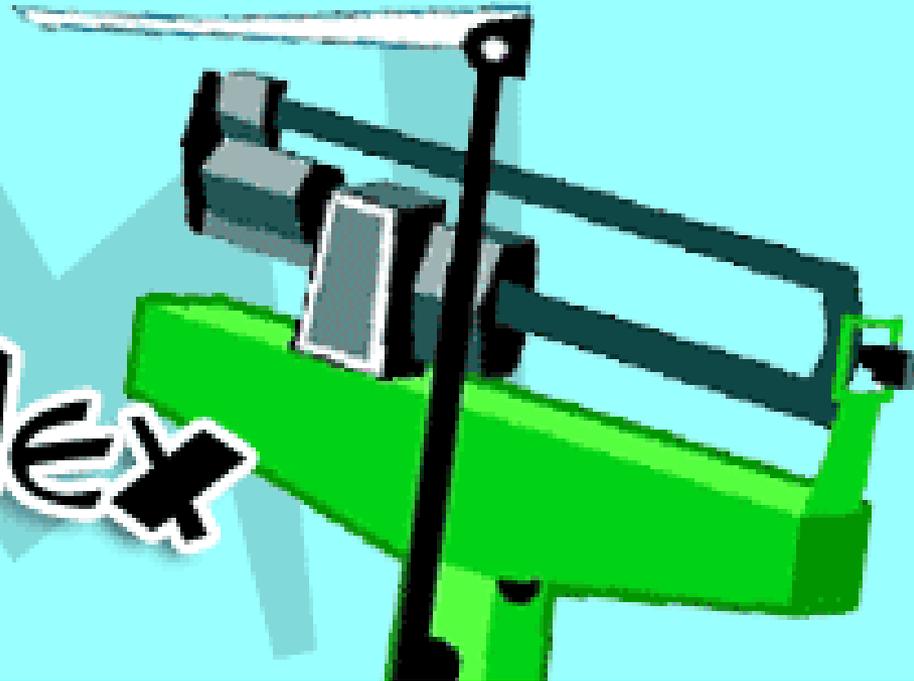


# Body Mass Index



# What is BMI?



**Developed by Belgian mathematician and sociologist Adolphe Quetelet in his 1835 text on social physics.**

**He graphed human traits based on how variable they were in populations relative to the average.**

# How Do I Calculate BMI?

$$\text{Body Mass Index} = \frac{\text{Weight (in kg)}}{\text{Height}^2 \text{ (in m)}}$$

# You can use a table like this to find out what category your BMI puts you in:

Body Weight (in pounds)

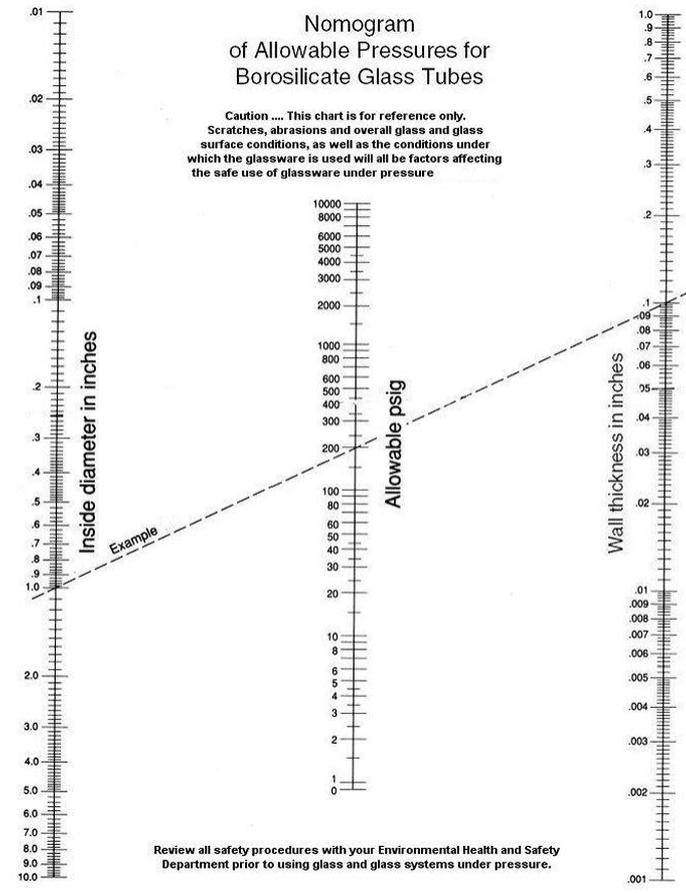
		Body Weight (in pounds)																		
		70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
54	16.9	19.3	21.7	24.1	26.5	28.9	31.3	33.8	36.2	38.6	41.0	43.4	45.8	48.2	50.6	53.0	55.4	57.9	60.3	
55	16.3	18.6	20.9	23.2	25.6	27.9	30.2	32.5	34.9	37.2	39.5	41.8	44.2	46.5	48.8	51.1	53.5	55.8	58.1	
56	15.7	17.9	20.2	22.4	24.7	26.9	29.1	31.4	33.6	35.9	38.1	40.4	42.6	44.8	47.1	49.3	51.6	53.8	56.0	
57	15.1	17.3	19.5	21.6	23.8	26.0	28.1	30.3	32.5	34.6	36.8	38.9	41.1	43.3	45.4	47.6	49.8	51.9	54.1	
58	14.6	16.7	18.8	20.9	23.0	25.1	27.2	29.3	31.3	33.4	35.5	37.6	39.7	41.8	43.9	46.0	48.1	50.2	52.2	
59	14.1	16.2	18.2	20.2	22.2	24.2	26.3	28.3	30.3	32.3	34.3	36.4	38.4	40.4	42.4	44.4	46.4	48.5	50.5	
60	13.7	15.6	17.6	19.5	21.5	23.4	25.4	27.3	29.3	31.2	33.2	35.2	37.1	39.1	41.0	43.0	44.9	46.9	48.8	
61	13.2	15.1	17.0	18.9	20.8	22.7	24.6	26.4	28.3	30.2	32.1	34.0	35.9	37.8	39.7	41.6	43.5	45.3	47.2	
62	12.8	14.6	16.5	18.3	20.1	21.9	23.8	25.6	27.4	29.3	31.1	32.9	34.7	36.6	38.4	40.2	42.1	43.9	45.7	
63	12.4	14.2	15.9	17.7	19.5	21.3	23.0	24.8	26.6	28.3	30.1	31.9	33.7	35.4	37.2	39.0	40.7	42.5	44.3	
64	12.0	13.7	15.4	17.2	18.9	20.6	22.3	24.0	25.7	27.5	29.2	30.9	32.6	34.3	36.0	37.8	39.5	41.2	42.9	
65	11.6	13.3	15.0	16.6	18.3	20.0	21.6	23.3	25.0	26.6	28.3	30.0	31.6	33.3	34.9	36.6	38.3	39.9	41.6	
66	11.3	12.9	14.5	16.1	17.8	19.4	21.0	22.6	24.2	25.8	27.4	29.0	30.7	32.3	33.9	35.5	37.1	38.7	40.3	
67	11.0	12.5	14.1	15.7	17.2	18.8	20.4	21.9	23.5	25.1	26.6	28.2	29.8	31.3	32.9	34.5	36.0	37.6	39.2	
68	10.6	12.2	13.7	15.2	16.7	18.2	19.8	21.3	22.8	24.3	25.8	27.4	28.9	30.4	31.9	33.4	35.0	36.5	38.0	
69	10.3	11.8	13.3	14.8	16.2	17.7	19.2	20.7	22.1	23.6	25.1	26.6	28.1	29.5	31.0	32.5	34.0	35.4	36.9	
70	10.0	11.5	12.9	14.3	15.8	17.2	18.7	20.1	21.5	23.0	24.4	25.8	27.3	28.7	30.1	31.6	33.0	34.4	35.9	
71	9.8	11.2	12.6	13.9	15.3	16.7	18.1	19.5	20.9	22.3	23.7	25.1	26.5	27.9	29.3	30.7	32.1	33.5	34.9	
72	9.5	10.8	12.2	13.6	14.9	16.3	17.6	19.0	20.3	21.7	23.1	24.4	25.8	27.1	28.5	29.8	31.2	32.5	33.9	
73	9.2	10.6	11.9	13.2	14.5	15.8	17.1	18.5	19.8	21.1	22.4	23.7	25.1	26.4	27.7	29.0	30.3	31.7	33.0	
74	9.0	10.3	11.6	12.8	14.1	15.4	16.7	18.0	19.3	20.5	21.8	23.1	24.4	25.7	27.0	28.2	29.5	30.8	32.1	
75	8.7	10.0	11.2	12.5	13.7	15.0	16.2	17.5	18.7	20.0	21.2	22.5	23.7	25.0	26.2	27.5	28.7	30.0	31.2	
76	8.5	9.7	11.0	12.2	13.4	14.6	15.8	17.0	18.3	19.5	20.7	21.9	23.1	24.3	25.6	26.8	28.0	29.2	30.4	
77	8.3	9.5	10.7	11.9	13.0	14.2	15.4	16.6	17.8	19.0	20.2	21.3	22.5	23.7	24.9	26.1	27.3	28.5	29.6	
78	8.1	9.2	10.4	11.6	12.7	13.9	15.0	16.2	17.3	18.5	19.6	20.8	22.0	23.1	24.3	25.4	26.6	27.7	28.9	
79	7.9	9.0	10.1	11.3	12.4	13.5	14.6	15.8	16.9	18.0	19.1	20.3	21.4	22.5	23.7	24.8	25.9	27.0	28.2	
80	7.7	8.8	9.9	11.0	12.1	13.2	14.3	15.4	16.5	17.6	18.7	19.8	20.9	22.0	23.1	24.2	25.3	26.4	27.5	
81	7.5	8.6	9.6	10.7	11.8	12.9	13.9	15.0	16.1	17.1	18.2	19.3	20.4	21.4	22.5	23.6	24.6	25.7	26.8	
82	7.3	8.4	9.4	10.5	11.5	12.5	13.6	14.6	15.7	16.7	17.8	18.8	19.9	20.9	22.0	23.0	24.0	25.1	26.1	
83	7.1	8.2	9.2	10.2	11.2	12.2	13.3	14.3	15.3	16.3	17.3	18.4	19.4	20.4	21.4	22.5	23.5	24.5	25.5	
84	7.0	8.0	9.0	10.0	11.0	12.0	13.0	13.9	14.9	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	

Height (in inches)

Extremely Slim
  Healthy
  Overweight
  Obese

You can also find out your BMI with a graph called a nomogram.

Nomograms are two-dimensional diagrams designed to allow the approximate graphical calculation of a function.

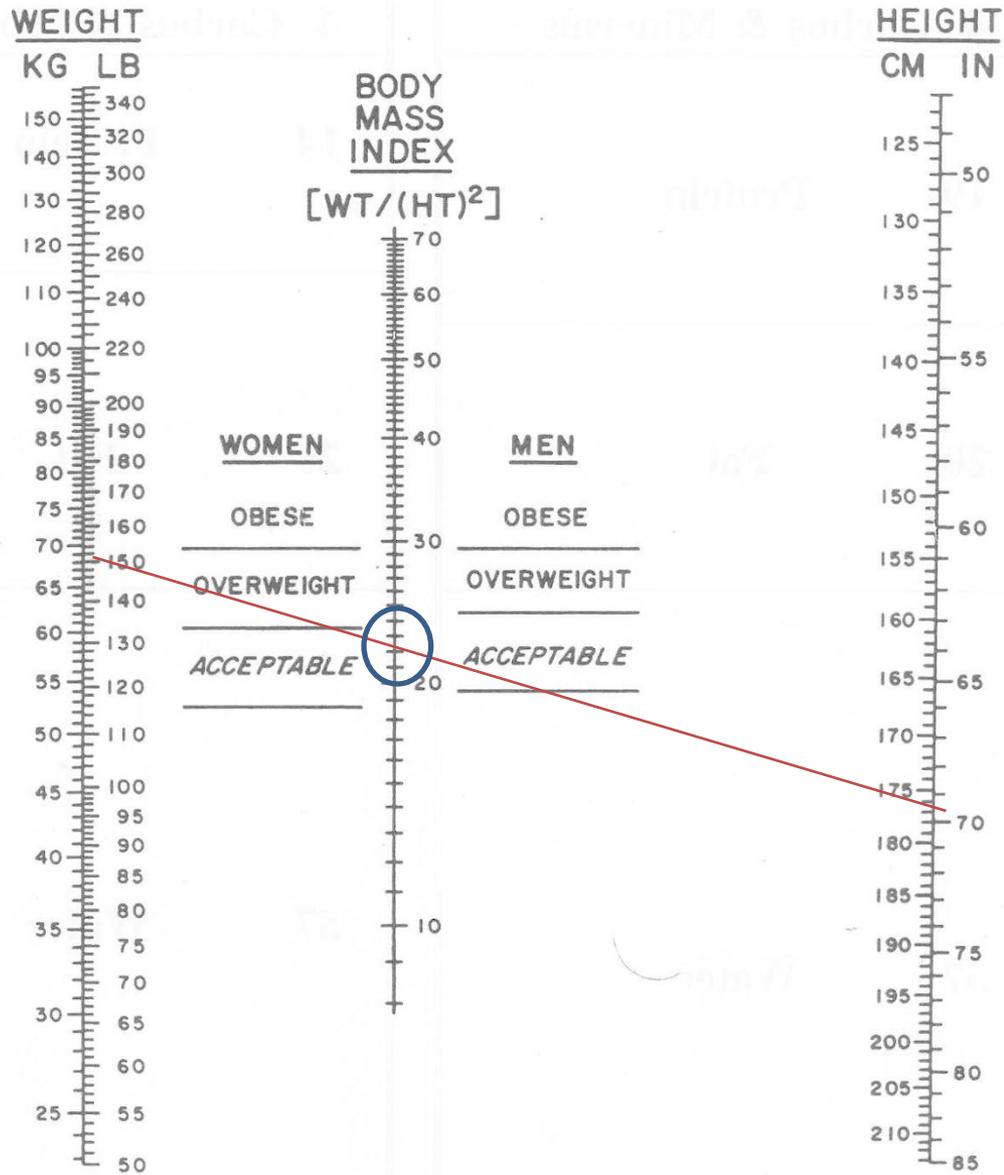


**Turn to the next page in your notes  
to see a BMI Nomogram.**

**To use:**

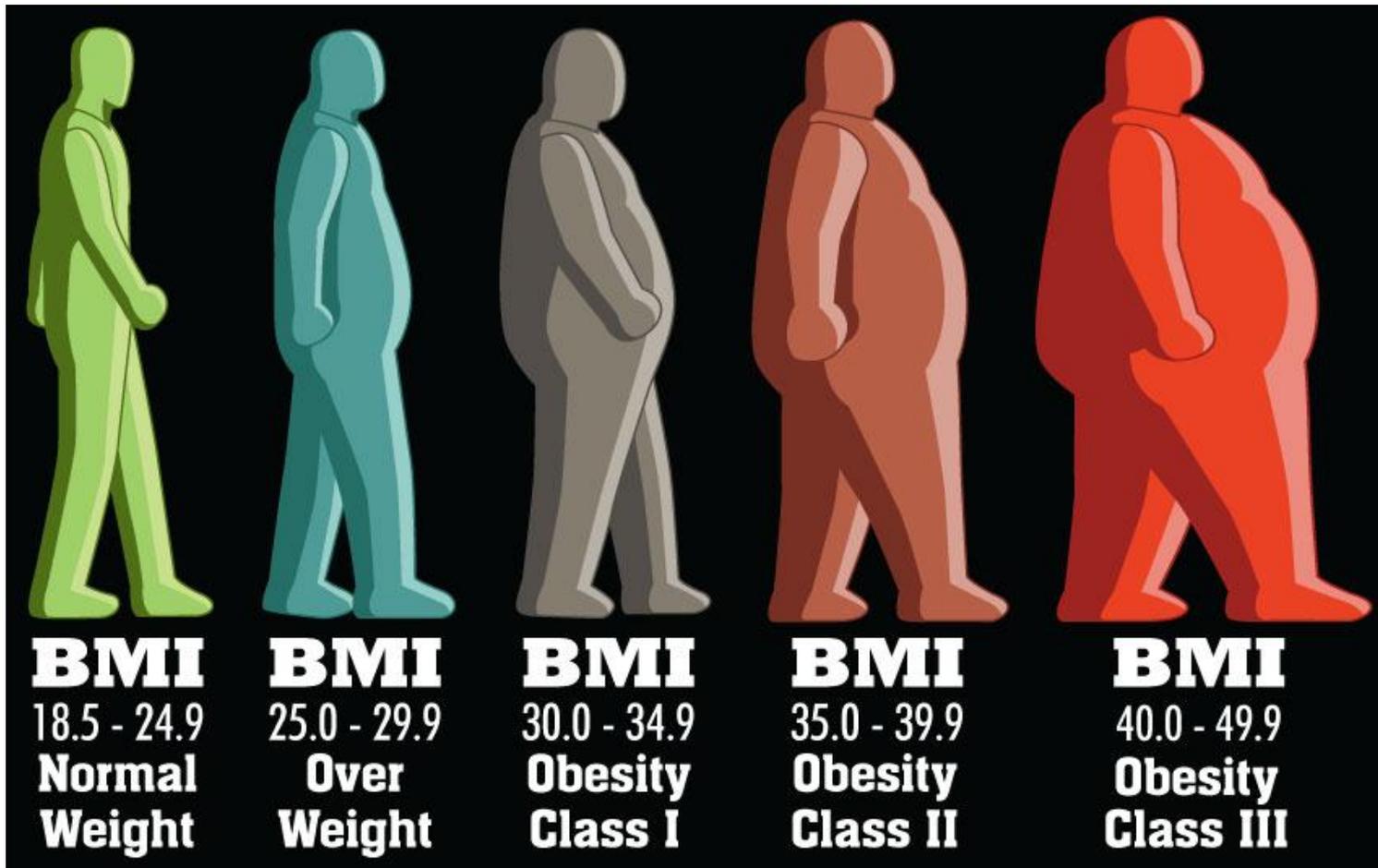
- 1. Find your weight on the left hand side of the graph and mark.**
- 2. Find your height on the right hand side of the graph and mark.**
- 3. With a straightedge, draw a line connecting the two marks.**
- 4. This line will intersect with the middle BMI line, giving you your BMI!**

# NOMOGRAM FOR BODY MASS INDEX

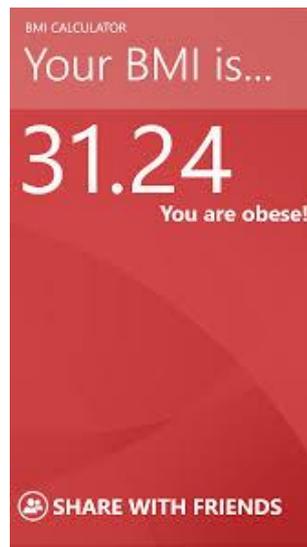


This person would have a BMI of about 22.

**A High BMI can be an indicator of high body fatness and health problems.**



**What BMI is considered too high for you based on your gender, age, height and weight? Record this in your notes.**



# Diseases associated with a HIGH BMI include:

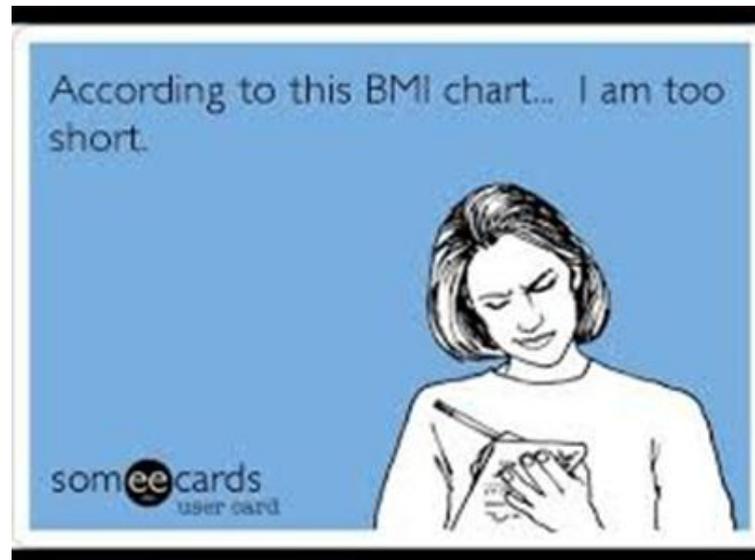


- **Type 2 Diabetes**
  - **Gallstones**
  - **Hypertension**
    - **Arthritis**
    - **Stroke**
- **Heart Disease**

**A LOW BMI can be an  
indicator of  
malnourishment**



**What BMI is considered too low for you based on your gender, age, height and weight? Record this in your notes.**



# **Diseases associated with a LOW BMI include:**

- **Hyperthyroidism**
  - **Diabetes**
  - **Cancer**
- **Anorexia/Bulimia**
  - **Certain treatments such as chemotherapy**

# Problems with the BMI:

A lot of research has come out lately, warning how BMI is an inaccurate measure of health.

SEARCH

The New York Times

WELL Why We Get Running Injuries (and How to Prevent Them)

Brazilians Shrug Off Zika Fears to Revel in Carnival Fun

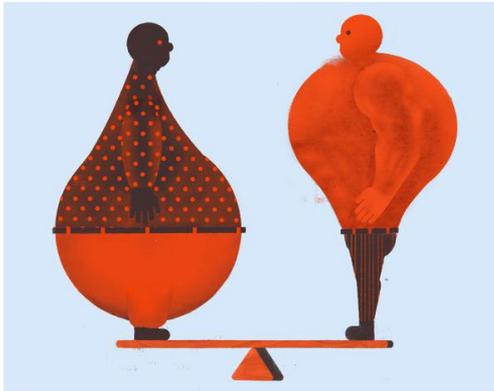
Experts Study From First O Pacific



## PERSONAL HEALTH

### A Number That May Not Add Up

By JANE E. BRODY APRIL 14, 2014 12:01 AM 88 Comments



Yarek Waszul

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In July 1998, the National Institutes of Health changed what it means to be overweight, defining it as a body mass index of 25 or greater for adults. The cutoff had been 28 for men and 27 for women, so suddenly about 29 million Americans who had been considered normal became overweight even though they hadn't gained an ounce.

The change, based on a review of hundreds of studies that matched

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### BMI Doesn't Really Tell You Anything About Your Health

Millions of obese Americans are metabolically healthy, while many "normal" weight Americans aren't.

02/10/2016 01:18 pm ET



Anna Almendrala  
Healthy Living Senior Editor, Huffington Post



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### Science News

from research organizations

Don't use body mass index to determine whether people are healthy  
BMI incorrectly categorizes millions of 'obese' people as unhealthy, according to research

Date: February 4, 2016

Source: University of California - Los Angeles

Summary: Relying on body mass index (BMI), a numerical measure of a person's height and weight, as a proxy for health incorrectly labels more than 54 million heavy Americans unhealthy when they are not, psychologists report. Many of these 'healthy obese' and 'healthy overweight' people may have to pay higher health insurance premiums.

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### FULL STORY

#### RELATED TOPICS

Health & Medicine

- > Obesity
- > Health Policy
- > Diet and Weight Loss

Science & Society

- > Public Health
- > Social Issues
- > World Development

#### RELATED TERMS

- > Body mass index
- > Healthy diet
- > General fitness training
- > Obesity
- > UV index
- > Overweight

Over the past few years, body mass index, a ratio of a person's height and weight, has effectively become a proxy for whether a person is considered healthy. Many U.S. companies use their employees' BMIs as a factor in determining workers' health care costs. And people with higher BMIs could soon have to pay higher health insurance premiums, if a rule proposed in April by the Equal Employment Opportunity Commission is adopted.

But a new study led by UCLA psychologists has found that using BMI to gauge health incorrectly labels more than 54 million Americans as "unhealthy," even though they are not. The researchers' findings are published online today in the *International Journal of Obesity*.

"Many people see obesity as a death sentence," said A. Janet Tomiyama, an assistant professor of psychology in the UCLA College and the study's lead author. "But the data show there are tens of millions of people who are overweight and obese and are perfectly healthy."

The scientists analyzed the link between BMI -- which is calculated by dividing a person's weight in kilograms by the square of the person's height in meters -- and several health markers, including blood pressure and glucose, cholesterol and triglyceride levels, using data from the most recent National Health and Nutrition Examination Survey.

# Problems with the BMI:

## Problem #1:

**Adolphe Quetelet used BMI to calculate obesity on a population level (remember he was a sociologist), never on an individual basis.**



“You only weigh 4 ounces, but your BMI says you are morbidly obese.”

# Problems with the BMI:

## Problem #2:

With BMI, one can't tell how much of a person's weight is body fat and how much is bone, muscle and water.



# Problems with the BMI:



## Problem #2:

**Professional athletes are a clear indicator of this problem.**

**Take LA Clippers player Blake Griffin for example.**

**At six-foot-ten and 251 lbs. he would be overweight according to the BMI index.**

# Problems with the BMI:

## Problem #3:

**The obese and healthy are often misclassified!**

**A new study (published in the February, 2016 Journal of Obesity) shows that 29% of obese people and 16% of morbidly obese people were technically metabolically healthy (meaning they had no increased risk for type 2 diabetes or heart disease)**



# Problems with the BMI:

## Problem #3:

**The obese and healthy are often misclassified!**

**What is even more alarming is that 30% of people in the “normal” weight category were metabolically unhealthy!**

**Showing that weight and especially BMI, may not be as great an indicator of health as we once thought.**

