What is the best way to measure obesity?

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(Medical Xpress)—Weight divided by height squared. The simple formula known as body mass index, or BMI, is used every day by doctors, researchers and others to determine who among us is obese, and therefore at risk for a host of health problems.

But what if BMI isn't the best way to measure obesity? In recent years, a chorus of voices has expressed doubts. The measure doesn't distinguish fat mass from lean mass, they say. A bodybuilder and someone with a beer gut can have the same BMI. And it doesn't account for the location of fat tissue: abdominal fat expands your risk of heart disease and diabetes more than fat elsewhere.

Is there an alternative to BMI? Bio-impedance technology, for one, makes it possible to differentiate fat tissue from muscle tissue.

Considering the scope of the obesity problem, a better tool could make a huge difference.

Andrew Rundle, DrPH, and two graduate students decided to take a closer look. Analyzing the health records of 10,000 adults, they compared BMI and five alternate measures to see which was best overall at predicting high blood pressure, cholesterol, and other indicators of metabolic syndrome, a precursor to health problems like heart disease and diabetes. The contenders:

1. Fat mass index
2. Fat-free mass index
3. Waist circumference
4. Waist-to-height ratio
5. Percent body fat

The result, published in the journal *Obesity Research & Clinical Practice*, was surprising. While the two waist-related measurements were a bit better at predicting elevated fasting glucose and low HDL-cholesterol levels and while body fat percentage had a slight edge as a predictor of high LDL, BMI came out tops overall.

"We were actually a little disappointed with what we found at first," says PhD student and study author Steve Mooney. "Then we thought 'Wait a minute: Maybe the fact that the fancy bio-impedance scale doesn't give you any better prediction value is actually more interesting than if it were better.'"

So why did humble BMI beat out the upstarts? For one, there weren't enough bodybuilders to throw off the calculus. "Your typical American doesn't look like Mr. Universe," observes Dr. Rundle, associate professor of Epidemiology. "We don't have an epidemic of buffness in this country."

Other advantage for BMI: its simplicity and consistency. Bio-impedance scales use an electrical current to estimate total body water, which in turn can be used to estimate fat-free mass, explains Mooney. "As you might expect, these measurements are prone to variation on a host of extraneous factors, like how much water the person tested drank recently."

Comparing waist sizes isn't easy either since it requires finding an equivalent point on every torso.

The matter may not be settled for all time, says Mooney. Better technology may come along. And while BMI is good at predicting metabolic syndrome, it could be that it isn't catching the deadliest cases. If that's shown to be the case, he says, "we may need to pull that fancy scale back out of the trash."

But for now, BMI is the best of what's out there. Says Dr. Rundle, "Despite all the criticism, it's a good measure that we should pay attention to."

Learn more in Steve Mooney's article on his research in the 2x2 Project.

More information: www.sciencedirect.com/science/ … ii/S1871403X12002657

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