



Usain Bolt Was Overweight? I Don't Think So!

Heuristics: Mental shortcuts that can facilitate problem-solving and probability judgments. These strategies are generalizations, or Rules-of-Thumb, that reduce cognitive load, and can be effective for making immediate judgments, *however, they often result in irrational or inaccurate conclusions.*

The world is complex, often too complicated to analyze in detail, so we often employ Rules-of-Thumb.

Am I okay to have another glass of wine?

Well ... The doctor said I'm allowed 15 units a week – the same as my partner who has double my body weight. He's okay, so I'm okay.

A glass of champagne has 85 calories – less than a banana which has 100 calories. *Obviously if I want to lose weight, I should have a glass of champagne after my workout instead of eating a banana.*

In the Health & Fitness industry, one of the most widely used Rules-of-Thumb is BMI, or Body Mass Index – see this link for a [BMI Calculator](#) and a Results Table from the CDC. *Here's the thing – BMI IS DEEPLY FLAWED!!!* – Don't believe me? Input these numbers into the BMI Calculator, which, depending on the source, were Usain Bolt's Height and Weight measurements at the 2016 Olympics: 95 Kilograms and 195 Centimeters. You will see that his BMI was 25, and that according to the index, he was technically overweight. How ridiculous!

BMI was invented in the 1830's by a Belgian astronomer and statistician. It's hard to think of any other similar metric that has survived for two centuries, and it owes its longevity to its simplicity. It suffers from the following flaws:

- A) It penalizes muscular people and males. Testosterone is a hormone that promotes the development of muscles. On average, males have more testosterone than females. By contrast, females tend to have more oestrogen than males. The end result is that the average female has 8 to 11% more body fat than the average male.

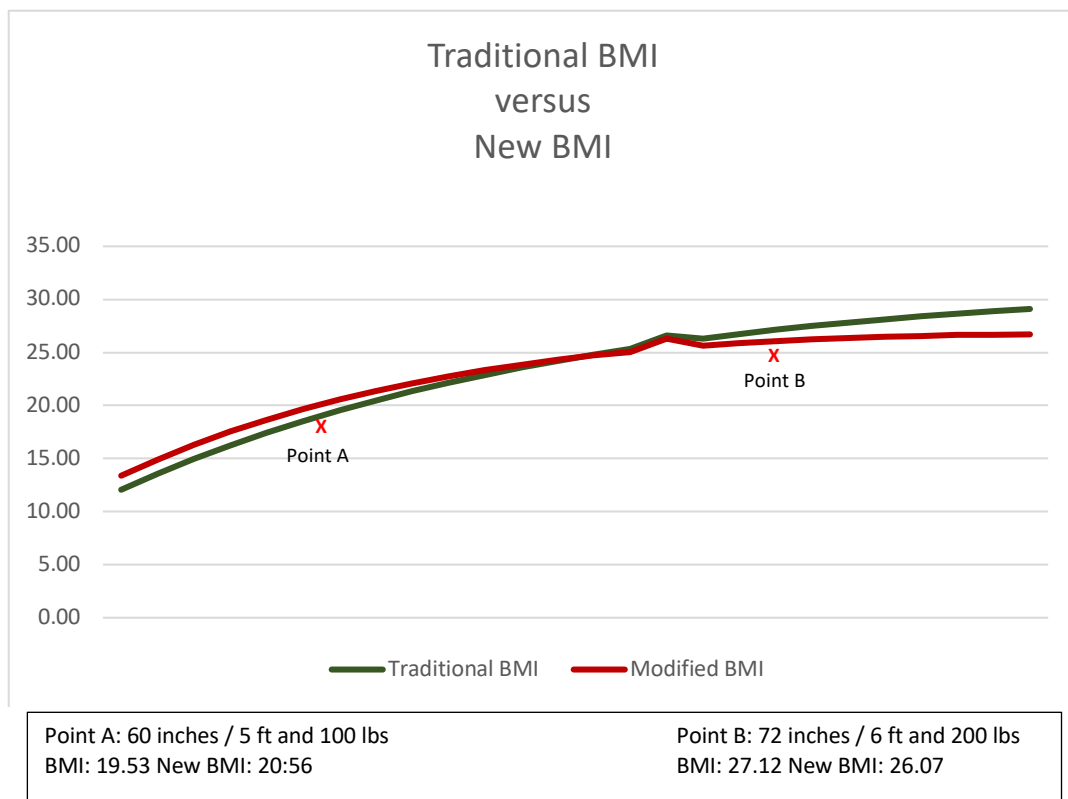
What does this have to do with BMI? Muscle is denser than fat. One litre of muscle weighs 1.06 kg (2.3 pounds) whereas one litre of fat weighs 0.9 kg, or 1.98 lbs. As well as being denser than fat, muscle burns more calories. So, when you increase your muscle mass, you also increase your resting metabolism. It's easy to see that relying on BMI to assess health can lead to some pretty irrational conclusions.

"I've been working out hard and watching my diet. As a result, I've converted body fat to muscle, meaning that my overall weight has increased, and my BMI has done so as well. Saaaay what?"

- B) BMI penalizes tall people. Just as muscle is denser than fat, often, so too are bones. The density of skeletal mass depends on the type of bone, but typically for an equivalent volume, bones will have at least the same weight as muscle, and for hard bones that bear weight like the femur, twice as much weight. The taller you are, the greater the proportion

of your body weight that is comprised of bone, and the higher the corresponding BMI score. This has nothing to do with overall fitness.

- C) BMI ignores important metrics such as resting heart rate, recovery rate, VO^2 levels and Cholesterol levels.
- D) BMI is purely arbitrary. As mentioned, BMI was invented nearly 200 years ago. In 2013, Nick Trefethen, a professor of numerical analysis at the University of Oxford, published a letter in the *Economist* magazine, that introduced "New BMI" or Modified BMI". While still flawed, Trefethen's new formula was designed to correct the bias that traditional BMI has against tall people. Roughly speaking, a 6-foot-tall person would lose one-point from their BMI reading, while a 5-foot-tall person would gain a point. So, Usain Bolt, who is relatively tall, would no longer be considered to be overweight. The graph below shows how the two formulas stack up over various weights and heights.



I am not a statistician, so I can't say if new BMI is better than traditional BMI, but what I can say is that both are arbitrary and both are deeply flawed. There is no one number that can give you an accurate indication of your overall health. Targeting some arbitrary and simplistic number will often lead to wild swings in weight and undesirable outcomes.

If you would like more information, about this, or other indicators of your overall health and fitness, please get in touch.