



CCGL9043 Obesity: Beyond a Health Issue

*Challenging the Science Legitimizing
the Battle Against Fatness*

Class Poll: How Well Do You Agree with the Followings?

1. Obesity is a disease.
2. A linear correlation exists between body weight and health risk.
3. Obese individuals are usually less healthy due to their accumulated fat.
4. Significant long-term weight-loss is a practical goal, and will improve health.

Class Poll: How Well Do You Agree with the Followings?

Obesity is a disease.

1. Grab your phone

2. Go to **www.govote.at**

3. Enter **76 12 43**

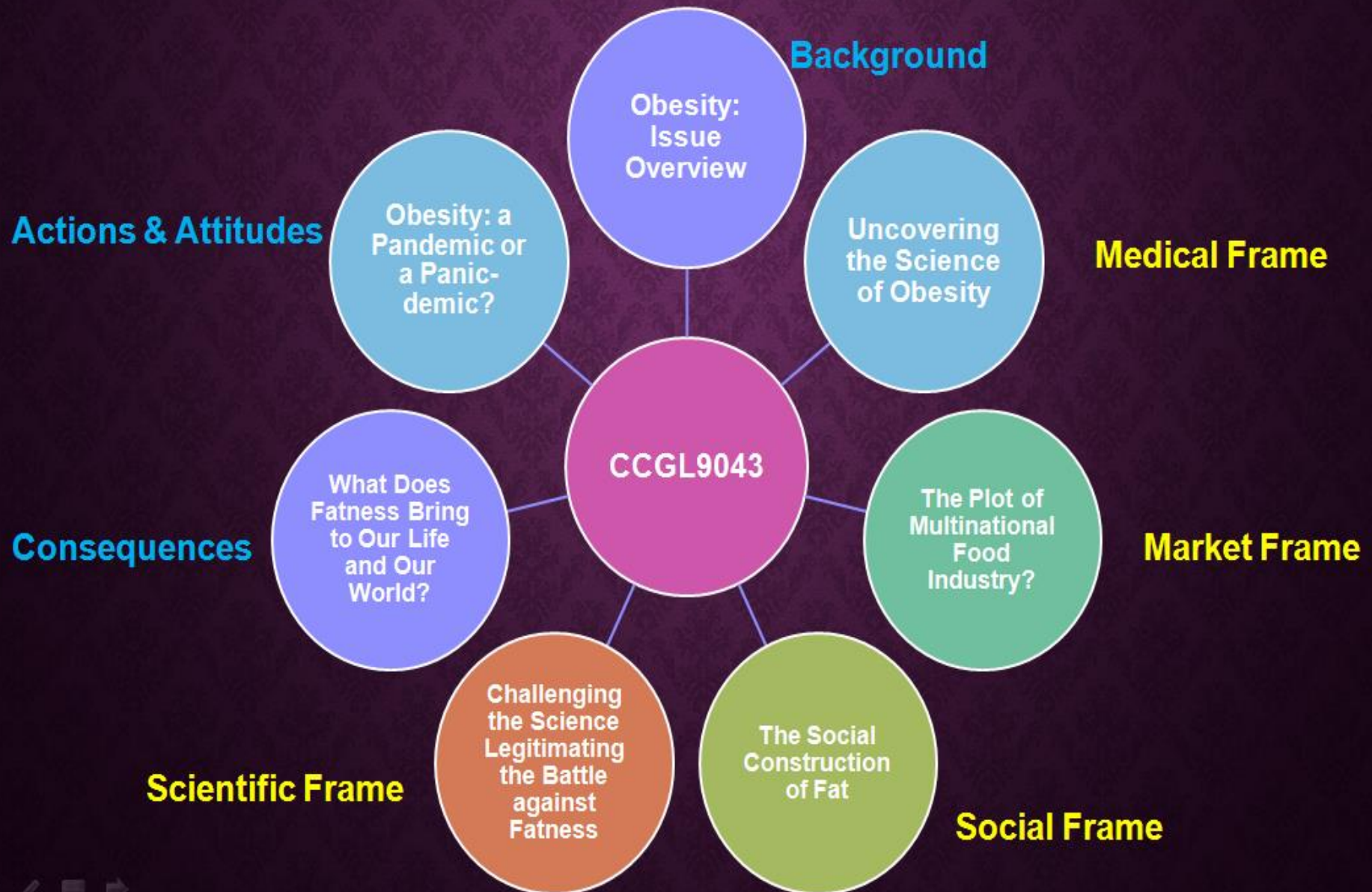
1. Grab your phone

2. Go to **www.govote.at**

3. Enter **96 72 36**

- A linear correlation exists between body weight and health risk.
- Obese individuals are usually less healthy due to their accumulated fat.
- Significant long-term weight-loss is a practical goal, and will improve health.

COURSE OUTLINE



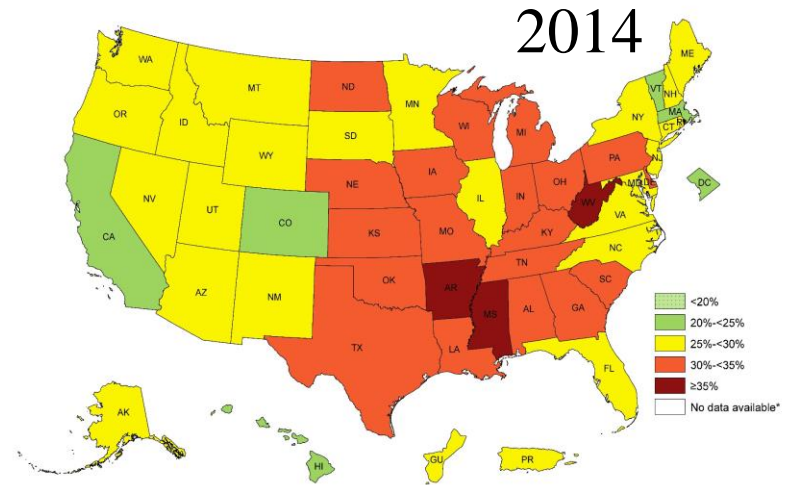
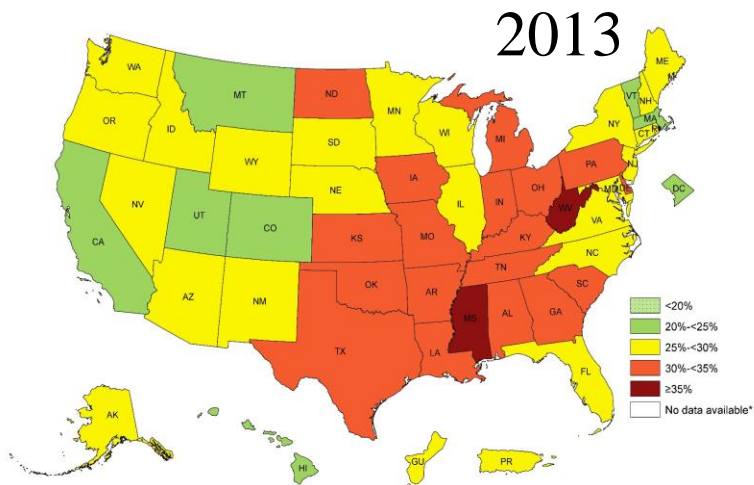
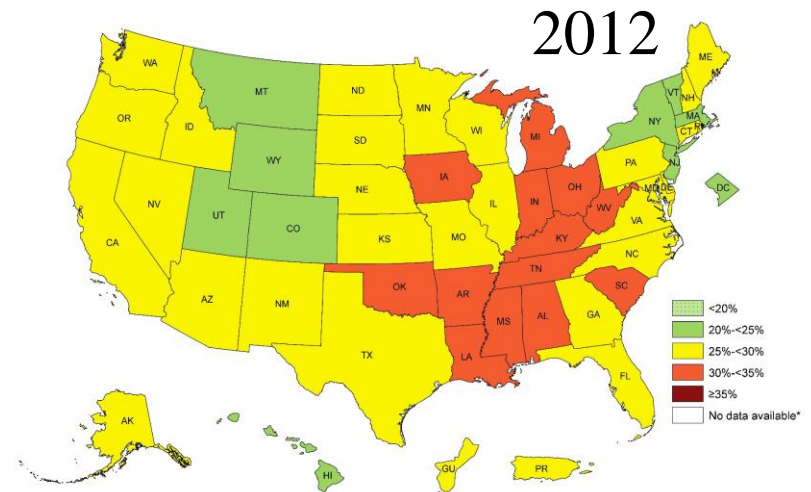
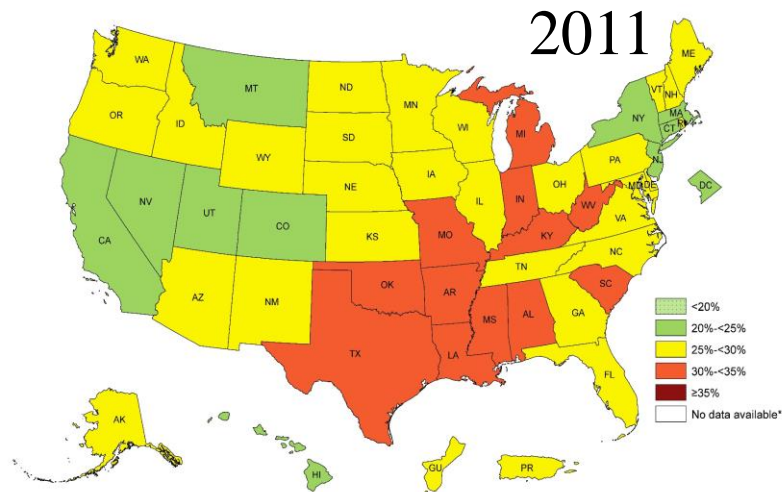
Obesity is a threat to national security (even more so than terrorists)



“Obesity epidemic” poses the greatest threat to the national security of the United States. **U.S. Surgeon General Koop** has repeatedly called it **the “terror within”** (Carmona, 2003).

Prevalence of Self-Reported Obesity Among U.S. Adults

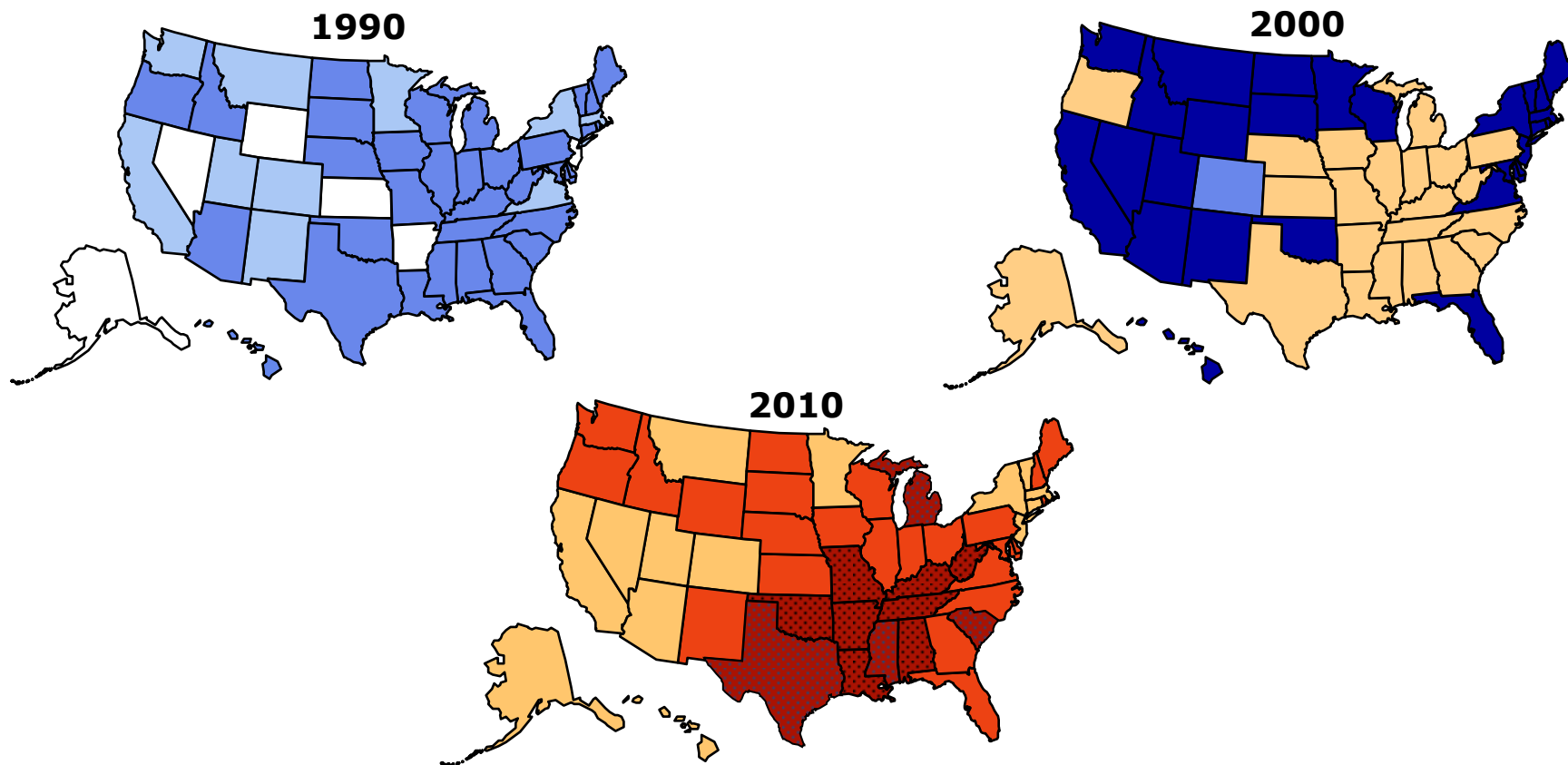
BRFSS, 2011 - 2014



Obesity Trends* Among U.S. Adults

BRFSS, 1990, 2000, 2010

(*BMI ≥ 30 , or about 30 lbs. overweight for 5'4" person)



Challenging the Science Legitimizing the Battle Against Fatness

Preamble

We are bombarded with information regarding the adverse effects of obesity.

Playing the devil's advocate, one can challenge the “status quo” and argue that

Are there enough evidence to affirm that obesity is a disease, if not, then is making body weight a focus of public health policy unwarranted?

Statement 1:

Obesity is a disease

Definition of DISEASE (1)

An **impairment of the normal state** of the living animal or plant body or one of its parts that interrupts or **modifies the performance of the vital functions**, is typically manifested by distinguishing signs and symptoms, and is **a response to environmental factors** (as malnutrition, industrial hazards, or climate), to **specific infective agents** (as worms, bacteria, or viruses), to **inherent defects of the organism** (as genetic anomalies), or to **combinations of these factors**

[Merriam-Webster Medical Dictionary]

Definition of DISEASE (2)

A **disease** is a particular abnormal, pathological condition that affects part or all of an organism. It is often construed as a **medical condition** associated with specific symptoms and signs.^[1] It may be caused by factors originally from an external source, such as infectious disease, or it may be caused by internal dysfunctions, such as autoimmune diseases. In humans, "disease" is often used more broadly to refer to any condition that causes pain, dysfunction, distress, social problems, or death to the person afflicted, or similar problems for those in contact with the person.

[Wikipedia]

Obesity as a disease

- Obesity was labeled as a “multi-metabolic and hormonal disease state” by the American Medical Association (AMA) in June 2013.
- AMA Council on Science and Public Health (CSPH) issued a report opposing the classification of obesity as a




Why such an opposing view?

Upsides & downsides of labelling obesity as a disease


Advantages:

- A clear warning
- Draw attention, increase funding and research

But

A light blue thought bubble with a dark blue outline and three smaller circles leading to it. It contains the text: "Would it reduce or add to the burden of body-image concerns and shame?"

Would it reduce or add to the burden of body-image concerns and shame?

A light blue thought bubble with a dark blue outline and three smaller circles leading to it. It contains the text: "Would it empower people to fight back, or lead to a fatalistic acceptance of being overweight?"

Would it empower people to fight back, or lead to a fatalistic acceptance of being overweight?

May make (obese) people feel better about their bodies, but it also may contribute to the maintenance, rather than reduction, of obesity.

Debate: Obesity as a disease

Yes, obesity is a disease.

- "Obesity is a **pathophysiologic disease**. There is a **treatment** for this disease."
- "... even though not every **hypertensive** gets a stroke and not every obese person suffers the complications, that does not change the fact that this is a disease."

No, obesity is not a disease.

- "It's more like smoking. **Smoking** isn't a disease."
- **Problem(s) in diagnosis** remains unsolved. Why not classify it as **a condition or disorder**?

Is it fair / appropriate comparing obesity to smoking ?

- Smoking is non-essential to survival but eating is
- Nicotine is addictive, is eating (overeating) addictive?
- Is addiction a disease or just a social problem?
- Is obesity a social problem?

The current ‘fat panic’, and the outburst of public health activity it has inspired, has very little to do with science, and everything to do with the economic and professional interests of obesity researchers, eating disordered thinking and anxieties about class, race and social over-consumption in general.

(Saguy and Almeling, 2005)

Obesity epidemic itself could be *a statistical artefact* of the decision to *define overweight and obesity at such low weight levels* that even a small increase in average weight in the population will produce tens of millions of newly overweight and obese individuals.

If this is the case, then the obesity epidemic is largely **an illusion!**

"Why should one third of Americans be diagnosed as having a disease if they **aren't necessarily sick?**"

Is it true that the argument arises from the way we define (measure and establish cut-offs) obesity.

What are the means to diagnose obesity?

Anthropometric indexes

- Body weight
- Body weight relative to height
 - Body mass index (BMI)
- **Fat mass / % body fat**
- Waist circumference (WC)
- Waist to hip ratio (WHR)
- Waist to height ratio (WHtR)
- Lean body mass (fat-free mass, FFM)

Are there any relationships among these anthropometric parameters?

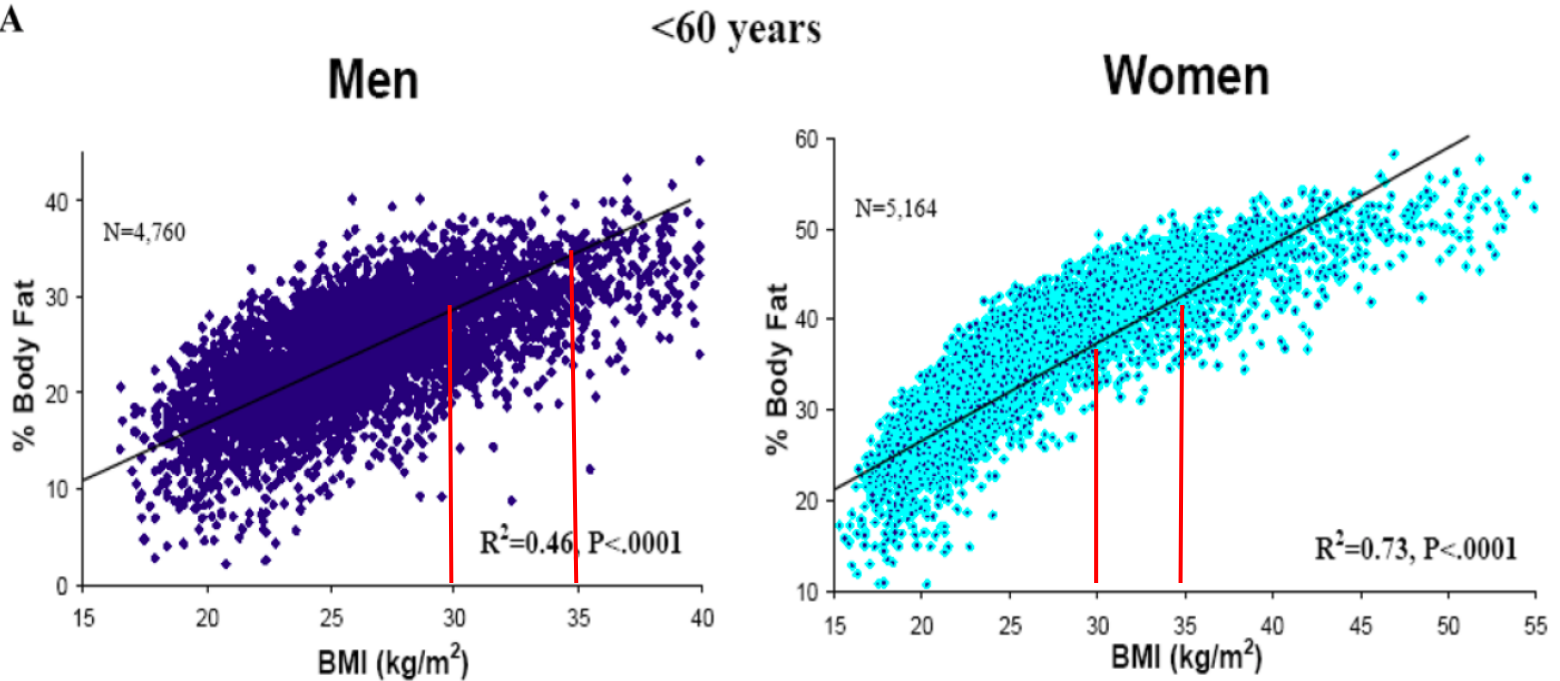
Body Mass Index (BMI)

- **BMI**=kg / m²
- **BMI** , developed by Adolphe Quételet , has been shown to correlate with body fat content, and to predict risk for several of the comorbidities of obesity.
- The **life insurance industry** can claim credit for having drawn attention to the relationship between obesity and premature death.



Adolphe Quételet
(1796-1874), Belgian
statistician.

Figure 2.A



A Disease by Definition

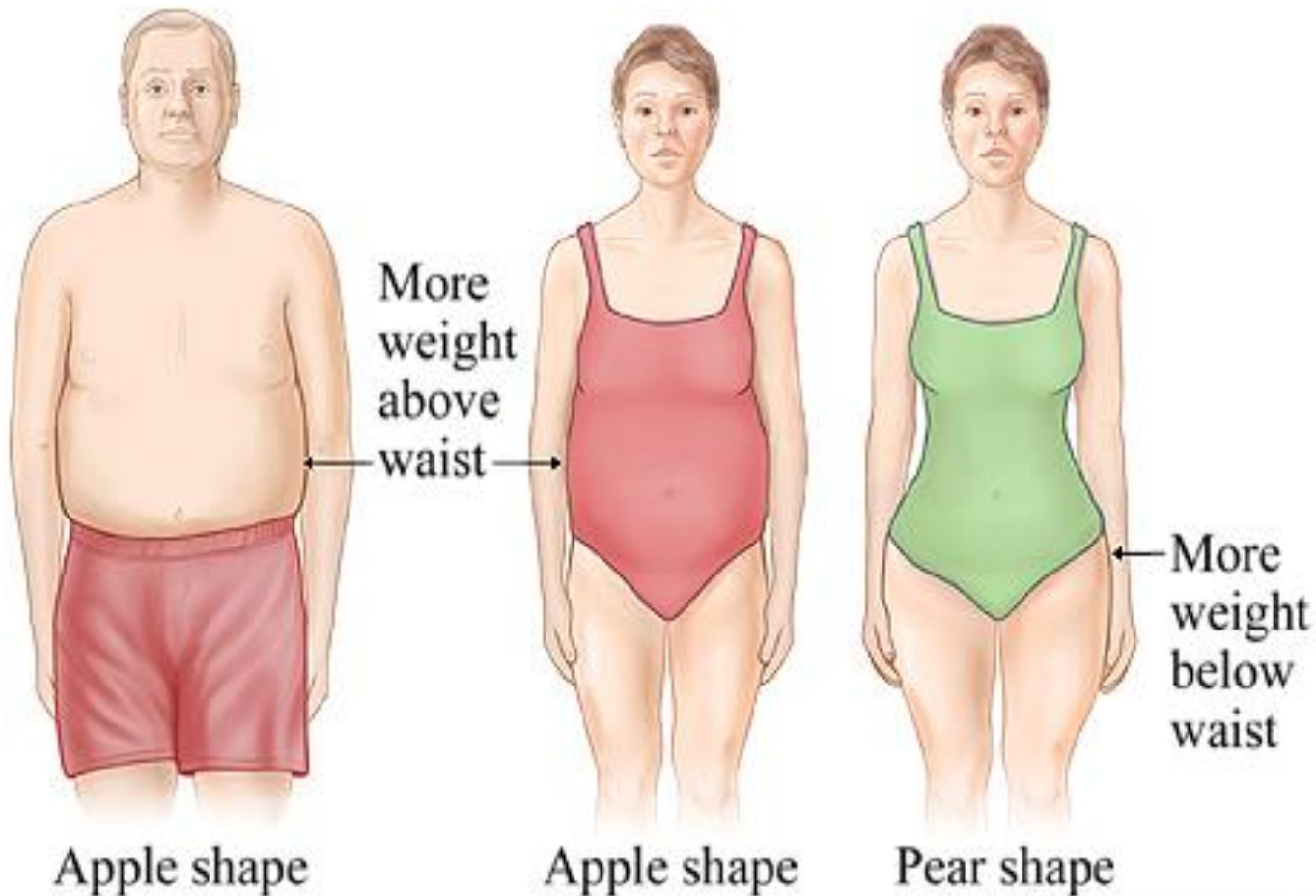
U.S. federal policy and WHO guidelines assign weight categories according to body mass index, or BMI, using the following formula and table:

$$\text{BMI} = \frac{(\text{weight in kilograms})}{(\text{height in meters})^2}$$

Below 18.5	18.5 to 24.9	25 to 29.9	30 to 34.9	35 to 39.9	40 or over
Underweight	Healthy weight	Overweight	Mild (class I) obesity	Moderate (class II) obesity	Severe (class III) obesity

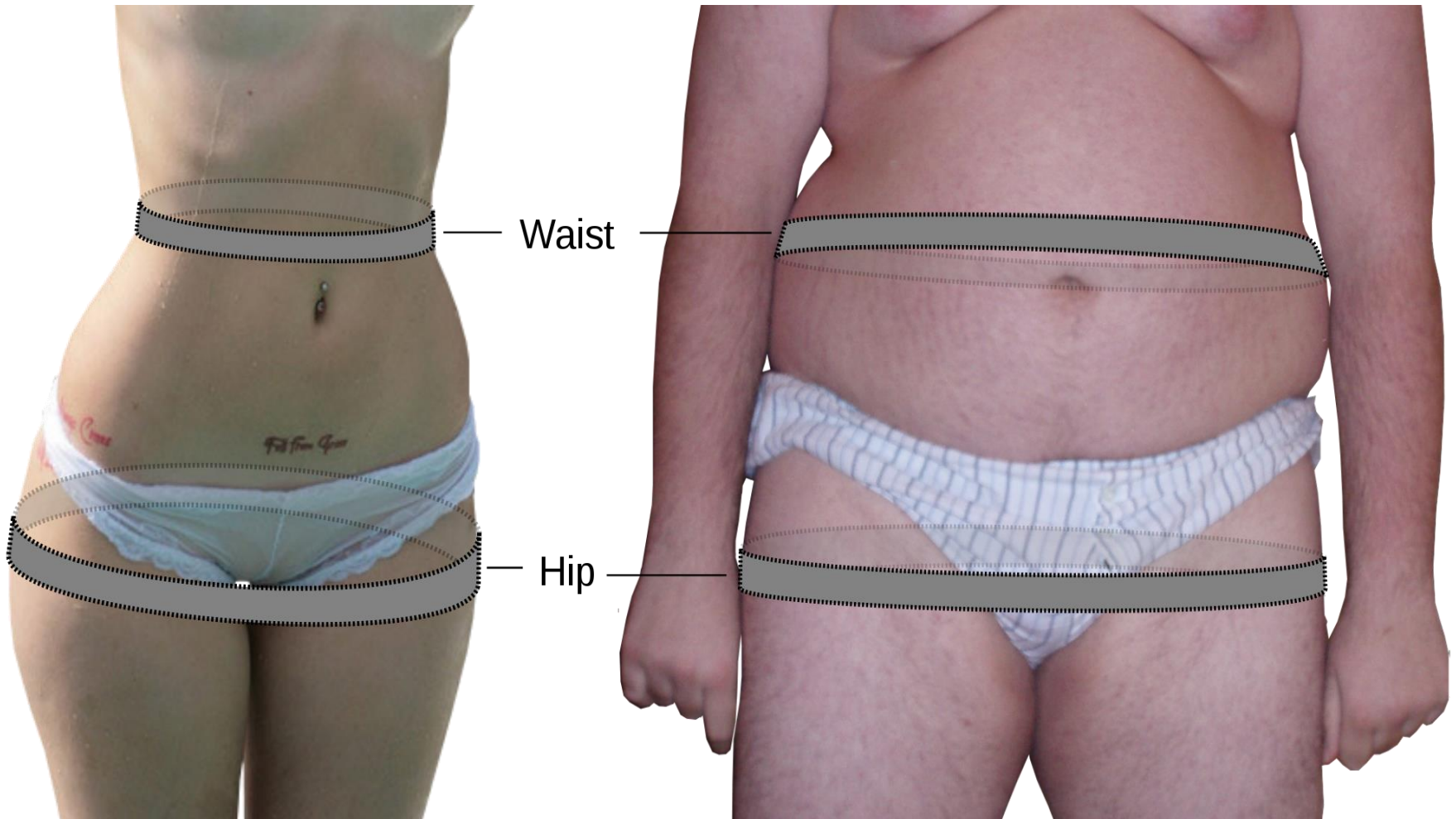
BMI is a reasonably good (but not perfect) predictor of body fatness.

But, body fat is not a homogeneous tissue. Fat in some locations is worst than others regarding impact on health.



© Healthwise, Incorporated

Waist circumference & waist-hip ratio



WHO International Obesity Task Force for Asians 2003

Classification	BMI (kg/m ²)
<i>Underweight</i>	< 18.5
<i>Normal range</i>	$18.5 - 22.9$
<i>Overweight:</i>	≥ 23
<i>Pre-obese</i>	$23 - 24.9$
<i>Obese I</i>	$25 - 29.9$
<i>Obese II</i>	≥ 30

Waist Circumference [for indication of android obesity]

Men	85 or 80cm (35.5 or 31.5 in)
Women	80 cm (31.5 in)



Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks

			Disease Risk* Relative to Normal Weight and Waist Circumference	
	BMI (kg/m ²)	Obesity Class	Men 102 cm (40 in) or less Women 88 cm (35 in) or less	Men > 102 cm (40 in) Women > 88 cm (35 in)
Underweight	< 18.5		-	-
Normal	18.5 - 24.9		-	-
Overweight	25.0 - 29.9		Increased	High
Obesity	30.0 - 34.9	I	High	Very High
	35.0 - 39.9	II	Very High	Very High
Extreme Obesity	40.0 +	III	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.

+ Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

Statement 2:

A linear correlation exists
between weight and health risk

Those who do not agree that obesity is a disease and that the condition is being exaggerated are based on the evidence that -

contrary to common believe, the relationship between body weight and health risk is *not linear*!

How Were the Studies Conducted?

- Many studies are **observational** rather than **experimental**.

Observational study:

Investigator **does not intervene**, but simply records what happens.



Experimental study:

Investigator **intervenes** in a pre-planned way and records the outcome.

- Very difficult to draw **causal inferences** from *mere associations*.

Why continues to use BMI as the ‘gold standard’?

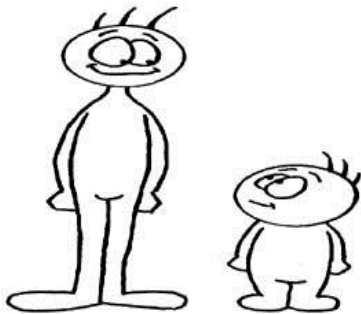
- The ‘gold standard’ of the obesity industry.¹
- Fails to account for
 - Body type
 - Bone mass
 - Lean muscle tissue
- Why not use additional alternatives?
 - Waist-to-Height Ratio (WHtR)
 - Waist-to-Hip Ratio (WHR)



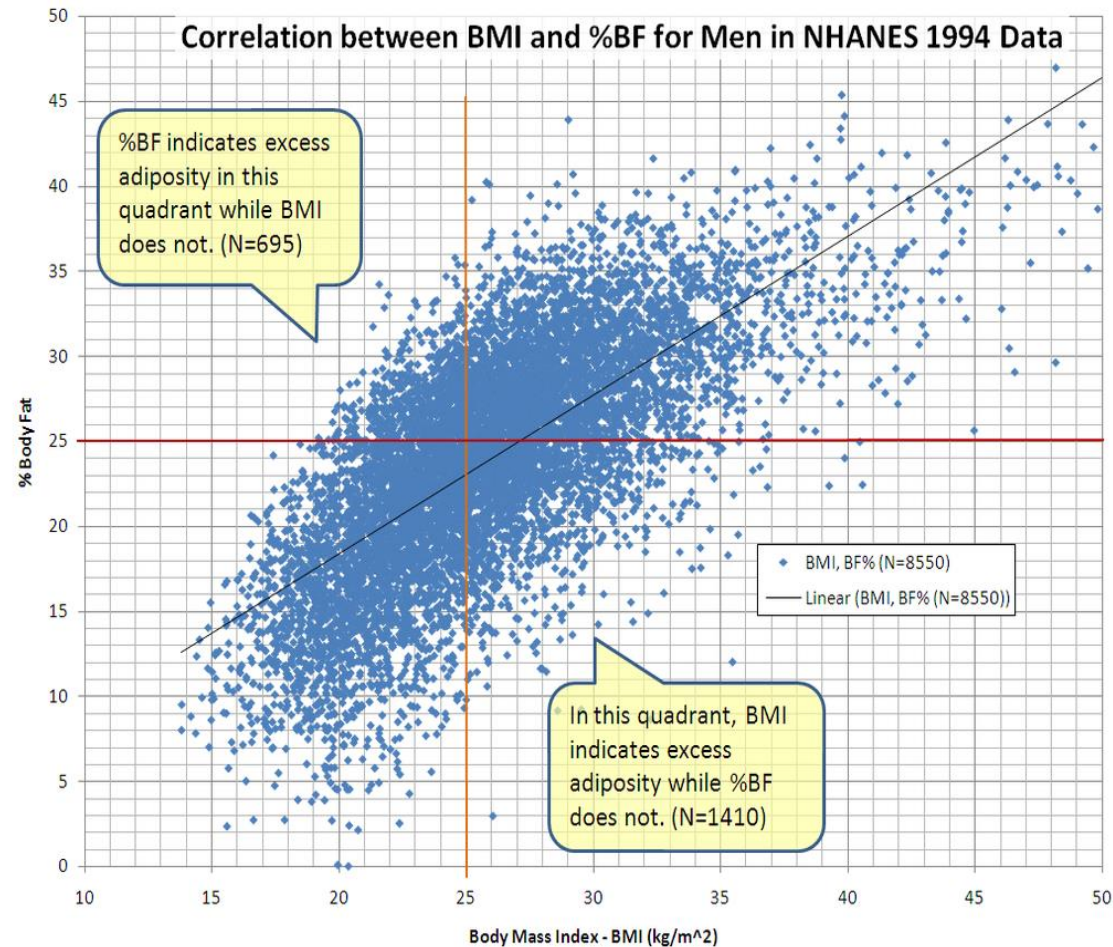
1. Ruppel Shell, E. (2003) *Fat Wars: the Inside Story of the Obesity Industry*. London: Atlantic Books.

Limitations

- BMI overestimates fatness in tall but underestimates fatness in short subjects.



- Becomes less accurate with age (>60 years)



A male with

Weight = 101 kg

Height = 1.7 m

BMI = 35

He must be obese, right?



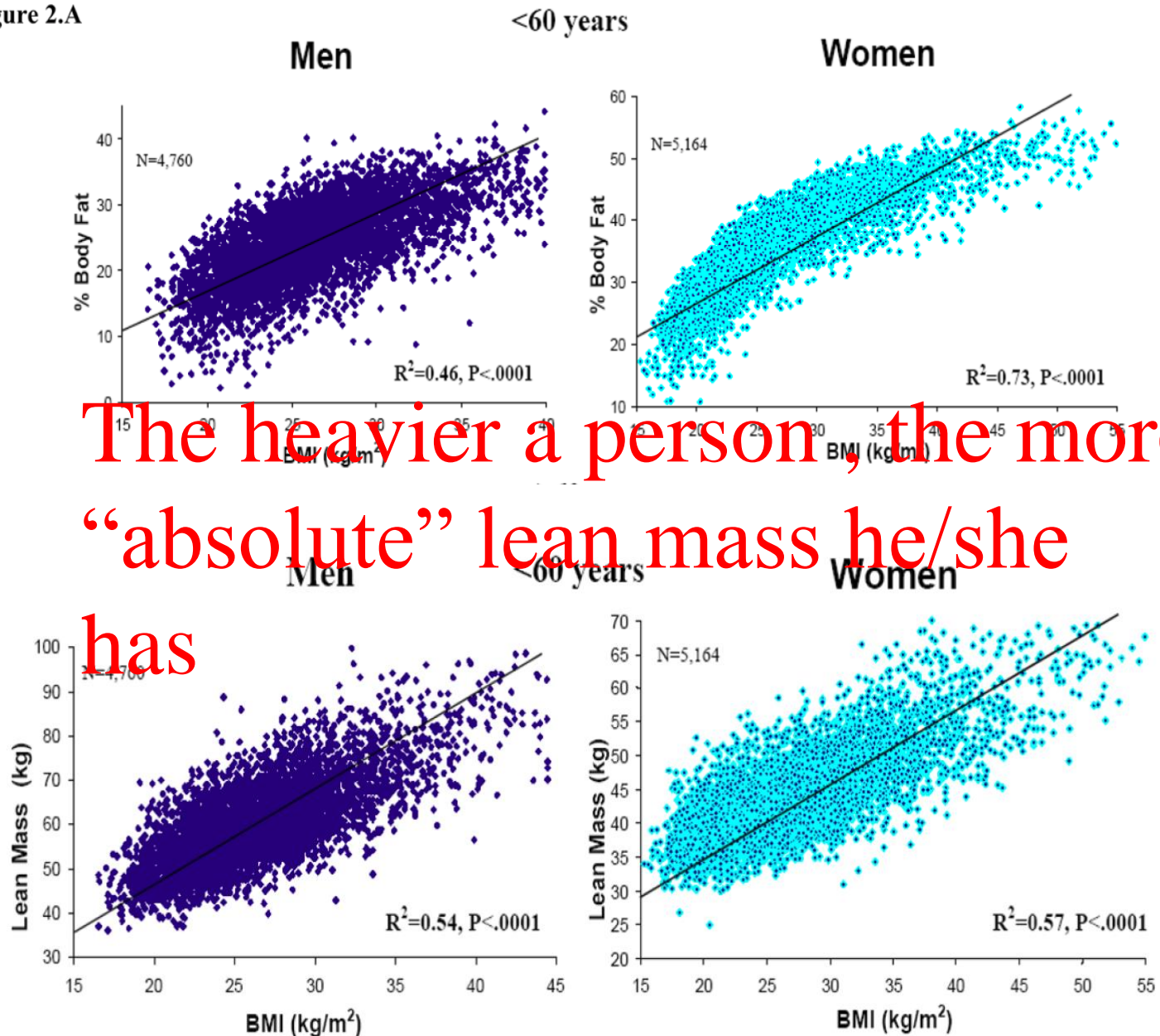


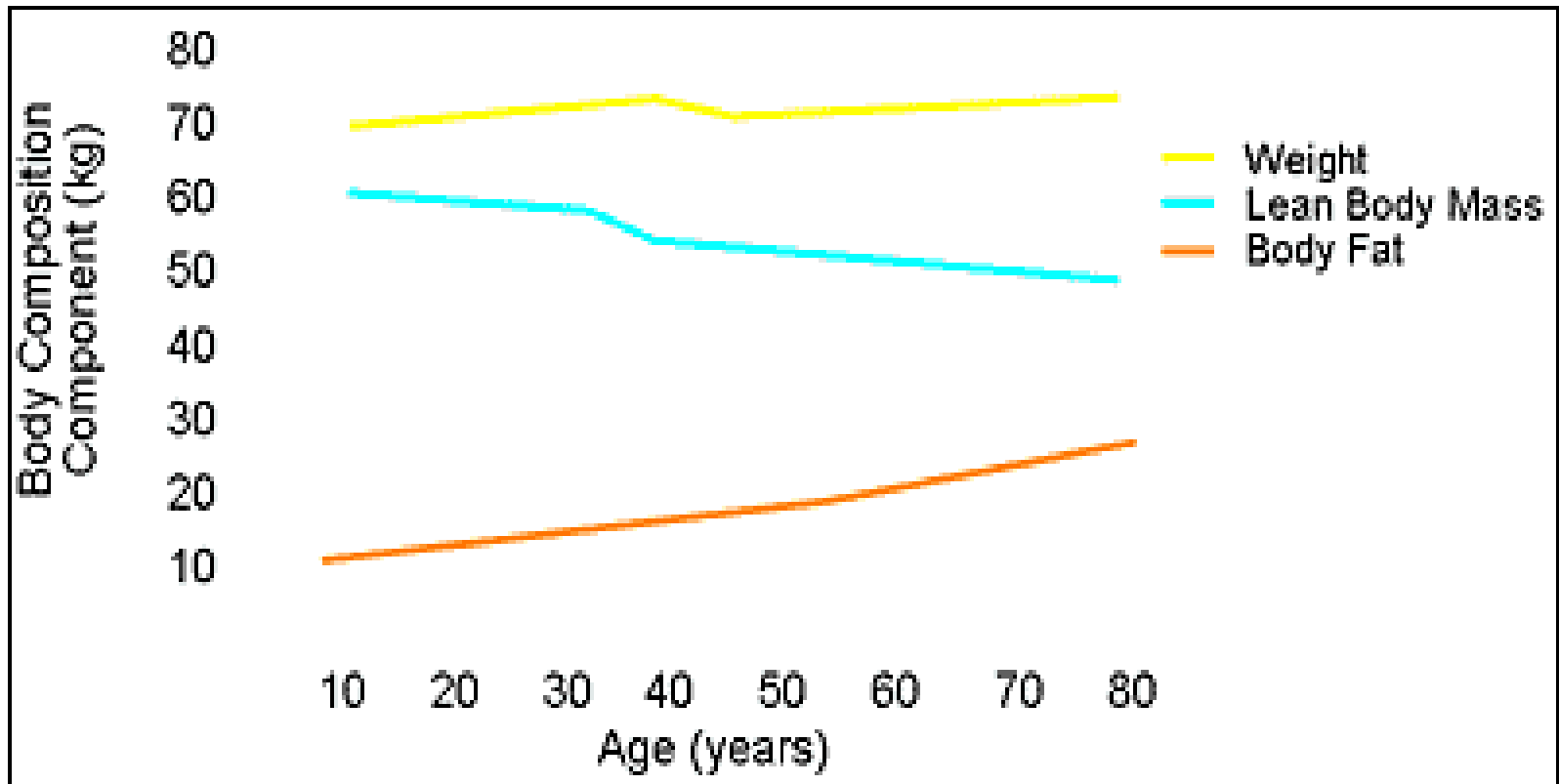
The people with the most lean body mass are Sumo Wrestlers...

What about ordinary people?

<http://leehayward.com/blog/the-best-body-type-for-bodybuilding/>

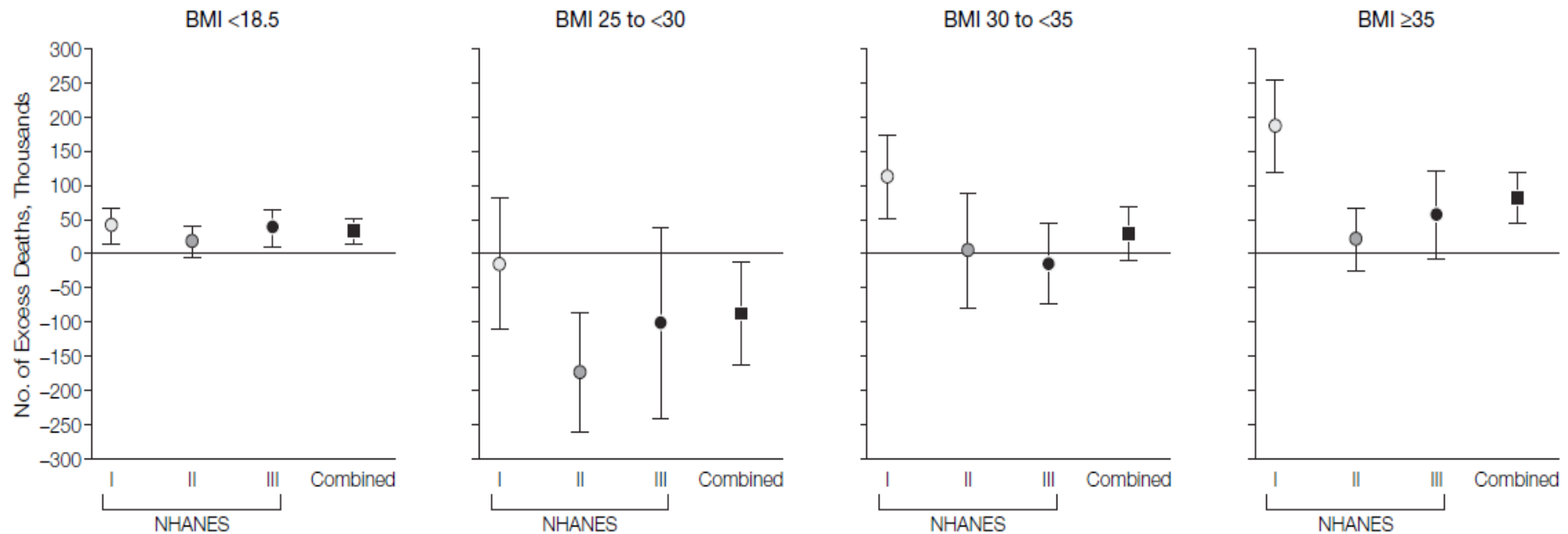
Figure 2.A





Age-related changes in lean body mass, body weight, and body fat

Figure 2. Estimated Numbers of Excess Deaths in 2000 in the United States Relative to the Healthy Reference BMI Category of 18.5 to <25, Shown by Survey and BMI Category



BMI indicates body mass index (measured as weight in kilograms divided by the square of height in meters). All estimates are based on the covariate distribution from NHANES 1999-2002, the number of deaths in 2000 from US vital statistics data, and the relative risks estimated from National Health and Nutrition Examination Surveys (NHANES) I, NHANES II, NHANES III, or the combined NHANES I, II, and III data set. Error bars indicate 95% confidence intervals.

There were excess deaths in the underweight (BMI < 18.5) as well as the Grade 2 (BMI > 35) groups.

Table 2. Summary Hazard Ratios (HRs) of All-Cause Mortality for Overweight and Obesity Relative to Normal Weight From Studies Considered Adequately Adjusted

	Self-reported or Measured Height and Weight				Height and Weight						HR (95% CI)	I ² , %
					Measured			Self-reported				
					N	HR	95% CI	I ² , %	N	HR		
<p>Relative to normal weight, obesity (all grades) were associated with significantly higher mortality. BUT, overweight is associated with lower whereas Grade 1 obesity was not associated with higher mortality.</p>												
BMI of 25-<30												
All ages	33	1.01 (0.91-1.12) ^a	84.8		16	1.03 (0.94-1.12) ^a	84.8		17	1.01 (0.91-1.12) ^a	91.0	
Mixed ages	33	1.02 (0.91-1.14) ^a	84.8		16	1.03 (0.94-1.12) ^a	84.8		17	1.02 (0.91-1.14) ^a	91.8	
Age ≥65 y only	9	0.98 (0.69-1.39) ^a	78.0		5	0.90 (0.70-1.16) ^a	64.1		4	0.98 (0.69-1.39) ^a	42.9	
BMI of ≥30												
All ages	42	1.47 (1.21-1.78) ^a	81.2		21	1.32 (1.20-1.46) ^a	46.6		21	1.47 (1.21-1.78) ^a	88.0	
Mixed ages	33	1.53 (1.22-1.93) ^a	82.2		16	1.37 (1.24-1.52)	40.4		17	1.53 (1.22-1.93) ^a	84.3	
Age ≥65 y only	9	1.25 (0.93-1.67) ^a	75.2		5	1.12 (0.89-1.43)	37.8		4	1.25 (0.93-1.67) ^a	39.7	
BMI of 30-<35												
All ages	33	1.05 (0.91-1.21) ^a	84.8		16	1.03 (0.94-1.12) ^a	84.8		17	1.05 (0.91-1.21) ^a	89.6	
Mixed ages	33	0.98 (0.91-1.06) ^a	84.8		16	1.03 (0.94-1.12) ^a	84.8		17	0.95 (0.83-1.07) ^a	90.3	
Age ≥65 y only	9	0.88 (0.69-1.12) ^a	78.0		5	0.90 (0.70-1.16) ^a	64.1		4	0.82 (0.46-1.47) ^a	88.1	
BMI of ≥35												
All ages	42	1.34 (1.21-1.47) ^a	81.2		21	1.32 (1.20-1.46) ^a	46.6		21	1.35 (1.16-1.57) ^a	88.7	
Mixed ages	33	1.35 (1.22-1.50) ^a	82.2		16	1.37 (1.24-1.52)	40.4		17	1.34 (1.14-1.57) ^a	89.6	
Age ≥65 y only	9	1.28 (0.93-1.76) ^a	75.2		5	1.12 (0.89-1.43)	37.8		4	1.40 (0.64-3.07) ^a	86.8	

Abbreviation: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared).

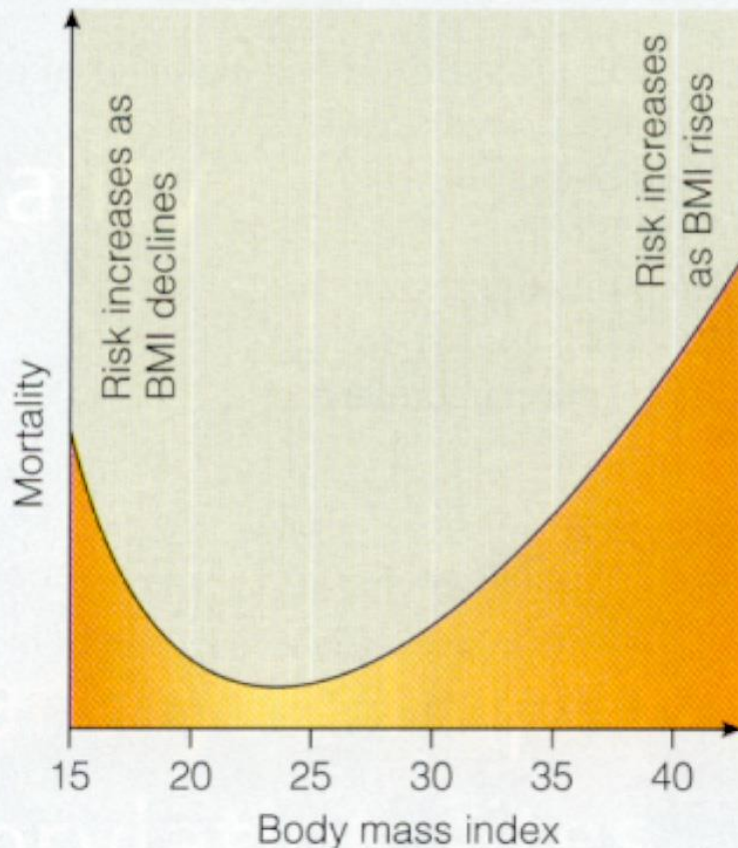
^aIndicates significant heterogeneity ($P < .05$).

Relative to normal weight, obesity (all grades) were associated with significantly higher mortality. BUT, overweight is associated with lower whereas Grade 1 obesity was not associated with higher mortality.

FIGURE 8-11

BMI and Mortality

This J-shaped curve describes the relationship between body mass index (BMI) and mortality and shows that both underweight and overweight present risks of a premature death.



If underweight people also have higher health risk, why just pinpoint the obese?

Issues

It is apparent that overweight and even Grade 1 obese are no worse than normal weight subjects in terms of mortality

Why are they “protect”, any mechanism to explain this “obesity paradox”?

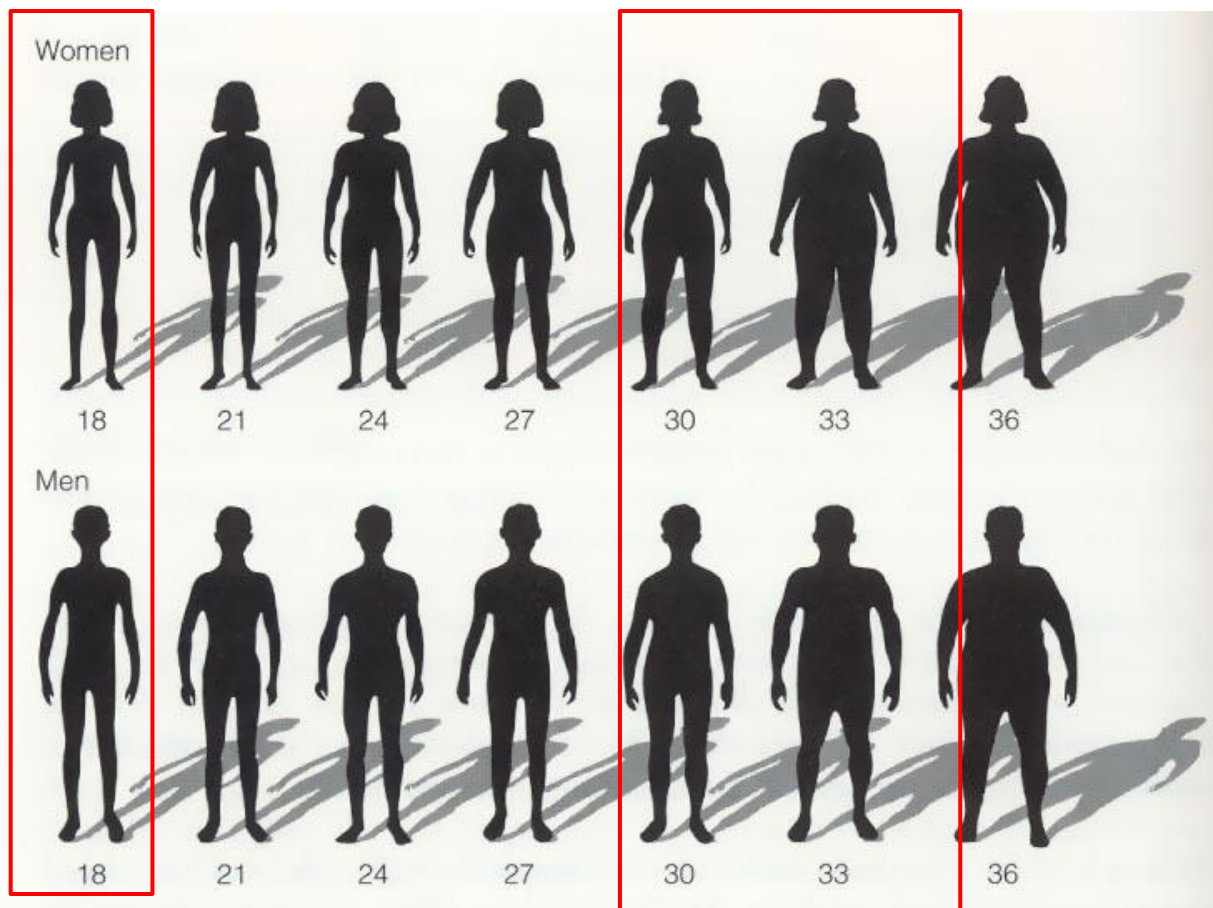
Can a person be overweight/obese and still in good health? How?

Is it simply discrimination against fatter persons?

Figure 8-4

Silhouettes and BMI

Source: Reprinted from material of the Canadian Dietetic Association.



* North Americans non-Asians