High body fat, not BMI, linked with higher death rate, study finds

By Carina Storrs, Special to CNN
Updated 1144 GMT (1944 HKT) March 14, 2016

Read the article and answer the following questions. You can underline the answer on the article directly.

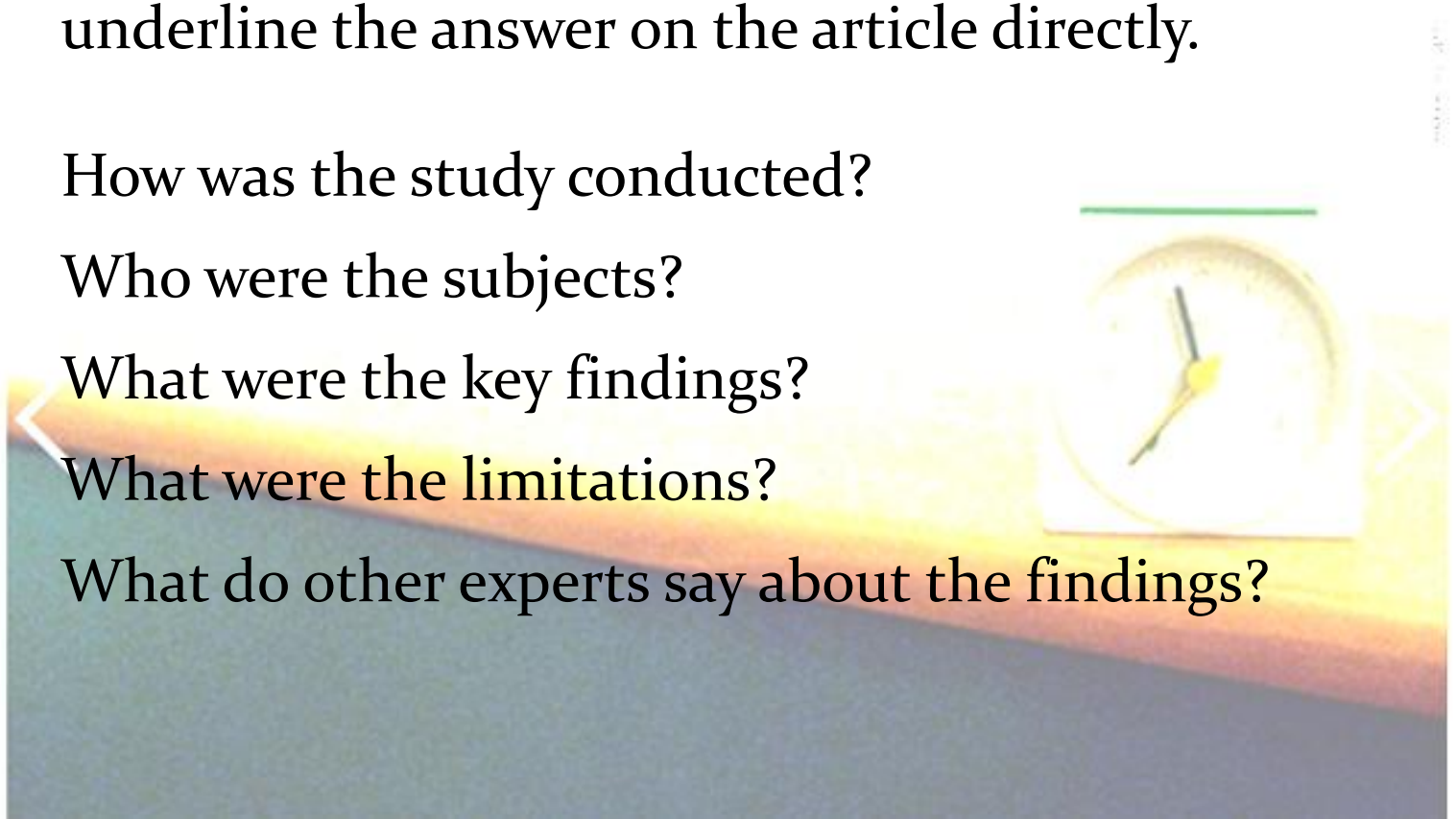
How was the study conducted?

Who were the subjects?

What were the key findings?

What were the limitations?

What do other experts say about the findings?



Challenging the Science Legitimating the Battle Against Fatness

CCGL9043 Obesity: Beyond a Health Issue

Part V

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.

Debate: Obesity as a disease

Yes, obesity is a disease.

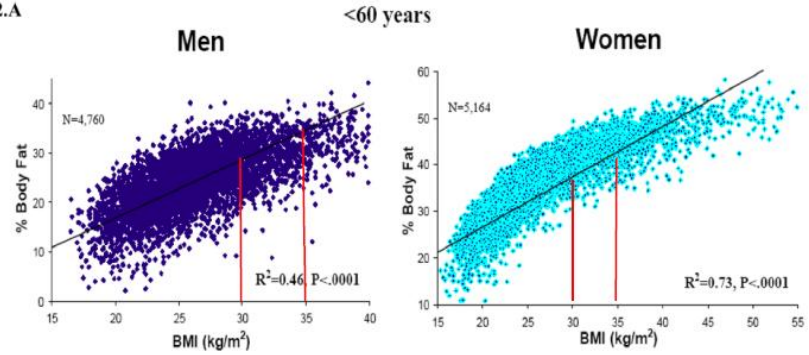
- "Obesity is a **pathophysiologic disease**. There is a **treatment** for this disease."
- "... even though not every **hypertensive** gets a stroke and not every obese person suffers the complications, that does not change the fact that this is a disease."

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**?

http://www.medscape.com/viewarticle/806566

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:

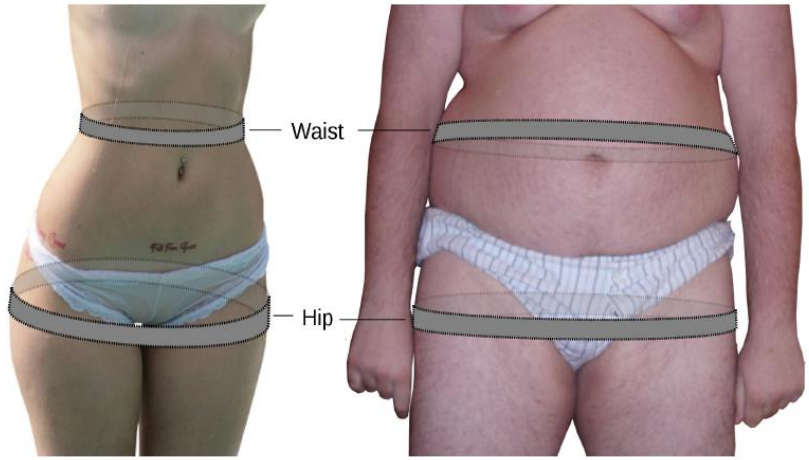
$$BMI = \frac{(\text{weight in kilograms})}{(\text{height in meters})^2}$$

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.

Romero-Corral et al. *Int J Obes* 32:959-966, 200

Waist circumference & waist-hip ratio

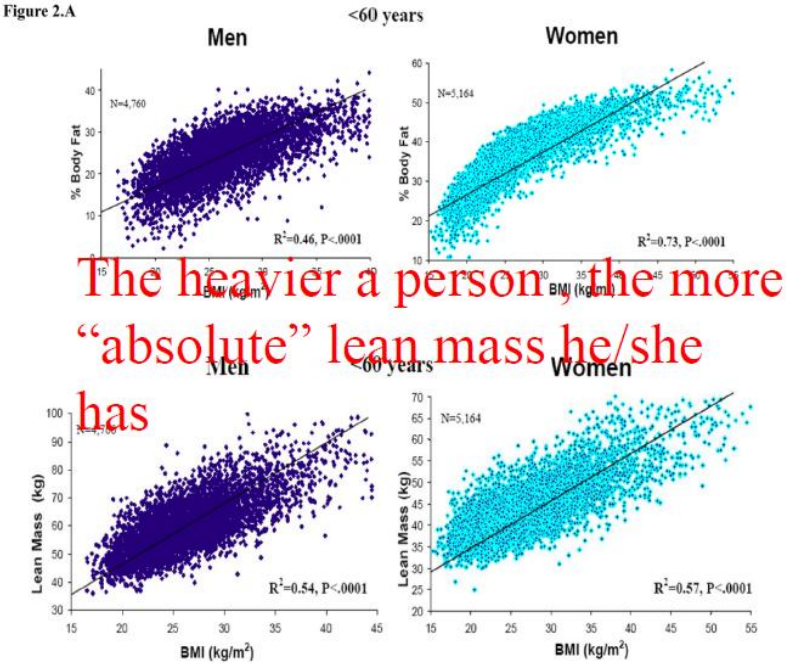


http://upload.wikimedia.org/wikipedia/commons/thumb/d/dd/Waist-hip_ratio.svg/2000px-Waist-

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

What about ordinary people?

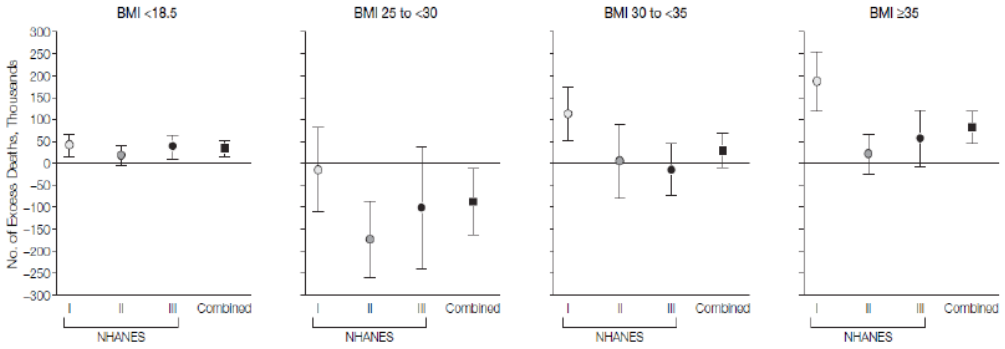
http://leehayward.com/blog/the-best-body-type-for-bodybuilding/



The heavier a person, the more "absolute" lean mass he/she has

Romero-Corral et al. *Int J Obes* 32:959-966, 2008

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.

Flegal et al. *JAMA* 293: 1861-1867, 2005

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: Measured			Height and Weight: Self-reported		
	No. of Studies	HR (95% CI)	I^2, %	No. of Studies	HR (95% CI)	I^2, %	No. of Studies	HR (95% CI)	I^2, %
BMI of 25-<30									
All ages								.01)[a]	91.0
Mixed ages								.02)[a]	91.8
Age ≥65 y only								0.98)	42.9
BMI of ≥30									
All ages								.47)[a]	88.0
Mixed ages								.53)[a]	84.3
Age ≥65 y only								1.25)	39.7
BMI of 30-<35									
All ages								.05)[a]	89.6
Mixed ages								.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

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.

Abbreviation: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared).
[a] Indicates significant heterogeneity ($P < .05$).

Flegal et al. *JAMA* 309: 71-82, 2013

Statement 2 (Cont'd)

A linear correlation exists between weight and health risk.

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

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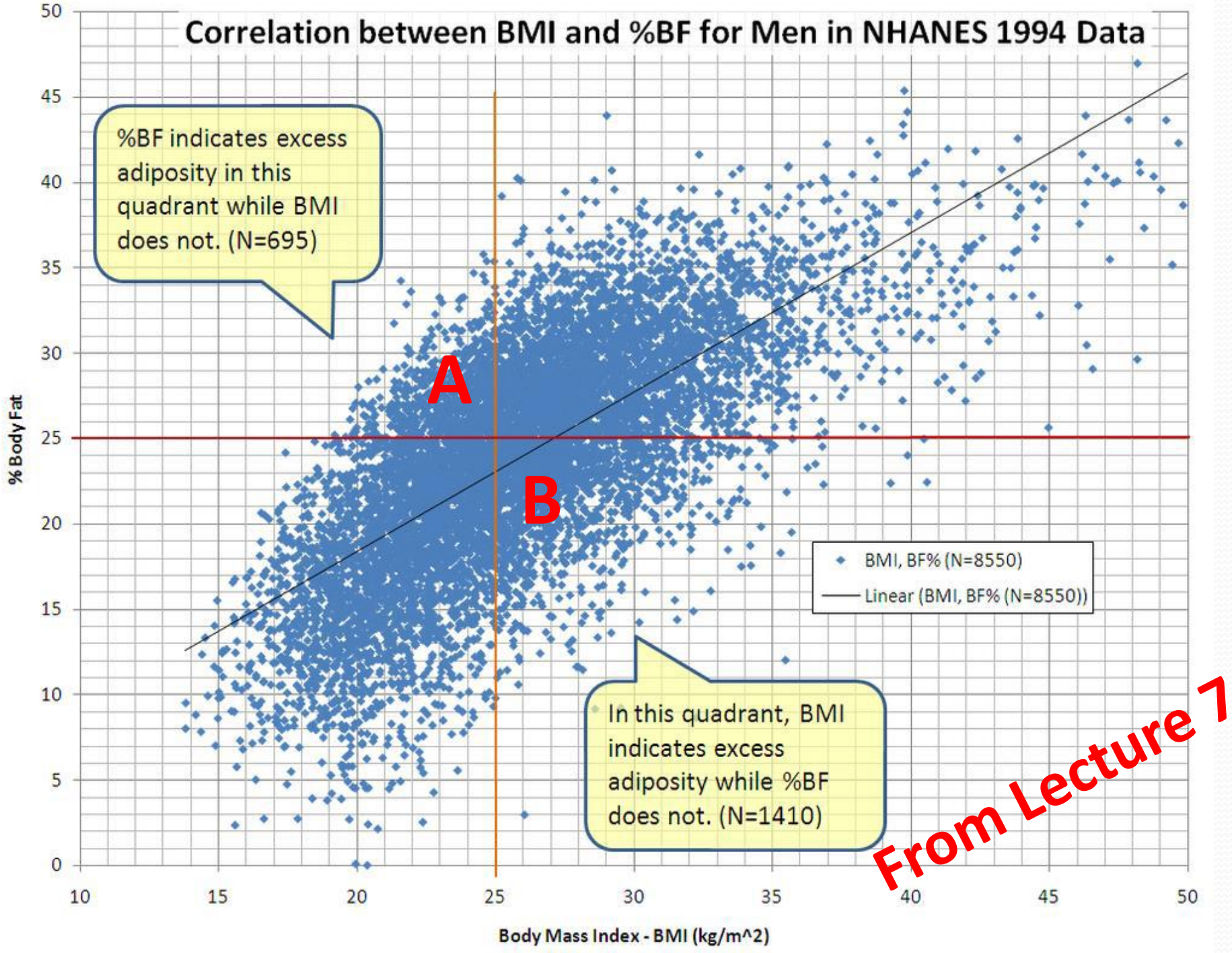

Correlation between BMI and %BF for Men in NHANES 1994 Data
%BF indicates excess adiposity in this quadrant while BMI does not. (N=695)
A
B
In this quadrant, BMI indicates excess adiposity while %BF does not. (N=1410)
BMI, BF% (N=8550)
Linear (BMI, BF% (N=8550))
% Body Fat
Body Mass Index - BMI (kg/m^2)
0
5
10
15
20
25
30
35
40
45
50
10
15
20
25
30
35
40
45
50
From Lecture 7

Relationship Among Body Fat Percentage, Body Mass Index, and All-Cause Mortality: A Cohort Study

ONLINE FIRST

Background: Prior mortality studies have concluded that elevated body mass index (BMI) may improve survival. These studies were limited because they did not measure adiposity directly.

Objective: To examine associations of BMI and body fat percentage (separately and together) with mortality.

Design: Observational study.

Setting: Manitoba, Canada.

Participants: Adults aged 40 years or older referred for bone mineral density (BMD) testing.

Measurements: Participants had dual-energy x-ray absorptiometry (DXA), entered a clinical BMD registry, and were followed using linked administrative databases. Adjusted, sex-stratified Cox models were constructed. Body mass index and DXA-derived body fat percentage were divided into quintiles, with quintile 1 as the lowest, quintile 5 as the highest, and quintile 3 as the reference.

Results: The final cohort included 49 476 women (mean age, 63.5 years; mean BMI, 27.0 kg/m^2; mean body fat, 32.1%) and 4944 men (mean age, 65.5 years; mean BMI, 27.4 kg/m^2; mean body fat, 29.5%). Death occurred in 4965 women over a median of 6.7 years and 984 men over a median of 4.5 years. In fully adjusted mortality models containing both BMI and body fat percentage, low BMI (hazard ratio [HR], 1.44 [95% CI, 1.30 to 1.59] for quintile 1 and 1.12 [CI, 1.02 to 1.23] for quintile 2) and high body fat percentage (HR, 1.19 [CI, 1.08 to 1.32] for quintile 5) were associated with higher mortality in women. In men, low BMI (HR, 1.45 [CI, 1.17 to 1.79] for quintile 1) and high body fat percentage (HR, 1.59 [CI, 1.28 to 1.96] for quintile 5) were associated with increased mortality.

Limitations: All participants were referred for BMD testing, which may limit generalizability. Serial measures of BMD and weight were not used. Some measures, such as physical activity and smoking, were unavailable.

Conclusion: Low BMI and high body fat percentage are independently associated with increased mortality. These findings may help explain the counterintuitive relationship between BMI and mortality.

Primary Funding Source: None.

Asking Critical Questions

- How was the study conducted?
- Who were the subjects? How many were involved?
- How long was the study?
- How well can the findings be generalized to the general population?
- What are the limitations? Are there any variables not taken into account?
- What do other experts say about the findings? Are the findings consistent with existing literature?

How Were the Studies Conducted?

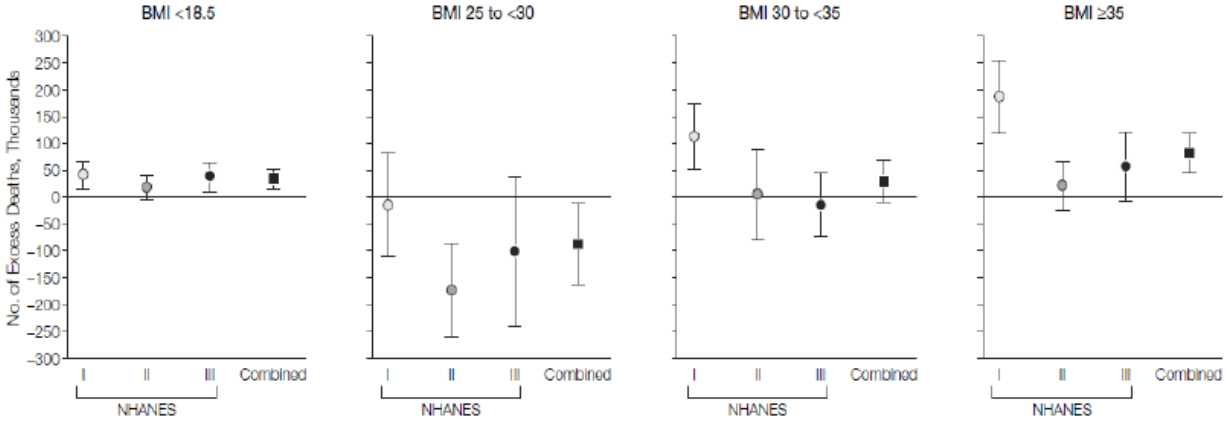
- Many studies are **observational** rather than **experimental**.

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*.

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



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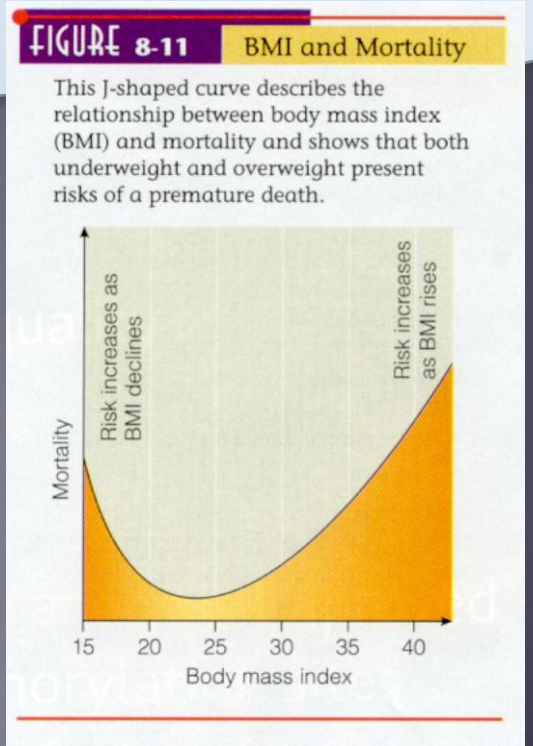
Flegal et al. *JAMA* 309: 71-82, 2013

Are fatness and fitness mutually exclusive?

What would be your first impression of a young woman who weighs 350 lb?

Weight = 160 kg, Height = 1.73 m,
BMI = ??



Are fatness and fitness mutually exclusive?

Holley Mangold, an American weightlifter and an Olympian in 2012

C.C. Sabathia of the New York Yankees
Weight = 138 kg, Height = 2.01 m, BMI = 34

Irish golfer Shane Lowry, ranked 51st in the world
Weight = 102 kg, Height = 1.83 m, BMI = 30.5

Are fatness and fitness mutually exclusive?

Former rugby star Ollie le Roux
Weight = 137 kg, Height = 1.83 m, BMI = 40

Super-heavyweight fighter Eric "Butterbean" Esch (L) has 77 career victories in the ring
Weight = 193 kg, Height = 1.80 m, BMI = ??

American shot-putter Reese Hoffa, who won a bronze medal at the 2012 Olympics
Weight = 147 kg, Height = 1.8 m, BMI = 45

http://edition.cnn.com/2015/05/18/sport/overweight-athletes-sabathia-davis-feat/

Fat & Fit vs. Lean & Unfit

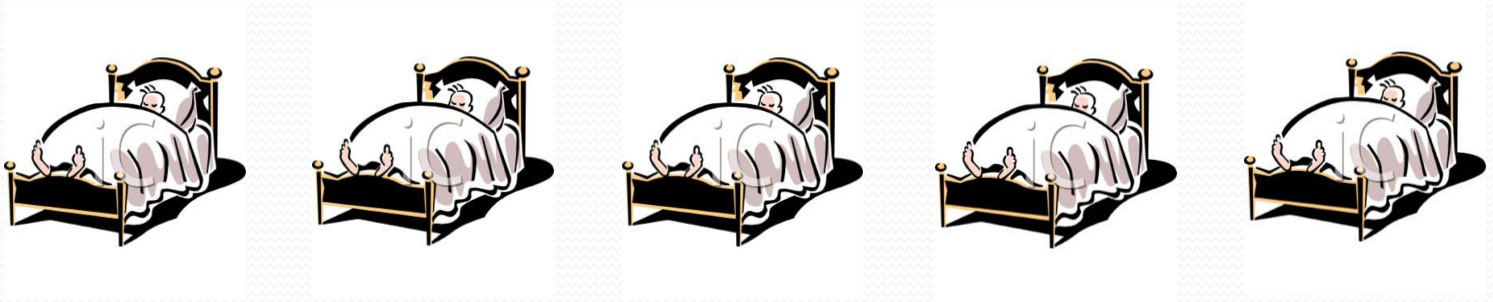
- In a study [1] with:
  - About 22,000 **male** participants from **middle to upper socio-economic groups**
  - **Obese & fit**
  - Had **cardiovascular and all-cause mortality rates** that were similar to those who were **lean and fit**.

- Obese people who maintain a moderate level of aerobic and cardiovascular fitness have a **far lower mortality rate** than **thin unfit people** and **the same mortality rate** as **thin fit people**.[2,3, 4]

1. Lee, C.D., Blair, S.N. and Jackson, A.S. (1999) Cardiorespiratory Fitness, Body Composition, and All-Cause and Cardiovascular Disease Mortality in Men, *American Journal of Clinical Nutrition, 69 (3): 373–380.*
2. Barlow, C.E., Kohl, H.W. III, Gibbons, L.W. and Blair, S.N. (1995) Physical fitness, mortality and obesity, *International Journal of Obesity 19 (S4): S41–S44.*
3. Blair, S.N., Kohl, H.W. III, Paffenbarger, R.S. Jr., Clark, D.G., Cooper, K.H. and Gibbons, L.W. (1989) Physical Fitness and All-Cause Mortality: A Prospective Study of Healthy Men and Women, *JAMA 262 (17): 2395–2401.*
4. Farrell, S.W., Braun, L., Barlow, C.E., Cheng, Y.J. and Blair, S.N. (2002).The Relation of Body Mass Index, Cardiorespiratory Fitness, and All-cause Mortality in Women, *Obesity Research 10: 417–423.*

Should we focus on Fatness or Fitness?

Five undergraduate men



Remained in bed for 20 days, had vital statistics measured

Wrong direction to focus on fatness??

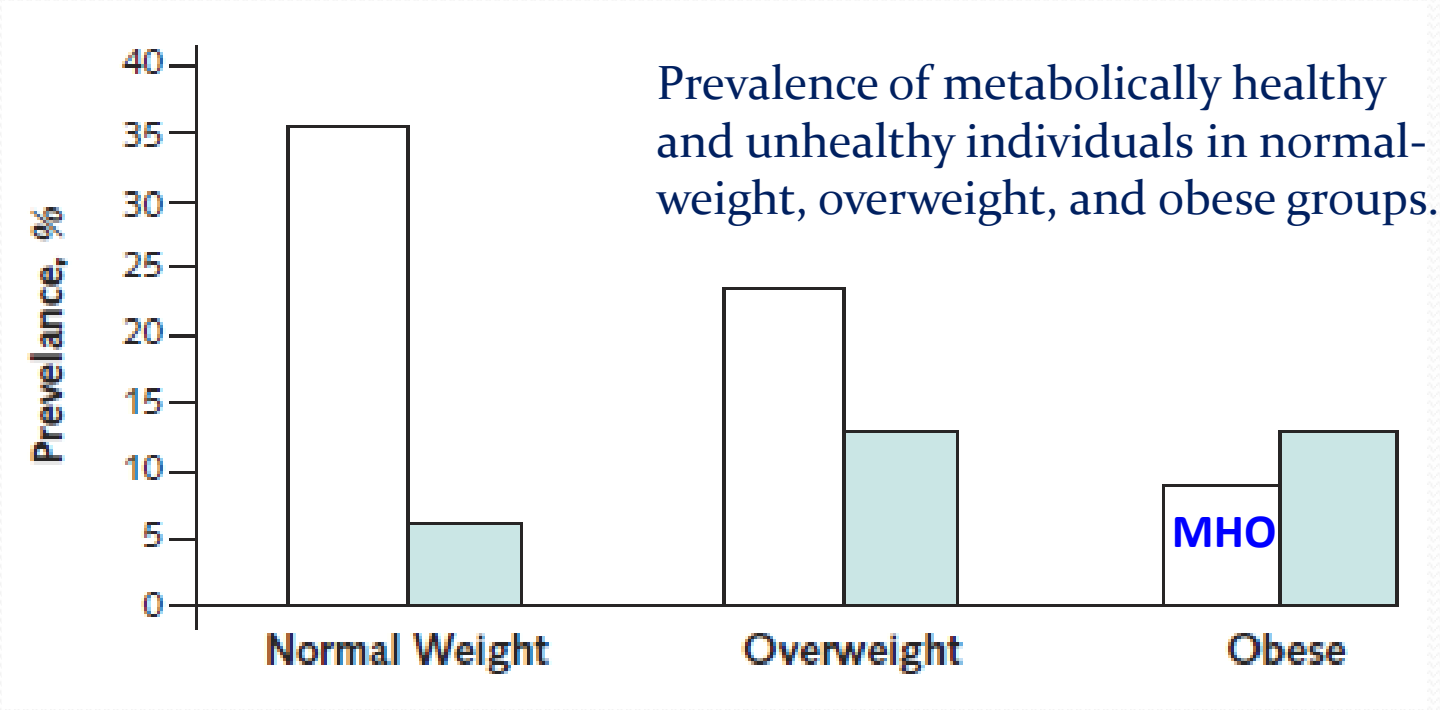
30 years later, gained at least 20 lb each, after a 6-month exercise program

Better aerobic capacity and cardiovascular fitness at age 50 than they had displayed after the 20 days spent in bed as undergraduates.

Winslow, R. (2002) Study Shows Even Moderate Exercise Can Reverse Effects of Aging by Years, *Wall Street Journal, May 8.*

“Metabolically Healthy Obese”

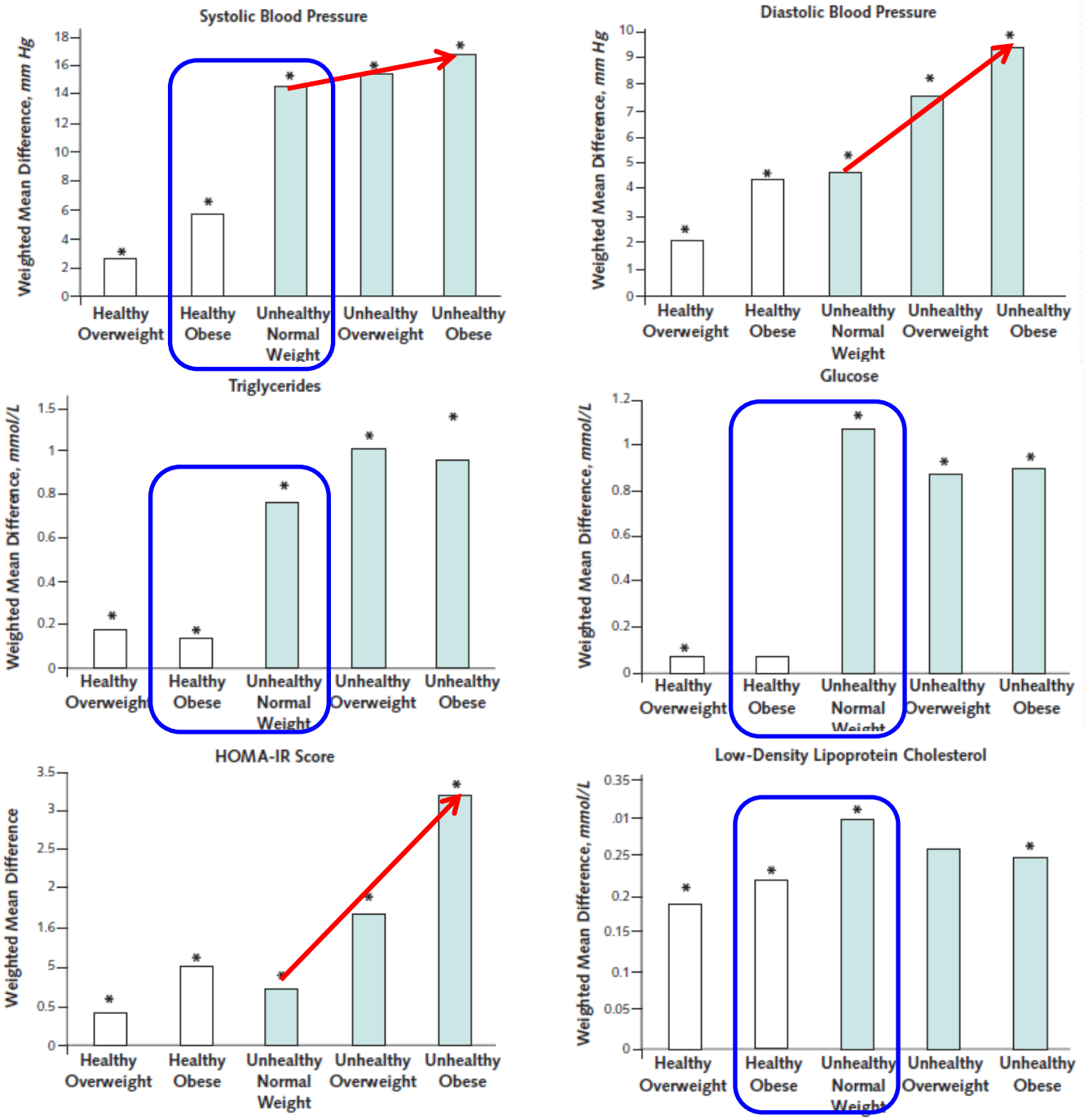
The metabolically healthy obese (MHO) phenotype refers to obese individuals with a favourable metabolic profile*.



* A favourable metabolic profile is characterized by high levels of insulin sensitivity, no hypertension as well as a favorable lipid, inflammation, hormonal, liver enzyme and immune profile

Kramer, C. K., Zinman, B., & Retnakaran, R. (2013). Are metabolically healthy overweight and obesity benign conditions?: A systematic review and meta-analysis. *Annals of internal medicine*, *159*(11), 758-769.

Meta-analyses of various clinical characteristics, by metabolic–body mass index categories.



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Are Metabolically Healthy Overweight and Obesity Benign Conditions?: A Systematic Review and Meta-analysis

Background: Recent interest has focused on a unique subgroup of overweight and obese individuals who have normal metabolic features despite increased adiposity. Normal-weight individuals with adverse metabolic status have also been described. However, it remains unclear whether metabolic phenotype modifies the morbidity and mortality associated with higher body mass index (BMI).

Purpose: To determine the effect of metabolic status on all-cause mortality and cardiovascular events in normal-weight, overweight, and obese persons.

Data Sources: Studies were identified from electronic databases.

Study Selection: Included studies evaluated all-cause mortality or cardiovascular events (or both) and clinical characteristics of 6 patient groups defined by BMI category (normal weight/overweight/obesity) and metabolic status (healthy/unhealthy), as defined by the presence or absence of components of the metabolic syndrome by Adult Treatment Panel III or International Diabetes Federation criteria.

Data Extraction: Two independent reviewers extracted the data. Metabolically healthy people of normal weight made up the reference group.

Data Synthesis: Eight studies (n = 61 386; 3988 events) evaluated participants for all-cause mortality and/or cardiovascular events. Metabolically healthy obese individuals (relative risk [RR], 1.24; 95% CI, 1.02 to 1.55) had increased risk for events compared with metabolically healthy normal-weight individuals when only studies with 10 or more years of follow-up were considered. All metabolically unhealthy groups had a similarly elevated risk: normal weight (RR, 3.14; CI, 2.36 to 3.93), overweight (RR, 2.70; CI, 2.08 to 3.30), and obese (RR, 2.65; CI, 2.18 to 3.12).

Limitation: Duration of exposure to the metabolic–BMI phenotypes was not described in the studies and could partially affect the estimates.

Conclusion: Compared with metabolically healthy normal-weight individuals, obese persons are at increased risk for adverse long-term outcomes even in the absence of metabolic abnormalities, suggesting that there is no healthy pattern of increased weight.

Primary Funding Source: Intramural funds from the Leadership Sinai Centre for Diabetes.

Curves showing the association between BMI-metabolic status phenotypes and cardiovascular disease (Fig. 1) and type 2 diabetes (Fig. 2) .

Fig. 1

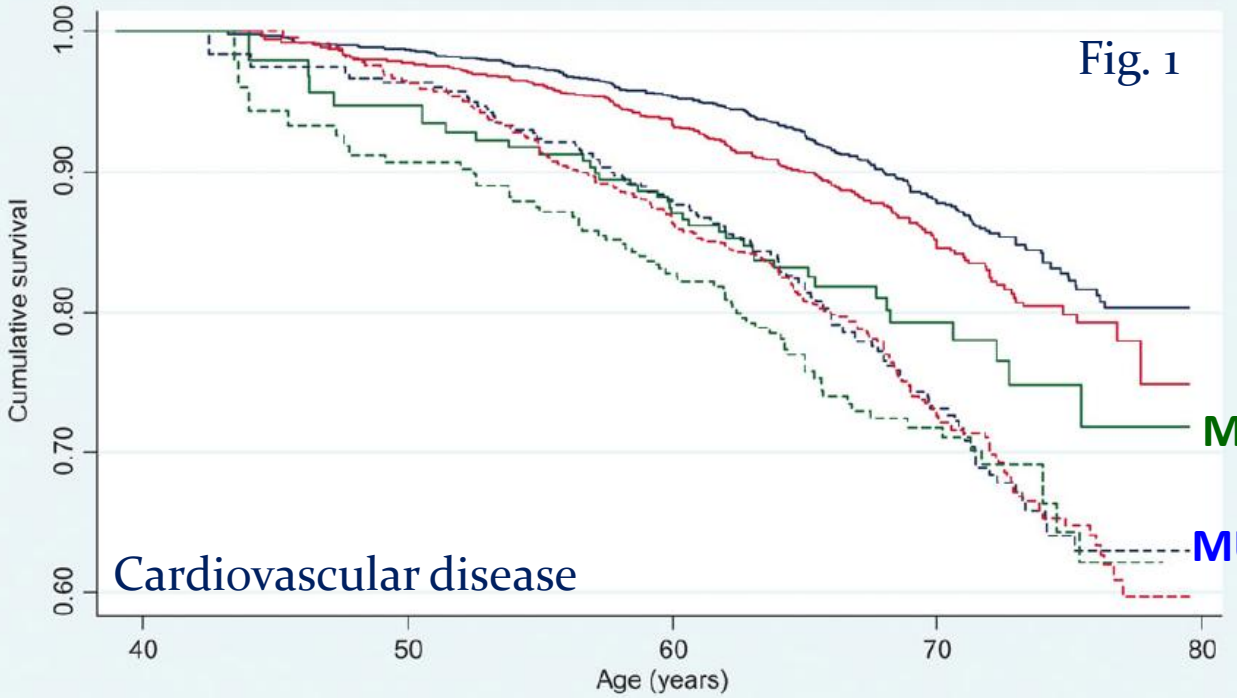
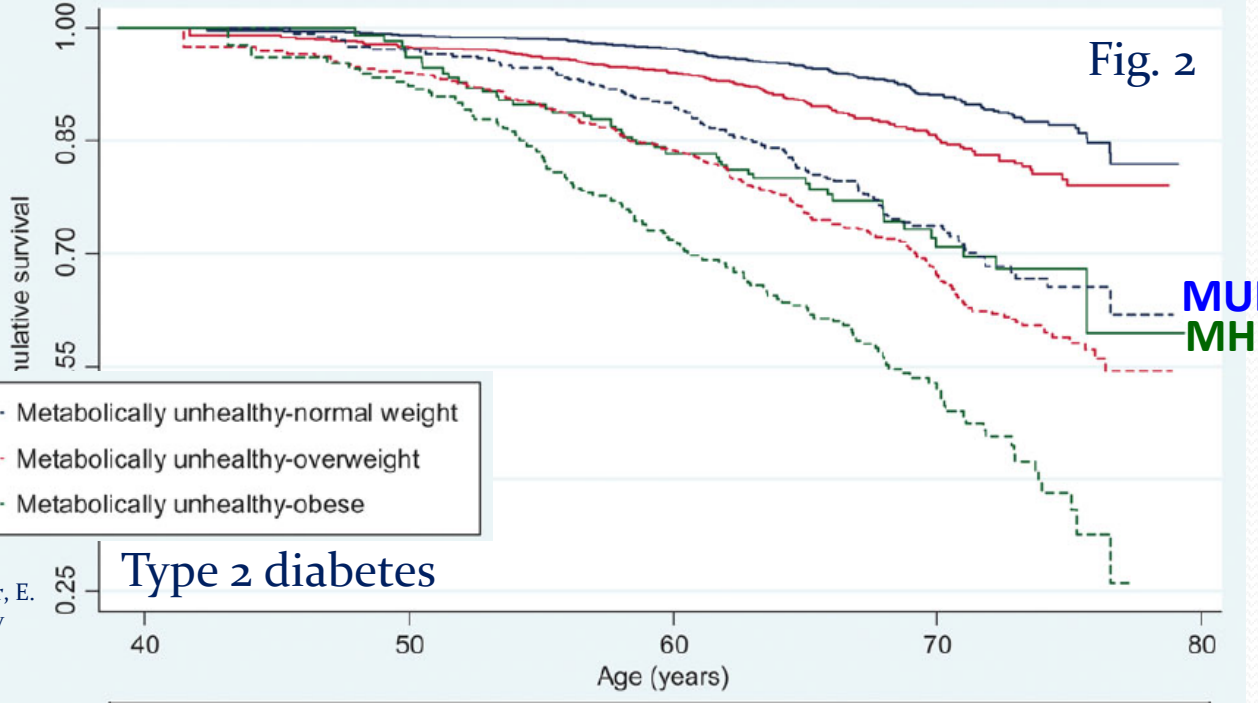
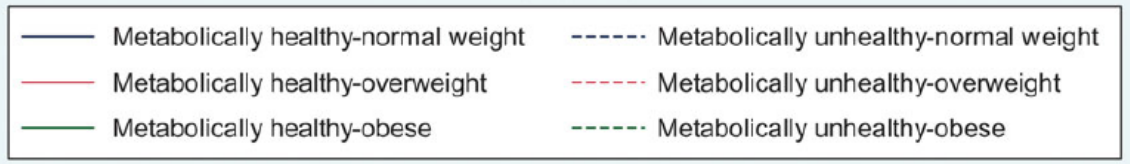


Fig. 2



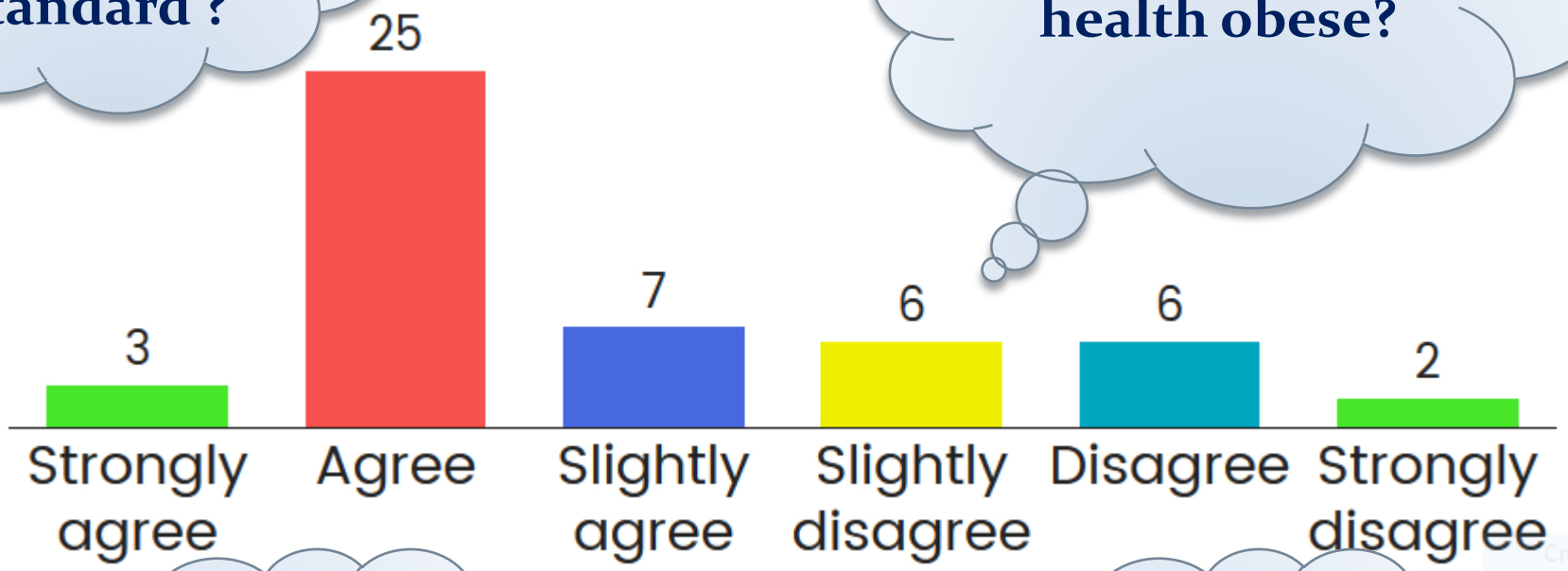


Hinnouho, G. M., Czernichow, S., Dugravot, A., Nabi, H., Brunner, E. J., Kivimaki, M., & Singh-Manoux, A. (2014). Metabolically healthy obesity and the risk of cardiovascular disease and type 2 diabetes: the Whitehall II cohort study. *European heart journal*, ehu123.

Statement 2: A linear correlation exists between weight and health risk.

BMI as the 'golden standard'?

Metabolically health obese?



Mortality risk?

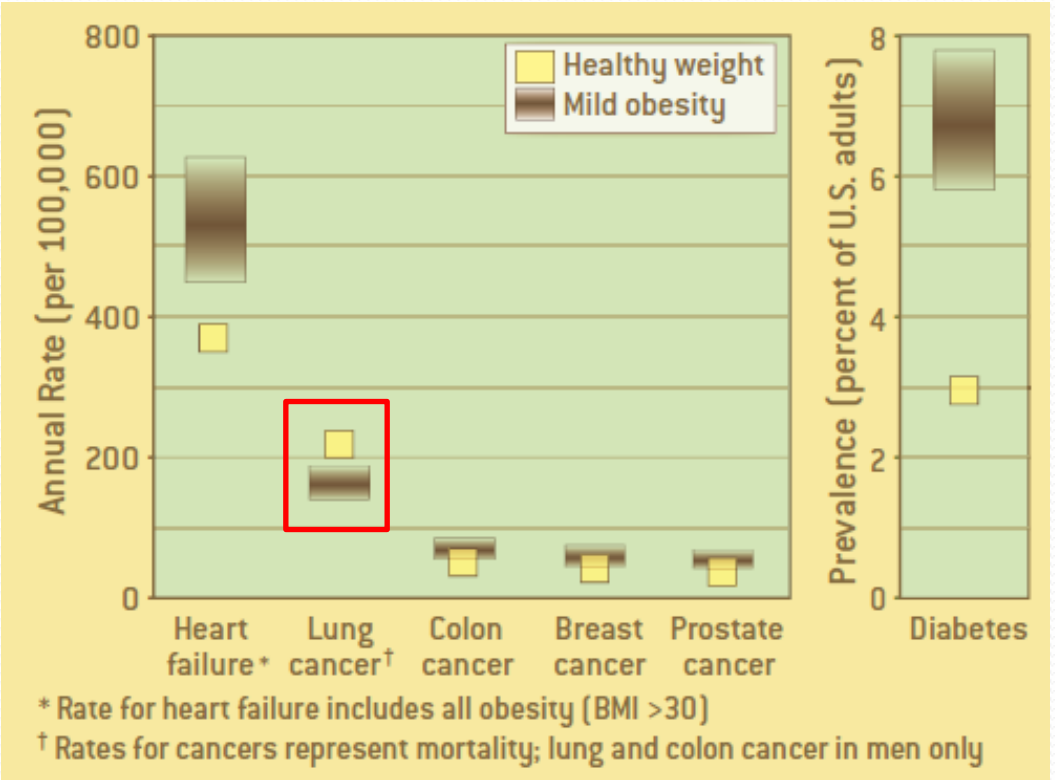
Fat and Fit?

Statement 3

Obese individuals are usually less healthy due to their accumulated fat.

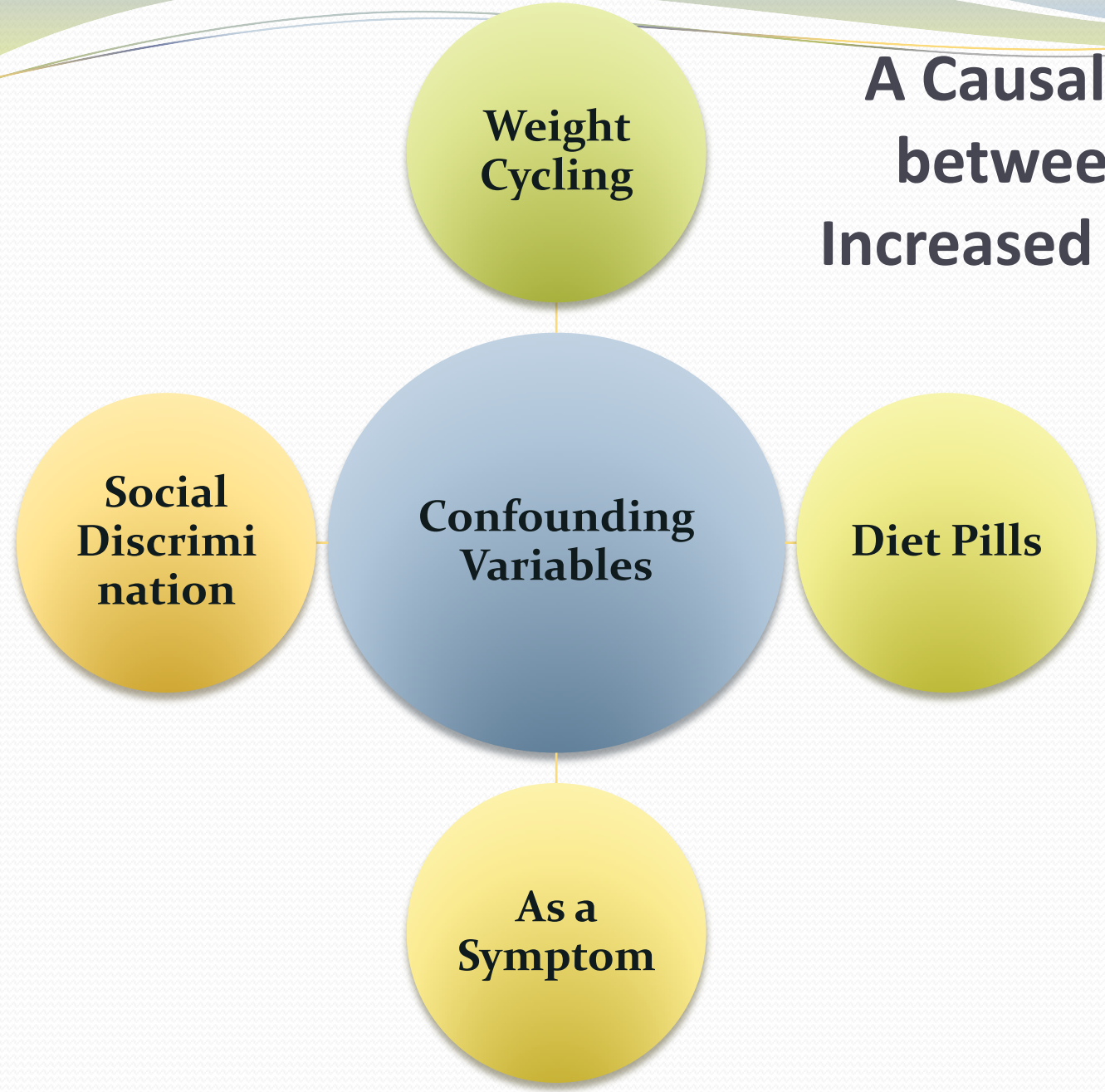
Obesity & Health Risks

- The heavier than average are at **significantly decreased risk** for diseases such as lung cancer, osteoporosis and most of the major respiratory ailments (Campos, 2004; Gaesser, 2002).
- With the exception of osteoarthritis, **causal links** between body fat and disease remain **hypothetical** (Anderson *et al., 1996;* Hochberg et al., 1995).

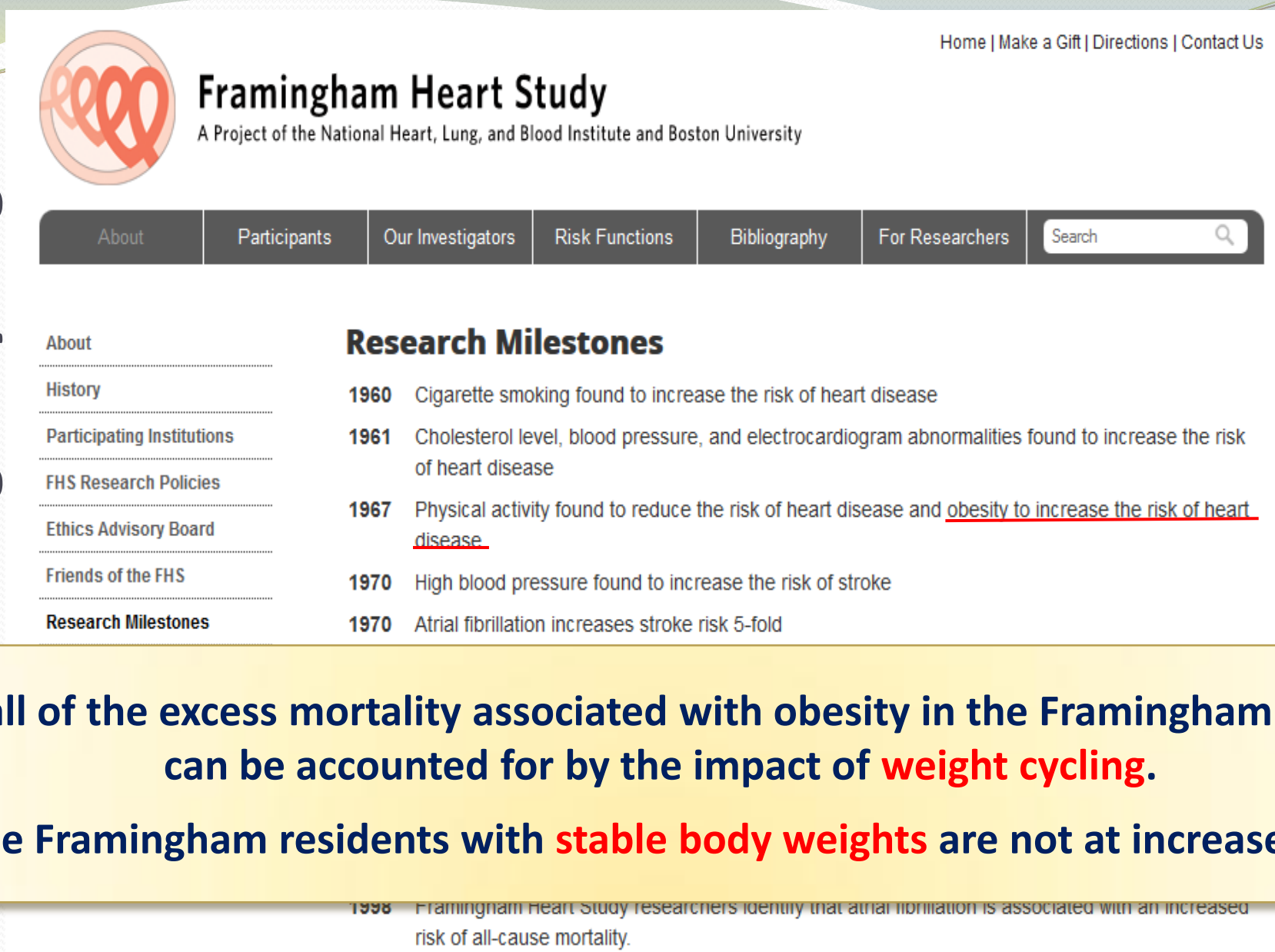


Gibbs, W. W. (2005). Obesity: an overblown epidemic?. *Scientific American*, *292*(6), 70-77.

A Causal Relationship between Obesity & Increased Health Risks??



Weight Cycling



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Framingham Heart Study

A Project of the National Heart, Lung, and Blood Institute and Boston University

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About
History
Participating Institutions
FHS Research Policies
Ethics Advisory Board
Friends of the FHS
Research Milestones

Research Milestones

1960 Cigarette smoking found to increase the risk of heart disease

1961 Cholesterol level, blood pressure, and electrocardiogram abnormalities found to increase the risk of heart disease

1967 Physical activity found to reduce the risk of heart disease and obesity to increase the risk of heart disease

1970 High blood pressure found to increase the risk of stroke

1970 Atrial fibrillation increases stroke risk 5-fold

1998 Framingham Heart Study researchers identify that atrial fibrillation is associated with an increased risk of all-cause mortality.

Yet all of the excess mortality associated with obesity in the Framingham cohort can be accounted for by the impact of weight cycling.

Obese Framingham residents with stable body weights are not at increased risk[1].

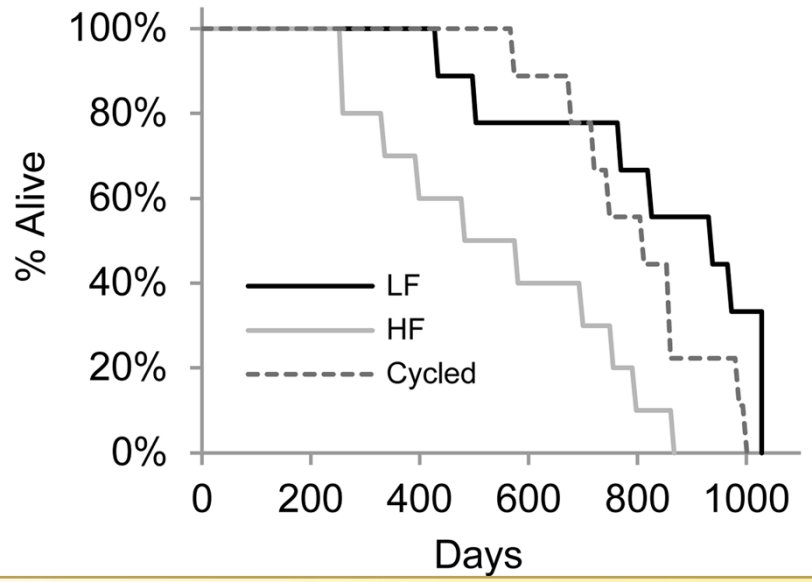
1. Lissner, L., Odell, P.M., D'Agostino, R.B., Stokes, J. III, Kreger, B.E., Belanger, A.J. and Brownell, K.D. (1991) Variability of Body Weight and Health Outcomes in the Framingham Population, *New England Journal of Medicine 324 (26):* 1839–1844.

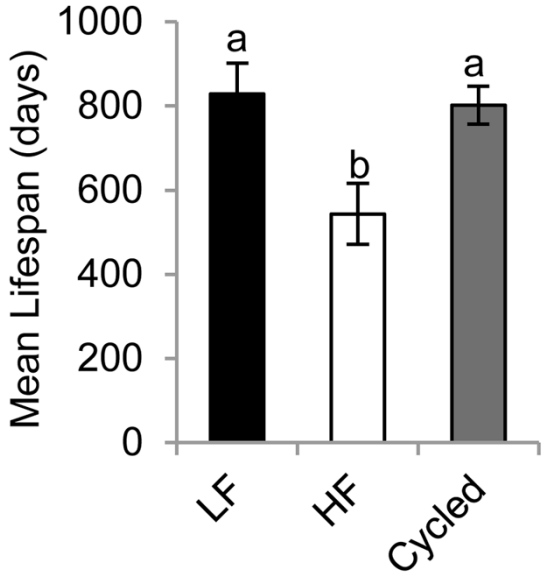
The effects of weight cycling on lifespan in mice

Low fat (LF) diet

High fat (HF) diet

Cycled diet





The act of repeatedly gaining and losing weight, in itself, did not decrease lifespan and was more beneficial than remaining obese.

List, E. O., Berryman, D. E., Wright-Piekarski, J., Jara, A., Funk, K., & Kopchick, J. J. (2013). The effects of weight cycling on lifespan in male C57BL/6J mice. *International journal of obesity*, *37*(8), 1088-1094.

The effects of weight cycling on lifespan in mice

Objective:

With the increasing rates of obesity, many people diet in an attempt to lose weight. As weight loss is seldom maintained in a single effort, weight cycling is a common occurrence. Unfortunately, reports from clinical studies that have attempted to determine the effect of weight cycling on mortality are in disagreement, and to date, no controlled animal study has been performed to assess the impact of weight cycling on longevity. Therefore, our objective was to determine whether weight cycling altered lifespan in mice that experienced repeated weight gain and weight loss throughout their lives.

Methods:

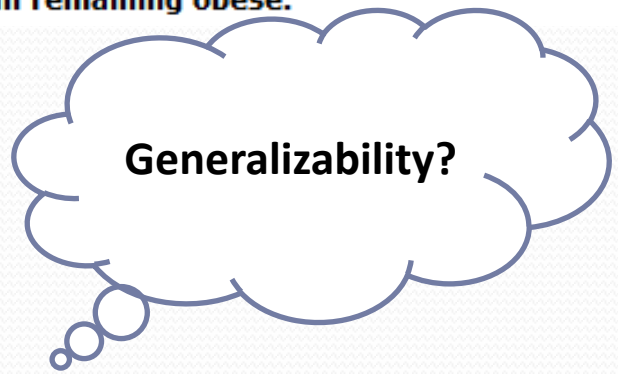
Male C57BL/6J mice were placed on one of three lifelong diets: a low-fat (LF) diet, a high-fat (HF) diet or a cycled diet in which the mice alternated between 4 weeks on the LF diet and 4 weeks on the HF diet. Body weight, body composition, several blood parameters and lifespan were assessed.

Results:

Cycling between the HF and LF diet resulted in large fluctuations in body weight and fat mass. These gains and losses corresponded to significant increases and decreases, respectively, in leptin, resistin, GIP, IGF-1, glucose, insulin and glucose tolerance. Surprisingly, weight cycled mice had no significant difference in lifespan (801±45 days) as compared to LF-fed controls (828±74 days), despite being overweight and eating a HF diet for half of their lives. In contrast, the HF-fed group experienced a significant decrease in lifespan (544±73 days) compared with LF-fed controls and cycled mice.

Conclusions:

This is the first controlled mouse study to demonstrate the effect of lifelong weight cycling on longevity. The act of repeatedly gaining and losing weight, in itself, did not decrease lifespan and was more beneficial than remaining obese.



List, E. O., Berryman, D. E., Wright-Piekarski, J., Jara, A., Funk, K., & Kopchick, J. J. (2013). The effects of weight cycling on lifespan in male C57BL/6J mice. *International journal of obesity*, *37*(8), 1088-1094.

Impact of weight cycling on risk of morbidity and mortality

Summary

Unintentional weight gain is commonly observed in adult humans, often provoking intentional weight loss attempts followed by unintentional weight regain. This episodic variation in body weight over a period of time has been referred to as 'weight cycling'. Over the last two decades, weight cycling has been associated with a number of morbid health conditions and increased mortality. This article provides a comprehensive evaluation of recent weight-cycling evidence, looks to understand design differences between studies and study outcomes, assesses the need for further research on particular health outcomes, and proposes alternative methodologies that will bridge the needs and capabilities of research. Searches were conducted per PRISMA guidelines. Articles on weight cycling in the literature were initially identified using search strings in PubMed. Eligibility assessment of the remaining articles was performed independently by three reviewers to identify publications that presented direct evidence. Twenty human studies (in addition to seven animal studies) were selected and retained; 12 accounted for the intentionality of weight loss. Although weight regain following successful weight loss remains one of the most challenging aspects of body-weight regulation, evidence for an adverse effect of weight cycling appears sparse, if it exists at all.

Acknowledgements

TM has consulted with Gjording Fouser PLLC and was supported by a UAB Doctoral Training Grant in Obesity and Nutrition funded by Kraft Foods. Funding to DLS was through the UAB by grants received currently or in the past from NIH, Ellison Medical Foundation and The Obesity Society. Authors received editorial assistance from Geula Bernstein of AXON Communications in the development of this manuscript. Editorial assistance was sponsored by Novo Nordisk.

Conflict of Interest statement

The sponsors had no role in design and conduct of the study; the collection, management, analysis and interpretation of the data; or the preparation, review or approval of the manuscript.

Mehta, T., Smith, D. L., Muhammad, J., & Casazza, K. (2014). Impact of weight cycling on risk of morbidity and mortality. *Obesity Reviews*, *15*(11), 870-881.

EXPERTISE

Generally, people seek out their own kind. Not us. We prefer to mix it up. Call us crazy but it's how we create integrated solutions. A nimble agency filled with passionate people, we combine a personal touch with the professionalism and extended network of a big communications firm.

Together, we provide expertise in medical communications, public relations, clinical trial services and market access communications support services/consultancy for pharmaceutical, biotech, medical device, animal health and functional foods companies.

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You get to be the best by working with some of the best.

Some of our Clients

Alcon
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Merck Serono
Novartis
Novo Nordisk
Piramal
Quest Diagnostics
Roche
Shire
Sunovion
Takeda
Vifor

Over-the-counter Diet Pills

- **Phenylpropanolamine (PPA)** and **herbal ephedra** have been linked to **heart attack and strokes**.

- No epidemiological study to date has assessed relative **mortality risks** after taking the **known hazards of stimulant diet pills** into account (Campos et al., 2006).

Campos, P., Saguy, A., Ernsberger, P., Oliver, E. and Gaesser, G. (2006) The Epidemiology of Overweight and Obesity: Public Health Crisis or Moral Panic?, *International Journal of Epidemiology 35: 55–60.*

Phenylpropanolamine (PPA) Information Page

Update - On December 22, 2005 the FDA issued a notice of proposed rulemaking (notice) for over-the-counter (OTC) nasal decongestant and weight control products containing phenylpropanolamine preparations. This proposed rule reclassifies phenylpropanolamine as nonmonograph (Category II) not generally recognized as safe and effective. Written and electronic comments and new data can be submitted by March, 22, 2006

- Phenylpropanolamine-containing products (OTC); te monographs (PDF - 92KB)

The Food and Drug Administration (FDA) is taking steps to remove phenylpropanolamine (PPA) from all drug products and has requested that all drug companies discontinue marketing products containing PPA. In addition, FDA has issued a public health advisory concerning phenylpropanolamine. This drug is an ingredient that was used in many over-the-counter (OTC) and prescription cough and cold medications as a decongestant and in OTC weight loss products.

In response to the request made by FDA in November 2000, many companies have voluntarily reformulated and are continuing to reformulate their products to exclude PPA while FDA proceeds with the regulatory process necessary to remove PPA from the market.

We have received numerous requests for a list of products containing PPA. Since companies continue to reformulate their products, FDA is not maintaining a comprehensive, updated list of products that still contain PPA. FDA is aware of emails circulating widely that list many products allegedly containing PPA. These emails, however, generally contain dated and inaccurate information and should be ignored.

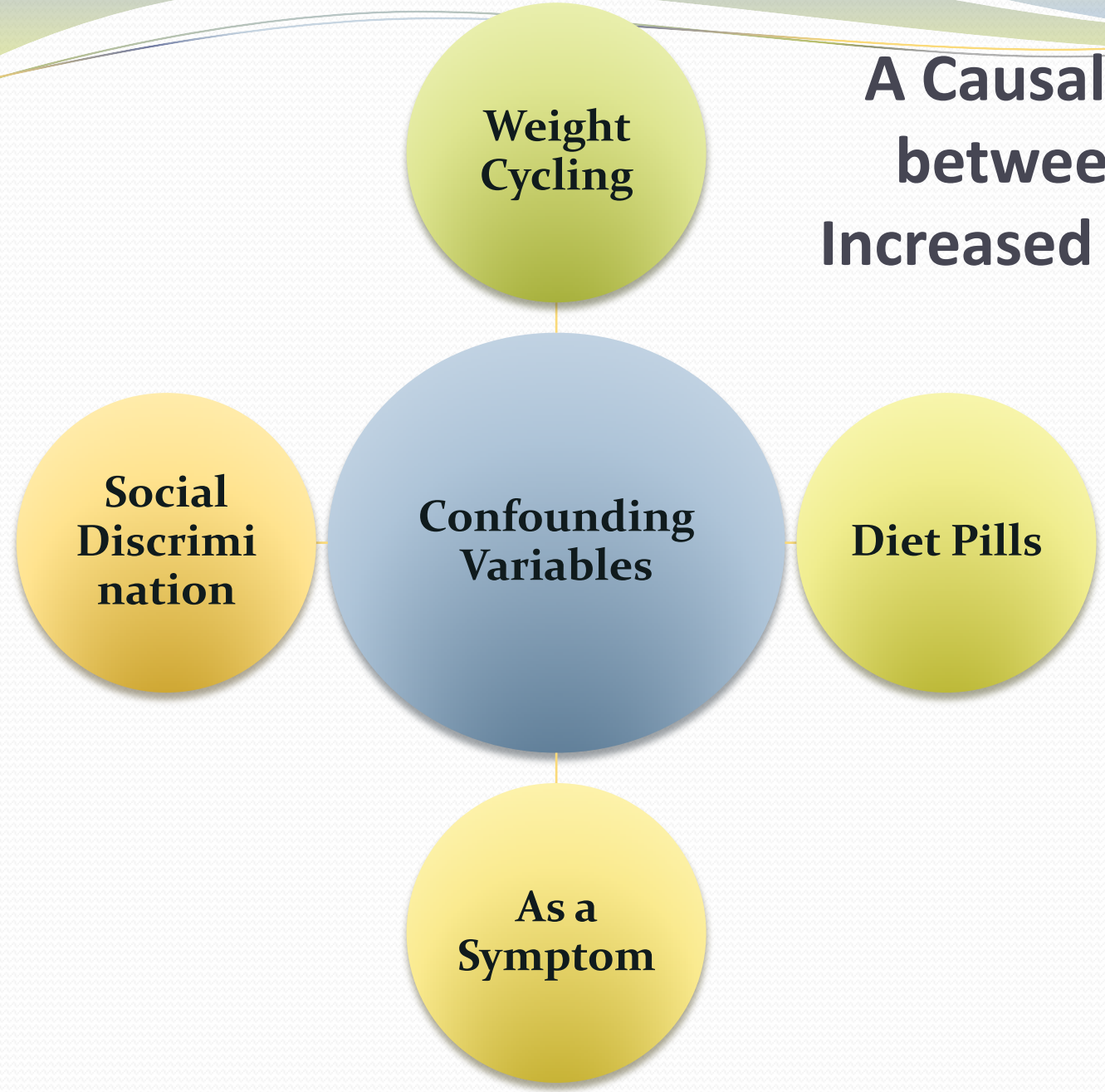
The FDA recommends that consumers read the labels of OTC drug products to determine if the product contains PPA. The Agency believes this to be the most accurate method for determining the PPA content of OTC products rather than providing an incomplete or out-of-date list of products that may have already been reformulated and no longer contain PPA. (Introduction updated 03/07/2003)

Scientists at Yale University School of Medicine recently issued a report entitled "Phenylpropanolamine & Risk of Hemorrhagic Stroke: Final Report of the Hemorrhagic Stroke Project." This study reports that taking PPA increases the risk of hemorrhagic stroke (bleeding into the brain or into tissue surrounding the brain) in women. Men may also be at risk. Although the risk of hemorrhagic stroke is very low, FDA recommends that consumers not use any products that contain PPA.

FDA's Nonprescription Drugs Advisory Committee recently discussed this Yale study along with additional information on phenylpropanolamine. The Advisory Committee determined that there is an association between PPA and hemorrhagic stroke. It recommended that PPA be considered not safe for over-the-counter use.

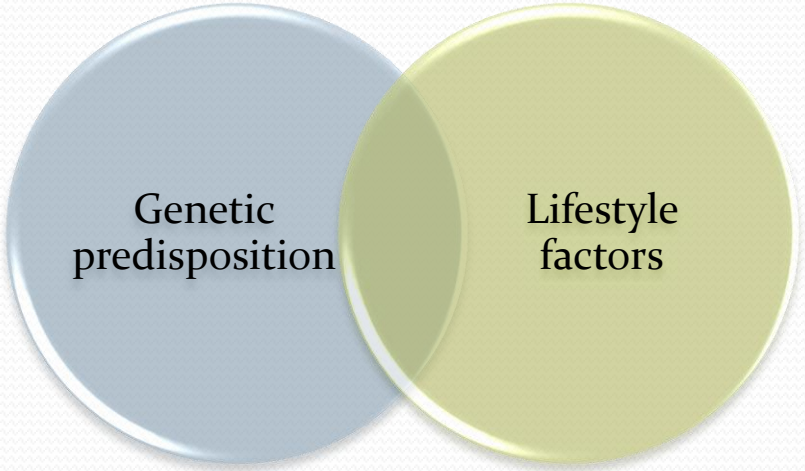
http://www.fda.gov/Drugs/DrugSafety/InformationbyDrugClass/ucm150738.htm

A Causal Relationship between Obesity & Increased Health Risks??



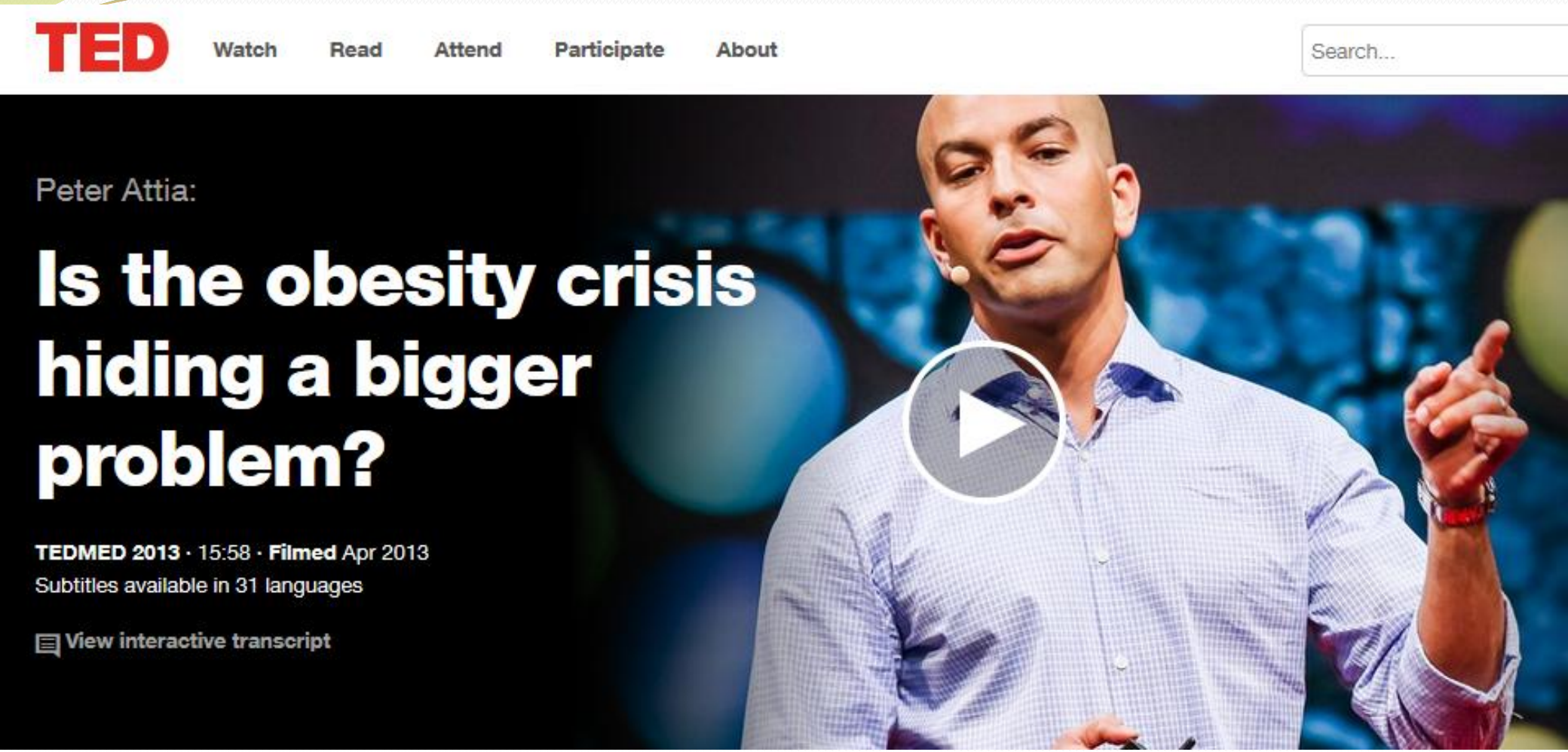
Obesity: A Symptom or a Cause of Diabetes Type II?

- Obesity may be **an early symptom** of diabetes rather than an underlying cause.[1]
- Is weight loss required to prevent diabetes Type II?

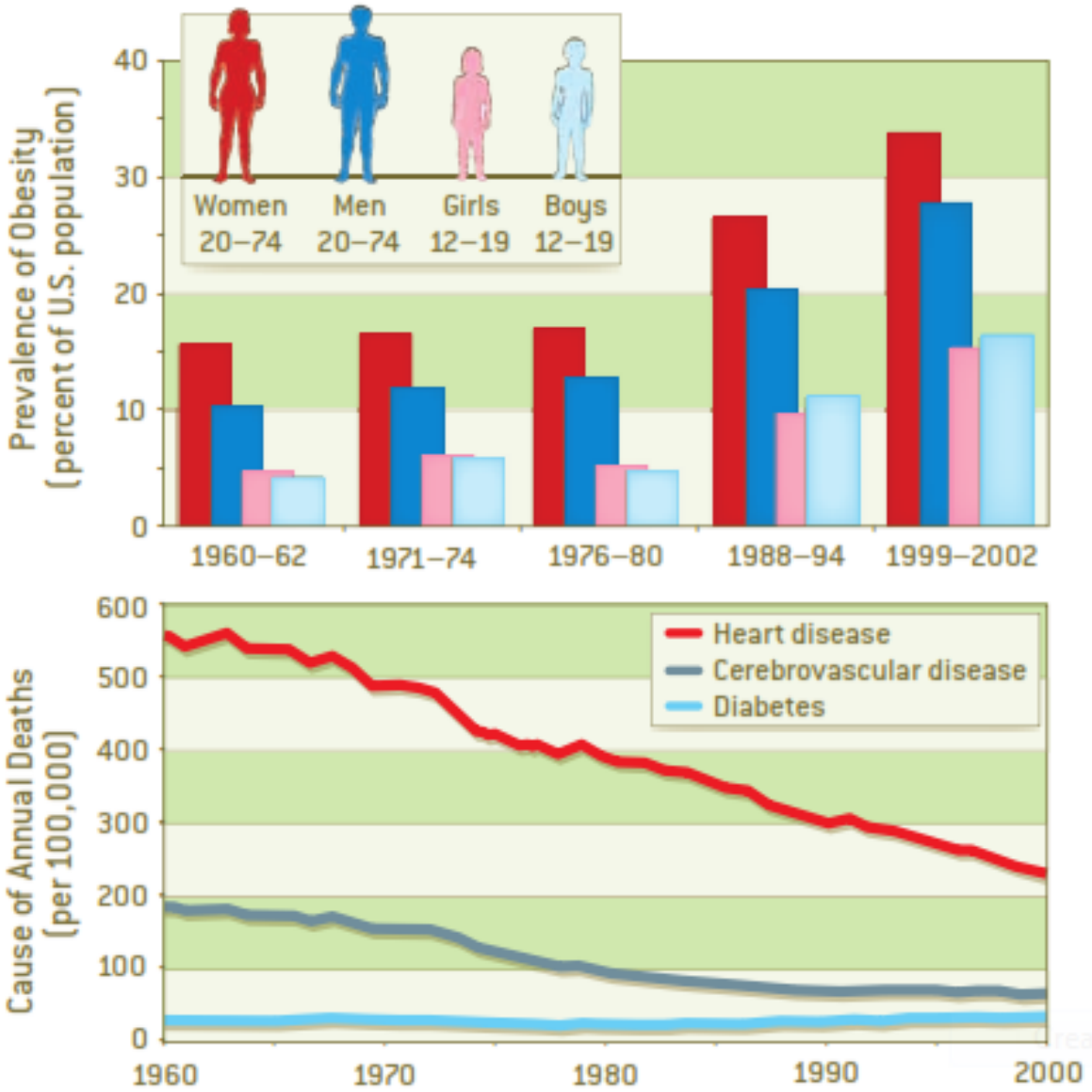


If sedentary people become moderately physically active and eat a lower-fat, lower-sugar diet, they greatly decrease their odds of developing diabetes, even though these interventions typically produce little or no weight-loss.

1. Neel, J.V., Weder, A.B. and Julius, S. (1998) Type II Diabetes, Essential Hypertension, and Obesity as 'Syndromes of Impaired Genetic Homeostasis': The 'Thrifty Genotype' Hypothesis Enters the 21st Century, *Perspectives on Biological Medicine 42 (1): 44–74.*



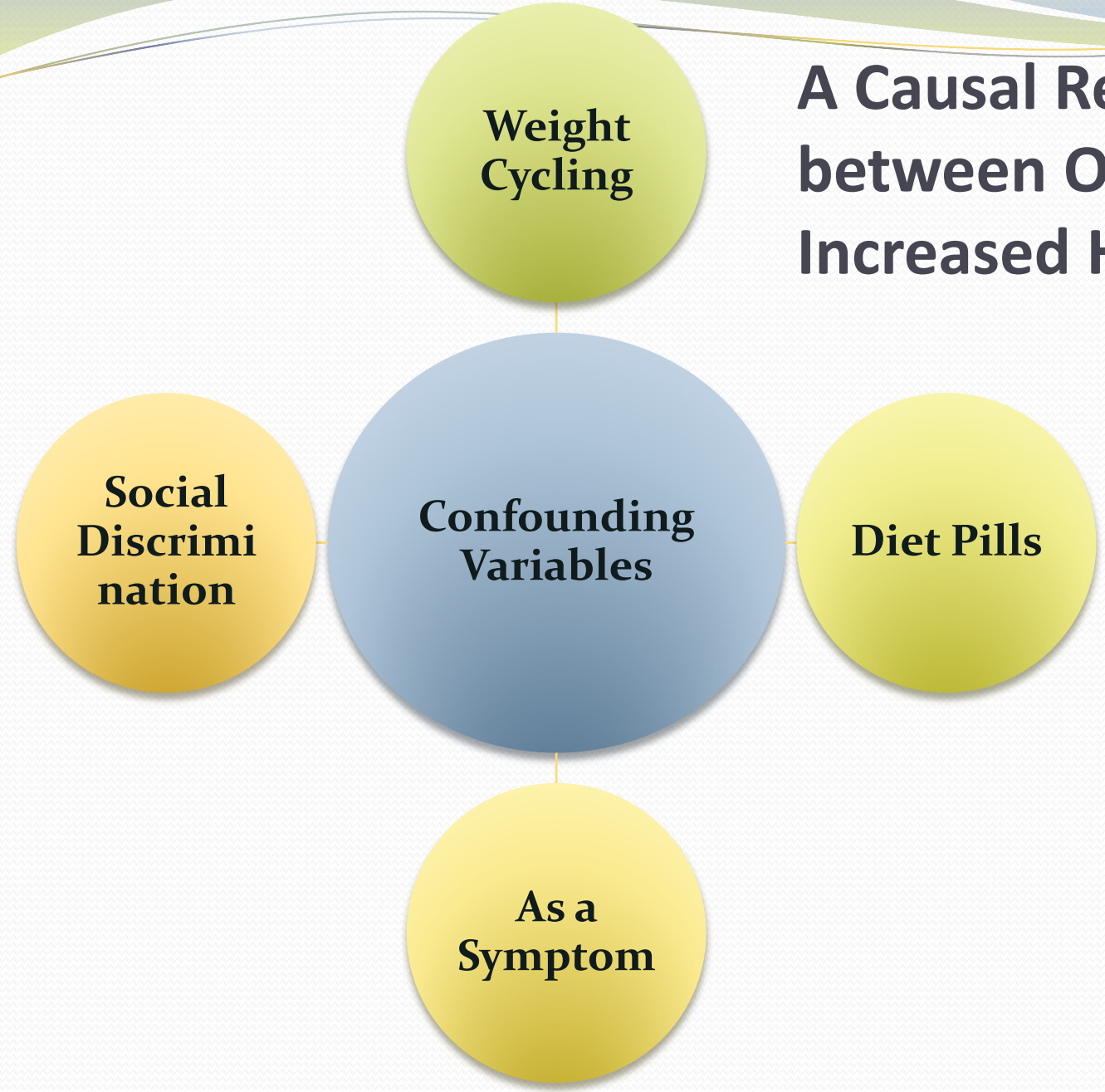
http://www.ted.com/talks/peter_attia_what_if_we_re_wrong_about_diabetes



PREVALENCE OF OBESITY has roughly doubled in the U.S. since 1980 among adults and has tripled among children (*top*). Although deaths caused by diabetes have risen somewhat, predicted increases in mortality from heart disease and stroke have not materialized (*bottom*).

Gibbs, W. W. (2005). Obesity: an overblown epidemic?. *Scientific American*, *292*(6), 70-77.

A Causal Relationship between Obesity & Increased Health Risks??



Social Discrimination

- In the U.S. obese people are far more likely to be **poor** and members of **ethnic minority groups** than thin people.[1]

- Epidemiological studies that both attempt to measure the effects of **weight** on health and control for **SES** are rare.[2]

1. Mokdad, A.H., Ford, E.S., Bowman, B.A., Dietz, W.H., Vinicor, F., Bales, V.S. and Marks, J.S. (2003) Prevalence of Obesity, Diabetes, and Obesity-Related Health Risk Factors, *JAMA 289 (1): 76–79.*
2. Campos, P., Saguy, A., Ernsberger, P., Oliver, E. and Gaesser, G. (2006) The Epidemiology of Overweight and Obesity: Public Health Crisis or Moral Panic?, *International Journal of Epidemiology 35: 55–60.*

Weight Bias

- Weight bias was identified **in virtually all health professionals** including those who specialize in obesity treatment .[1]

- Evidence of a strong anti-fat bias was found for **both fitness professionals and regular exercisers.**[2]

1. Schwartz, M. B., Chambliss, H. O. N., Brownell, K. D., Blair, S. N., & Billington, C. (2003). Weight bias among health professionals specializing in obesity. *Obesity research*, *11*(9), 1033-1039.
2. Robertson, N., & Vohora, R. (2008). Fitness vs. fatness: Implicit bias towards obesity among fitness professionals and regular exercisers. *Psychology of Sport and Exercise*, *9*(4), 547-557.

Weight Bias among Health Professionals Specializing in Obesity

Purpose: To determine the level of anti-fat bias in health professionals specializing in obesity and identify personal characteristics that correlate with both implicit and explicit bias.

Research Methods and Procedures: The Implicit Associations Test (IAT) and a self-report questionnaire assessing explicit attitudes, personal experiences with obesity, and demographic characteristics was administered to clinicians and researchers attending the opening session of an international obesity conference (*N* = 389). The IAT was used to assess overall implicit weight bias (associating "obese people" and "thin people" with "good" vs. "bad") and three ranges of stereotypes: lazy-motivated, smart-stupid, and valuable-worthless. The questionnaire assessed explicit bias on the same dimensions, along with personal and professional experiences with obesity.

Results: Health professionals exhibited a significant pro-thin, anti-fat implicit bias on the IAT. In addition, the subjects significantly endorsed the implicit stereotypes of lazy, stupid, and worthless using the IAT. Level of bias was associated with several personal characteristics. Characteristics significantly predictive of *lower* levels of implicit anti-fat bias include being male, older, having a positive emotional outlook on life, weighing more, having friends who are obese, and indicating an understanding of the experience of obesity.

Discussion: Even professionals whose careers emphasize research or the clinical management of obesity show very strong weight bias, indicating pervasive and powerful stigma. Understanding the extent of anti-fat bias and the personal characteristics associated with it will aid in developing intervention strategies to ameliorate these damaging attitudes.

Schwartz, M. B., Chambliss, H. O. N., Brownell, K. D., Blair, S. N., & Billington, C. (2003). Weight bias among health professionals specializing in obesity. *Obesity research*, *11*(9), 1033-1039.

Statement 3: Obese individuals are usually less healthy due to their accumulated fat.

Weight Cycling

Social Discrimination

Confounding Variables

Diet Pills

As a Symptom

Dieting, diet drugs, poverty and social discrimination all have profound effects on health risk, and all disproportionately affect the heavier than average.

Do you see the following statements as equivalent to each other?

"dietary factors and activity patterns that are too sedentary are associated with 300K deaths per year" [1]

"three hundred thousand deaths caused by obesity."

1. McGinnis, J.M., & Foege, W.H. (1998). The Obesity Problem, New England Journal of Medicine, 338(16), 1157–1158.

Misrepresentation of Data

"dietary factors and activity patterns that are too sedentary are associated with 300K deaths per year" [1]

Appeared in both media and research articles as

"three hundred thousand deaths caused by obesity."

Was misused by

The FDA hearings to approve Redux

"dangerous epidemic of obesity, second only to tobacco as the leading cause of preventable death" (The Shape Up America! campaign)

1. McGinnis, J.M., & Foege, W.H. (1998). The Obesity Problem, New England Journal of Medicine, 338(16), 1157–1158.

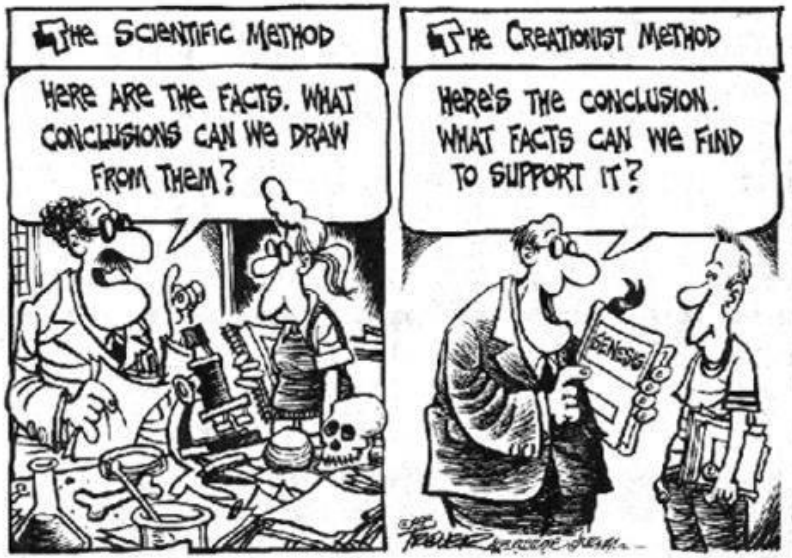
Constructing Obesity as a Massive Health Problem?

In 1999 Allison and colleagues published another data analysis **trying to maintain the accuracy** of the 300K figure.[1]

In 2005, Allison reported having received **funding from 148 drug and diet industry sponsors**.[2]

Flegal and colleagues soundly challenged the contested figure[3]:

1. They estimated the associated deaths to be **far lower**—112K for those with BMI>35.
2. Slightly "overweight" people had **lower mortality rates** than people at recommended weights.

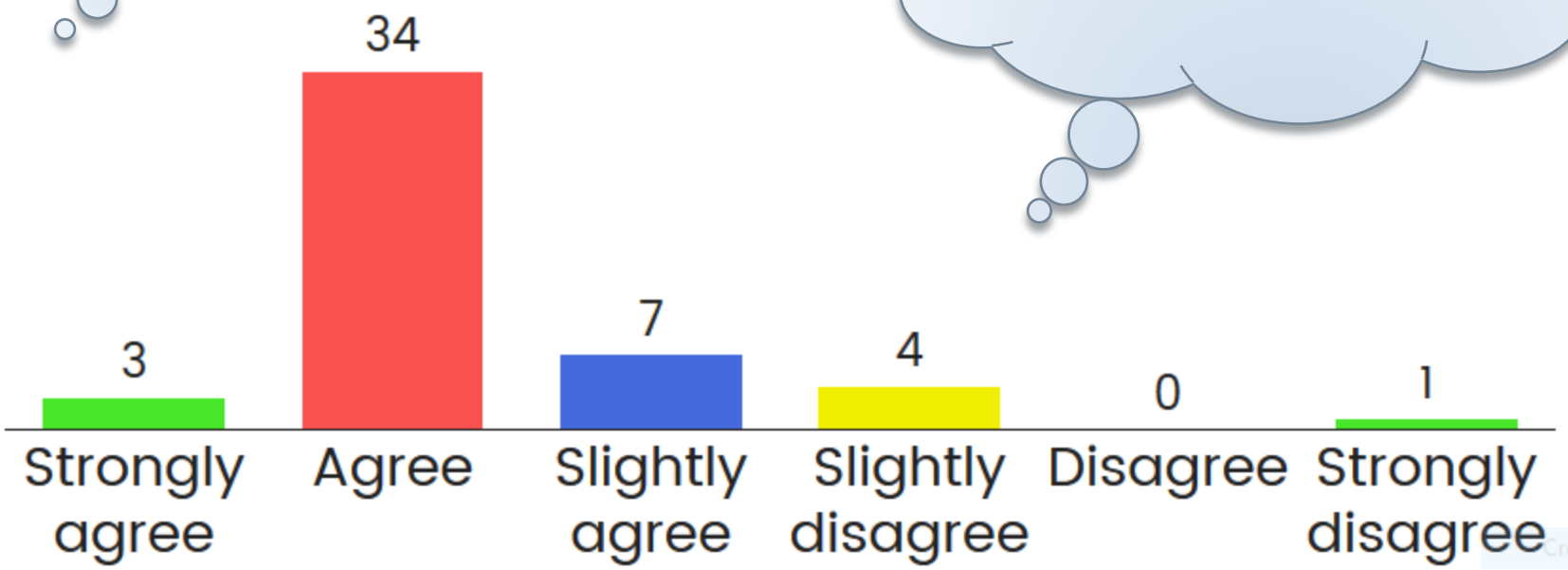


1. Allison DB, Fontaine KR, Manson JE, VanItallie TB (1999). Annual deaths attributable to obesity in the United States. Journal of the American Medical Association 282: 1530–1537.
2. Gibbs, W. (2005). Obesity: An Overblown Epidemic? *Scientific American, 292 (6), 70–77.*
3. Flegal KM, Graubard BI, Williamson DF, Gail MH (2005). Excess deaths associated with underweight, overweight, and obesity. Journal of the American Medical Association 293:1861–1867.

Statement 3: Obese individuals are usually less healthy due to their accumulated fat.

Confounding variables

Misrepresentation of data



Statement 4

Significant long-term weight loss is a practical goal, and will improve health.

Class Poll

What is the success rate for maintaining weight loss ?

A. 90%
B. 75%
C. 50%
D. 35%
E. 20%

Go to **www.govote.at** and use the code **25 28 87**

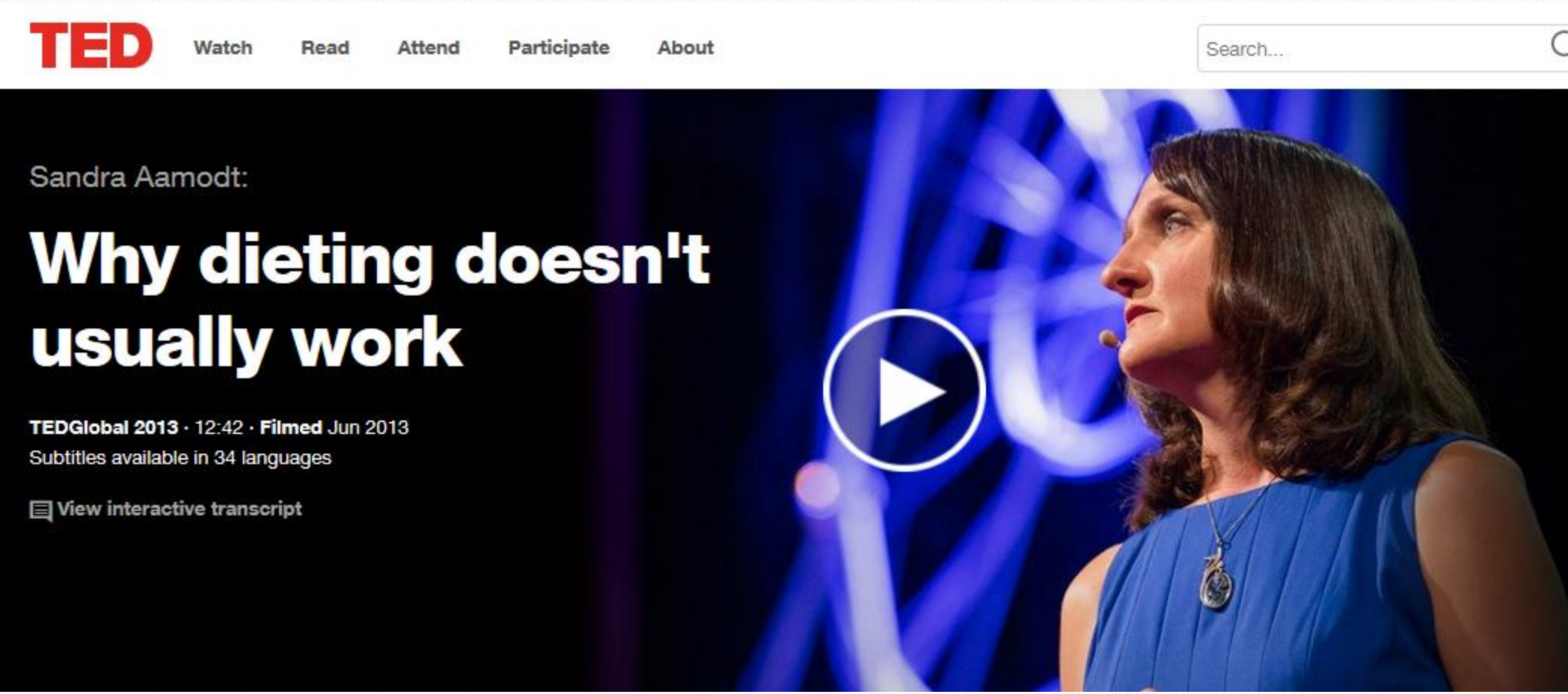
1. Wing, R.R., & Hill, J.O. (2001). Successful weight loss maintenance. Annual Review of Nutrition, 21, 323–341.
2. Hill, J.O., Wyatt, H., Phelan, S., & Wing, R. (2005). The National Weight Control Registry: is it useful in helping deal with our obesity epidemic? Journal of Nutrition Education and Behavior, 37, 206–210.
3. McGuire, M.T., Wing, R.R., & Hill, J.O. (1999). The prevalence of weight loss maintenance among American adults. International Journal of Obesity, 23, 1314–1319.
4. National Institutes of Health Technology Assessment Conference Panel. (1992). Methods for Voluntary Weight Loss and Control. Annals of Internal Medicine, 116, 942–949.

What is your definition of “long-term weight loss”?

Successful Weight Loss Maintenance

■ **Abstract** Obesity is now recognized as a serious chronic disease, but there is pessimism about how successful treatment can be. A general perception is that almost no one succeeds in long-term maintenance of weight loss. To define long-term weight loss success, we need an accepted definition. We propose defining successful long-term weight loss maintenance as intentionally losing at least 10% of initial body weight and keeping it off for at least 1 year. According to this definition, the picture is much more optimistic, with perhaps greater than 20% of overweight/obese persons able to achieve success. We found that in the National Weight Control Registry, successful long-term

Wing, R. R., & Hill, J. O. (2001). Successful weight loss maintenance. *Annual review of nutrition*, *21*(1), 323-341.

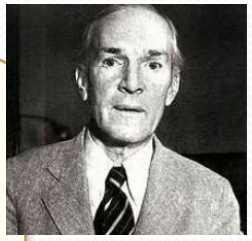


http://www.ted.com/talks/sandra_aamodt_why_dieting_doesn_t_usually_work

Sustainability of Weight Loss

- "Of those who enter obesity treatment, **most will drop out**. Of those who stay in treatment, **most will not lose weight**. Of those who do lose weight, **most will regain it**".[1]
- **90–95% of participants** in all weight loss programs failed to attain and sustain weight loss beyond two to five years.[2]
- "a focus on approaches that can produce **health benefits independently of weight loss** may be the best way to improve the physical and psychological health…" [2]

National Institutes of Health



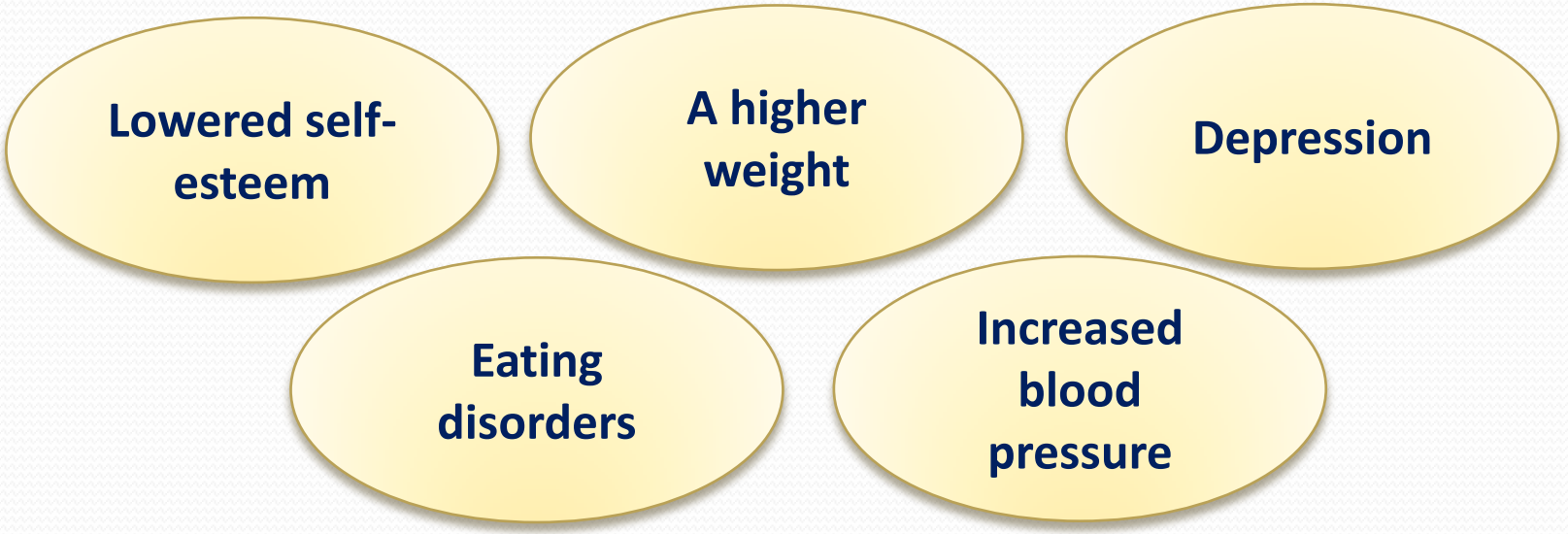
"It is difficult to get a man to understand something when his salary depends upon his not understanding it."

Upton Sinclair

1. Stunkard, A, & McLauren-Hume, M. (1959). The results of treatment for obesity: a review of the literature and report of a series. Archives of Internal Medicine, 103, 79–85.
2. National Institutes of Health Technology Assessment Conference Panel. (1992). Methods for Voluntary Weight Loss and Control. Annals of Internal Medicine, 116, 942–949.

Drawbacks of Weight Loss

"We continue to believe that when doctors emphasize body weight and fail to consider the efficacy and risks of available treatments, **the cure can be worse than the disease**".[1]

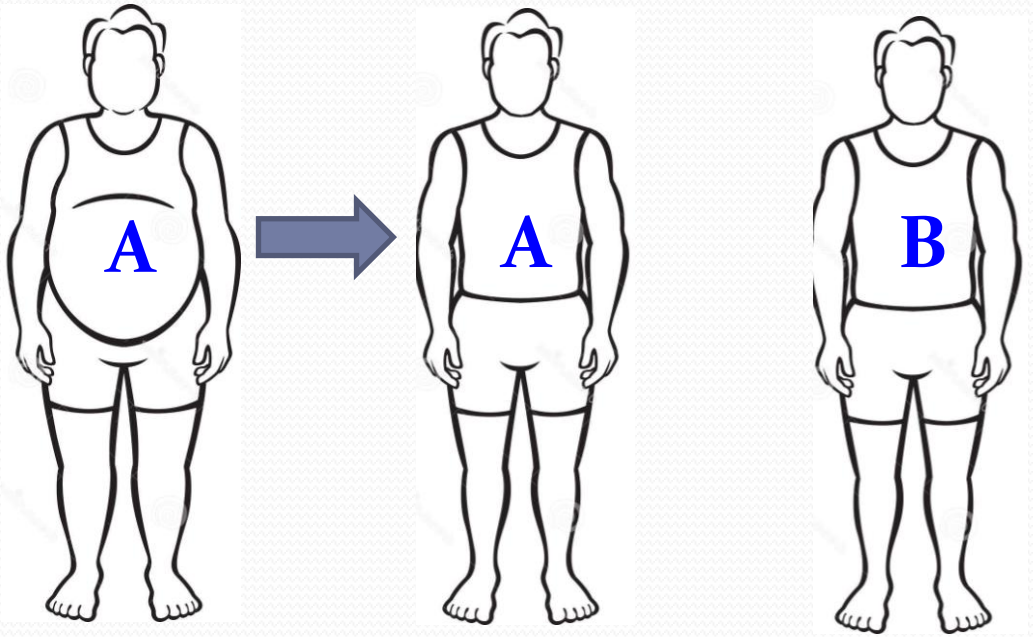


"trying to lose weight is a battle against biology, a battle that only the intrepid take on and one in which only a few prevail".[2]

1. Letters to the Editor. (April 16, 1998). New England Journal of Medicine, 338 (16), 1156–1158.
2. Friedman, J.M. (February 7, 2003). A War on Obesity, Not the Obese. *Science, 299, 856–858.*

“Reduced” fat people vs. always-been-thinner people

“We simply do not know whether a person who loses 20 lbs will thereby acquire the same reduced risk as a person who started out 20 lb lighter. The few studies of mortality among people who voluntarily lost weight produced **inconsistent results**; some even suggested that weight loss **increased mortality**”



Do Subjects A and B have the same mortality risk?

Kassirer, J. P., & Angell, M. (1998). Losing weight – an ill-fated New Year's resolution. *The New England Journal of Medicine*, *338*(1), 52.

When confronted with evidence of weight as a very poor predictor of morality risk…

Some obesity researchers may argue that:

- Being overweight puts one **closer to being obese**, which does increase mortality risk.

- "even if positive energy imbalance rather than excess adiposity is the cause of some morbidity, **the solution will be the same**: increased activity and reduced energy in the diet" [1]

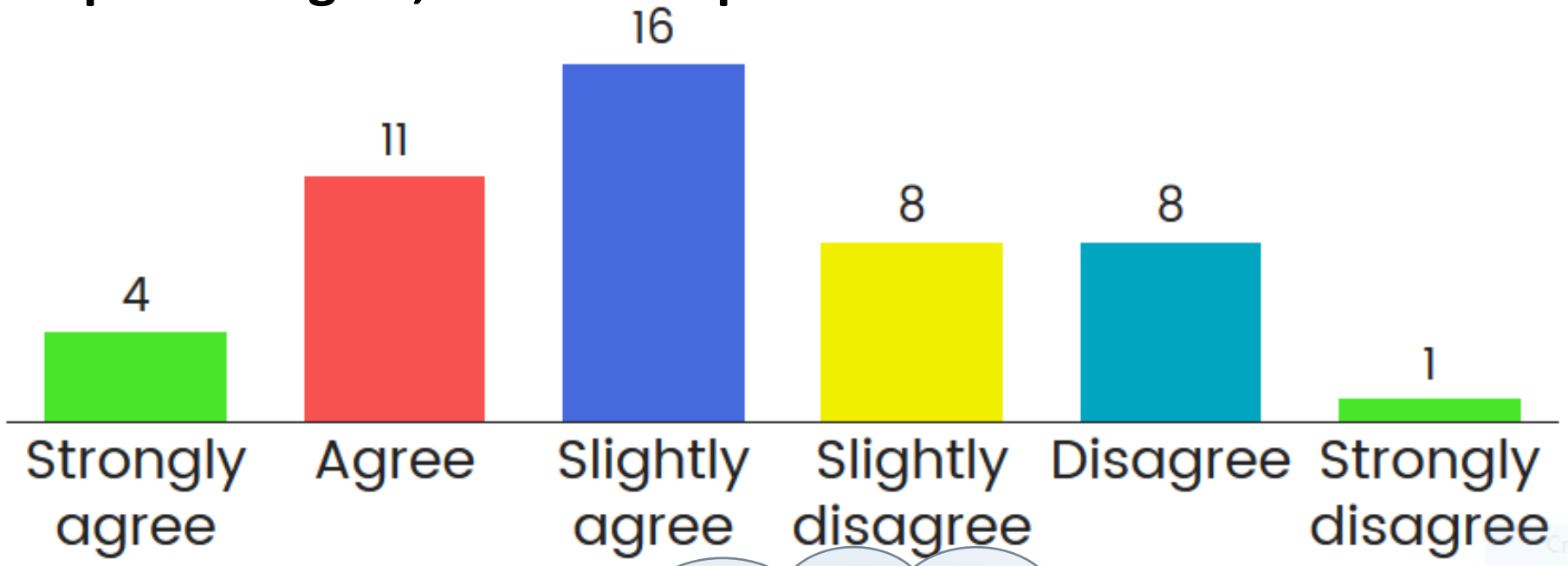
BUT…

Being normal weight puts one closer to being underweight.

Becoming more active and adopting a healthy diet do not result in significant weight-loss for most people.

1. Stevens, J., McClain, J.E. and Truesdale, K.P. (2006) Commentary: Obesity Claims and Controversies, *International Journal of Epidemiology 35 (1): 77–78.*

Statement 4: Significant long-term weight loss is a practical goal, and will improve health.



Sustainable weight loss?

"Reduced" fat people vs. always-been-thinner people

Drawbacks of weight loss

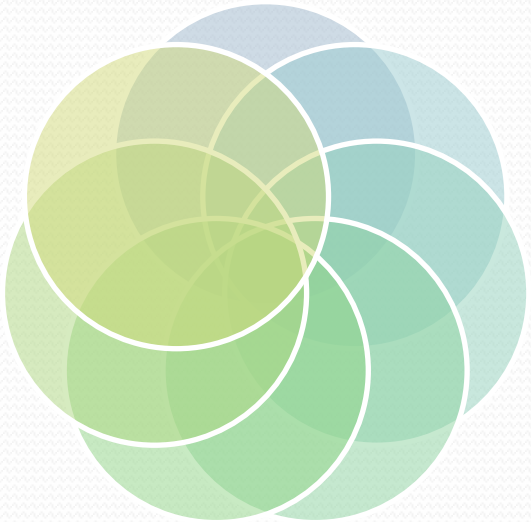
The "Obesity Experts"

Former federal employees are in drug company leadership positions, and former drug company consultants are now in powerful federal positions.

Weight loss clinics

Board members of drug companies

Medical institutions



Paid consultants

NIH panels

Medical journals

NIH grants

Exaggerating the health consequences of higher weight while downplaying treatment failure has been a common approach.

Fraser, L. (1997). Losing It: America's Obsession with Weight and the Industry That Feeds on It. New York: Dutton.
Moore, T.J. (1993) Lifespan: Who Lives Longer and Why? New York: Simon and Schuster.
Mundy, A. (2001). Dispensing with the Truth: The Victims, the Drug Companies, and the Dramatic Story Behind the Battle over Fen-Phen. New York: St. Martin's Press.
Oliver, E. (2006). Fat Politics. New York: Oxford University Press.

The "Obesity Experts"

James Hill, PhD was being **paid as a consultant** to companies developing weight loss drugs while he was a **member of the NIH Task Force on Obesity Prevention and Treatment**.

Xavier Pi-Sunyer, MD was **chairing the NIH Task Force on Obesity Prevention and Treatment**, and was also identified as one of several researchers **offered payment by Wyeth-Ayerst** to put their name on research papers favorable to Phen-Fen that had been written by the drug company.

Richard Atkinson, MD was a major **spokesperson for Wyeth-Ayerst and numerous other drug companies**; is also the **current editor of the *International Journal of Obesity Research***.

Extracted from Lecture 7

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)

Self-reflection

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.

Based on what you have learned in this chapter, has your viewpoint changed, why?
Put down your thoughts at the Moodle Wiki.
Sentences in bullet forms will be accepted.