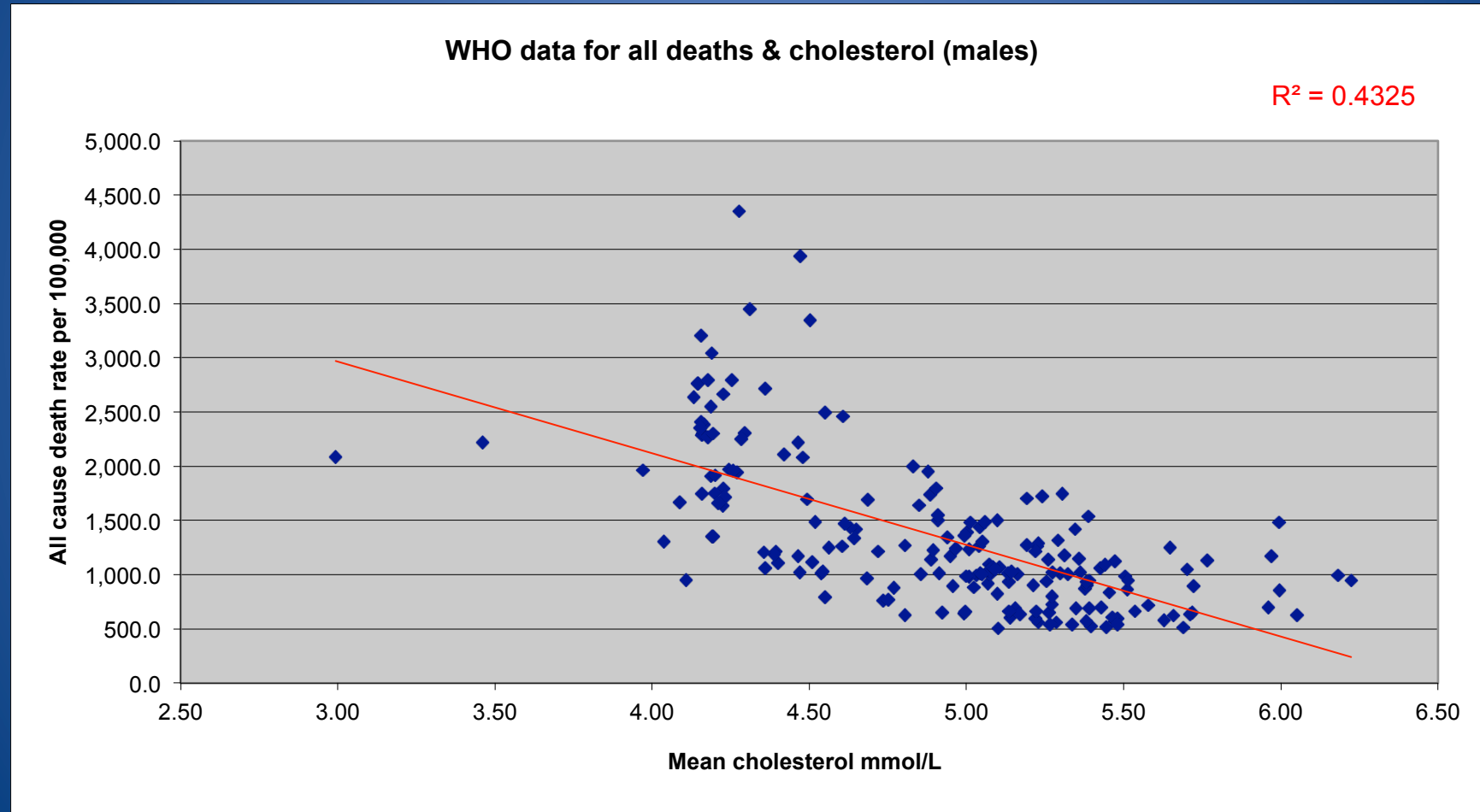
Cholesterol & Dying

WHO data for CVD death rates & cholesterol (females)



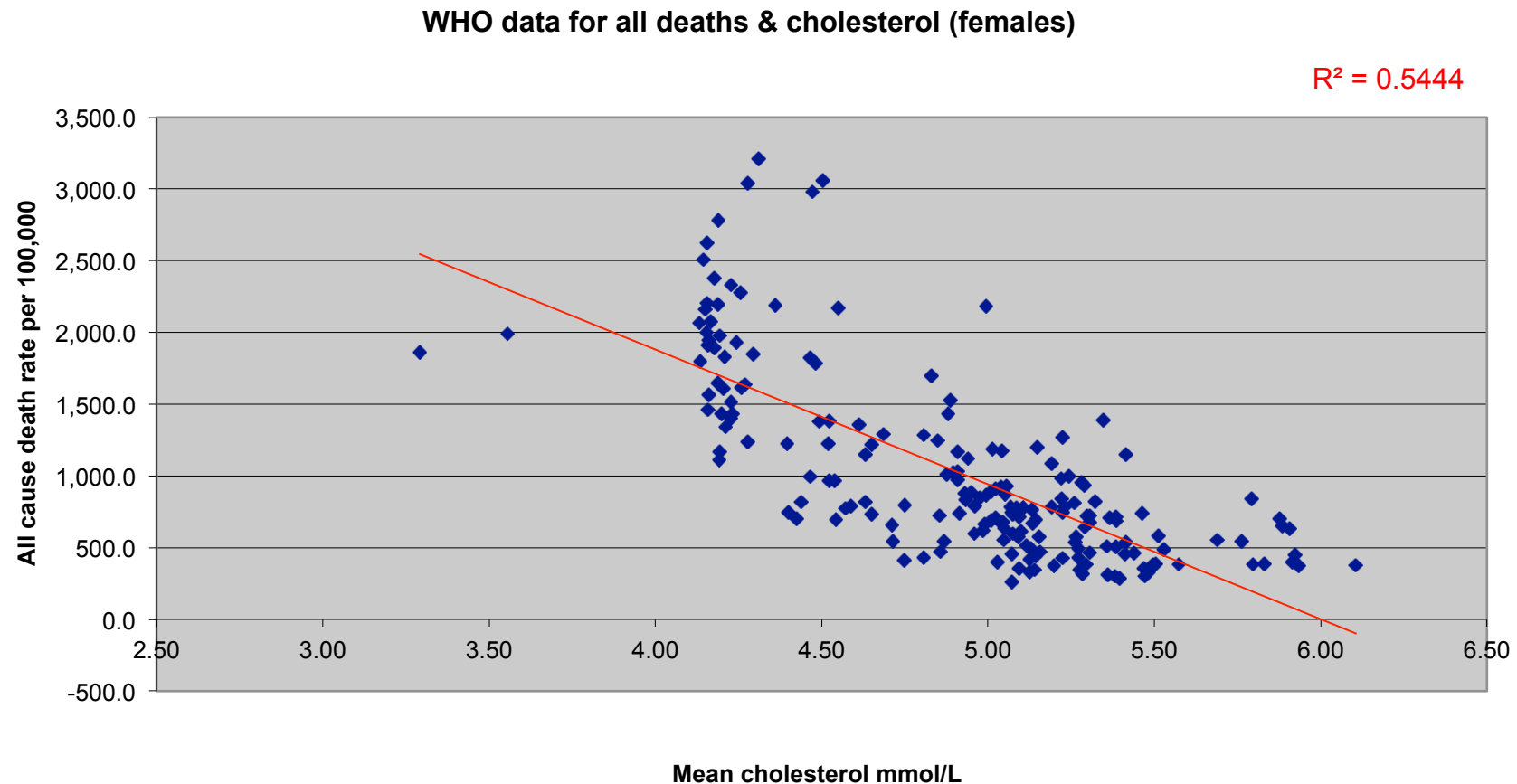
Part 2 – The Obesity Epidemic

Cholesterol & Dying



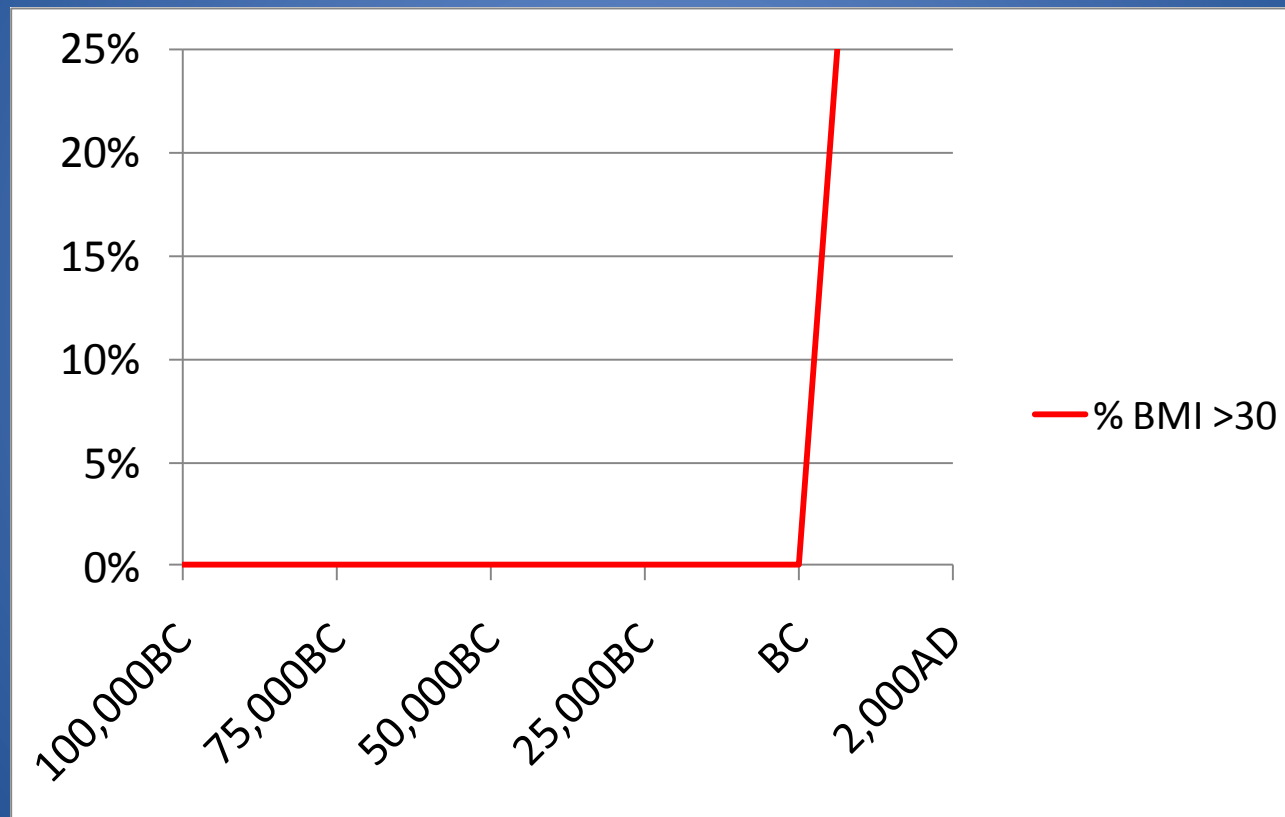
Part 2 – The Obesity Epidemic

Cholesterol & Dying



Part 2 – The Obesity Epidemic

Obesity rates over time



Part 3 – Fat cats & fat people

Conflicts of interest

- Dietetic associations
- ‘Nutritional’ organisations
- Obesity organisations
- Government
- The media

Part 3 – Fat cats & fat people

American Dietetic Association



Part 3 – Fat cats & fat people

Dieticians Association of Australia



Ref: DDA web site

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Part 3 – Fat cats & fat people

British Dietetic Association

- “The BDA does work with a wide variety of organisations – including commercial companies, business groups representing major commodities (e.g. flour, fish, sugar)...”
- “...the specific financial details relating to individual projects are confidential and we would not share this information outside the BDA.”
- “...we have been delighted to work with the Sugar Bureau...”
- Similac Isomil Advance, Soy Formula: 50% corn syrup, 14% soy protein isolate, 10% high oleic safflower oil, 10% sucrose, 8% soy oil and 8% coconut oil.

Gold Corporate Members



Education Award



BDA obesity Conf



Part 3 – Fat cats & fat people

‘Nutritional’ organisations – BNF



Refs 322, 323



Part 3 – Fat cats & fat people

‘Nutritional’ organisations

- **Sugar Bureau – Losing Weight & Keeping it off:**
“Puddings, cakes, biscuits, cereal bars and confectionery all contain carbohydrate, but choose those with a lower fat content. Some lower fat examples include: arctic roll, sorbets, fruit yoghurt, trifle, rice pudding, currant buns, fig rolls, jelly beans and mints.” Ann de Looy, Prof of Dietetics
- **Flour Bureau (1956)** – “Basically we aim to show the positive contribution bread makes to the UK diet.”
- **Savoury Snacks Bureau**
- **International Life Sciences Institute (1978)** –
“ILSI is a nonprofit, worldwide organization whose mission is to provide science that improves public health and well-being.”

Part 3 – Fat cats & fat people

Obesity organisations

- ASO (Association for the Study of Obesity)



- NOF (National Obesity Forum)



- Heads of Organisations



Part 3 – Fat cats & fat people

Government

- Andrew Lansley, Minister for ...
- 5-a-day/WCRF/ 
- Change4life



- Olympics



Part 3 – Fat cats & fat people

The Media

Giving up bread can make you fat: Gluten IS good for you
Daily Mail, 22 January 2010

Nine in ten 'are all in the fat'
Daily Mail, 19 January 2010

Ban butter to save thousands of lives heart surgeon
Daily Mail, 19 January 2010

Lack of exercise key to increased BMI in children
The Sugar Bureau, May 2010

Part 3 – Fat cats & fat people

Conflicts of interest

- Follow the money...
- Ask: In whose interests is this?
- Then take your health into your own hands

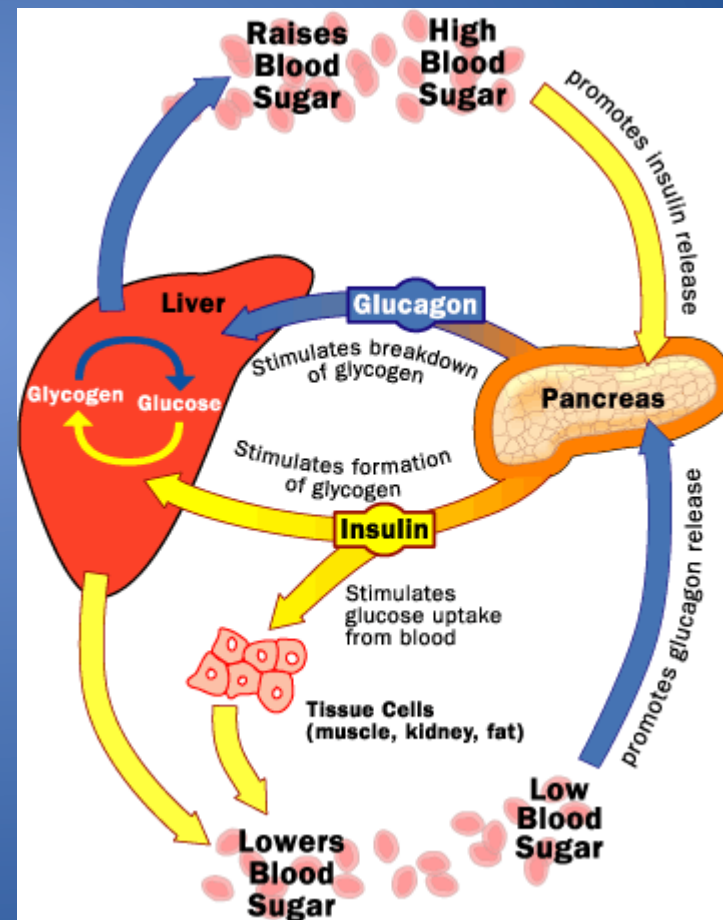
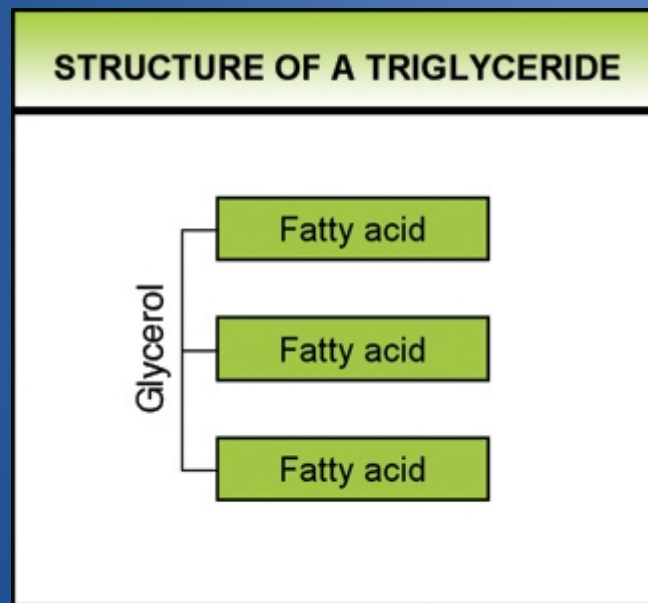
Part 4 – How do we lose weight?

If not eat less, then do more?

- Do more – UK
 - Medium evidence for moderate preventative benefit
 - Medium evidence for moderate therapeutic benefit
- Do more – USA
 - “It is reasonable to assume that persons with relatively high daily energy expenditures would be less likely to gain weight over time, compared with those who have low energy expenditures. So far, data to support this hypothesis are not particularly compelling.”
- Deakin
- Eat in 1 minute... & Evolution

Part 4 – How do we lose weight?

Storing & un-storing fat



Part 4 – How do we lose weight?

The three golden rules

- 1) Eat food ...
- 2) ... three times a day
- 3) Manage carbs

Agree on real food

Agree on vegetables & salads

Animals

Eat food; mostly animals; quite a lot

Grass fed meat/eggs; fish

Some disagreement on dairy/grains

Plants

Eat food; mostly plants; not too much

Whole grains, beans, pulses

Part 4 – How do we lose weight?

What would help?

1) Government/Dieticians:

- Right information or shut up
- Eliminate conflicts of interest
- Tax processed / subsidise real food

2) Individuals:

- Ignore public health advice
- Be acutely aware of conflicts of interest
- Don't buy processed food / do buy real food

Bottom up revolution/Survival of the wisest

Part 5 – Summary

Pulling it all together

- 1) Part 1 – we got the foundations wrong – The General Principle & The Calorie Formula
- 2) Part 2 – We have done a horrific experiment – it needs to stop. However...
- 3) Part 3 – This is too lucrative for the powers-that-be to stop, so we must.
- 4) Part 4 – Eat food!

Just one more thing...

Part 5 – Summary

Answer must lie in what has *changed*

- Answer cannot lie in anything we have been eating since time began *Fat!*
- Answer cannot lie in anything we have been eating less of since The Obesity Epidemic *Fat!*
- Answer *can* lie in anything we have *not* been eating since time began *Carbs!*
- Answer *can* lie in anything we have been eating more of since The Obesity Epidemic *Carbs!*

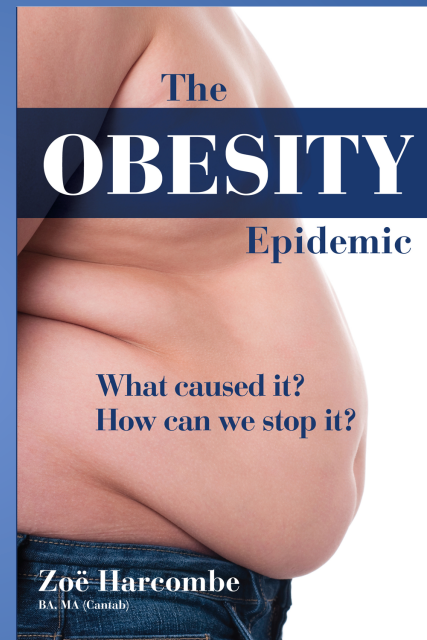
Part 5 – Summary

Man & Nature

- 'Civilised' man is the only chronically sick animal on the planet. (Barry Groves)
- Man is the only species clever enough to make his own food...
- ... & stupid enough to eat it.

“Life in all its fullness is mother nature obeyed”

Thank you!



www.theobesityepidemic.org

www.zoeharcombe.com