



WEIGHT IT UP

THE CENTURIES-OLD BODY MASS INDEX – MORE COMMONLY KNOWN AS BMI – IS USED AROUND THE WORLD TO TELL PEOPLE IF THEY SHOULD WORRY ABOUT THEIR WEIGHT, BUT COMBINING A SERIES OF STATISTICS MIGHT BE A HEALTHIER WAY TO GO.

● TRACKING YOUR FITNESS PROGRESS IS A PRETTY STRAIGHTFORWARD BUSINESS...

... if you record the weights you lift or take advantage of specially designed watches or apps. But the type of data you can get isn't quite as good at showing how healthy you are. Visceral fat, the type that's around your organs, for example, isn't easily detected, and cholesterol can be high regardless of how often you exercise.

In fact, tracking all the significant stats that indicate how healthy you are can be quite a job if you're meticulous about it, so it shouldn't come as a surprise that a one-size-fits-all formula has gained widespread traction. That everything-to-everyone set of numbers is the body mass index (BMI), and it's been used for all sorts: from informing government policies to academic research and insurance qualifying standards. It's also been around as a height-and-weight-based mathematical formula since Adolphe Quetelet created it in 1832, but it has a long and growing list of critics.

"It was basically developed by a Belgian statistician who was just interested in variation in bodies," says Jeff Hunger, assistant professor of psychology at the University of Miami, US. "He wasn't interested in health or wellbeing at all." It wasn't until the 1970s when physiologist and health researcher Ancel Keys took hold of this formula and thought that it could tell us something about health. In the past 40 years, research has shown that it can't.

Quick and cheap

Hunger co-authored a study led by the University of California, Los Angeles three years ago, which revealed some significant flaws in BMI when it was published in the *International Journal of Obesity*. The research, using data from a seven-year national survey in the US, found that 47.4% of Americans who were considered overweight according to their BMI score – and almost 29% who were labelled obese – were in fact healthy. The academics' work also found that 30% of people who fell into the "normal" BMI category – with scores between 18.5 and 25 – were unhealthy according to other indicators.

"The BMI ignores all of the individual characteristics, like body type, muscle mass, bone density, and doesn't capture other things

that we know are going to be stronger predictors of health," says Hunger. "Our paper was one of many that have pointed out the flaws of BMI as an indicator of physical health.

"One of the reasons people use BMI is because it's relatively quick and cheap. You can basically go online or use an app, put in your height and weight, and it'll spit out whether you're healthy or not. In my opinion, quick or cheap should not win out over accurate."

The level of inaccuracy on an individual level can be infuriating and, if you're a gym-goer, you may be among those who have experienced the frustration. The BMI formula is calculated by dividing a person's weight in kilos by the square of the person's height in metres, creating a crude measure of obesity. The index, as it is most commonly used, then equates fatness with ill-health, something which academics also say doesn't always add up. But even if fatness and fitness were always at the opposite ends of the same health spectrum, you would need a measure that could accurately identify how lean you are.

Body blindness

Body type and gender can skew your results in a BMI test and, as muscle is denser than fat, so can having a great deal of strength.

"The only time I have ever been in a 'normal' BMI range was when I was at the heart of competition preparation and incredibly depleted, sitting at 3-5% body fat," says former bodybuilder and personal trainer Dean Koenig. "If you put me into a BMI scale now, I'm listed as morbidly obese, even though my body fat is at under 15%, I train daily, eat healthily and every doctor would tell me I'm in good health."

Koenig has a good feel for fitness and health after struggling to control his weight as a youngster and again after a near-fatal car accident nine years ago. At his heaviest, he weighed nearly 155kg, yet only two years ago he won a regional under 90kg bodybuilding competition. His transformation has been remarkable and involved years of checking how he looked in the mirror, getting on scales and taking skinfold and tape measurements. But he now encourages his weight-loss clients to also think about how they feel.



Former MMA fighter Sol Gilbert favours newer forms of health tech to get his clients in shape.



Low-tech alternatives

Waist circumference

Having fat accumulate around your middle is more dangerous than elsewhere in your body and can leave you at risk of heart disease, type 2 diabetes and stroke. Stand relaxed, wrap a tape measure around your belly, midway between your bottom rib and hips, and take the measurement after an out breath once you're relaxed – for men, 94cm is deemed overweight; 102cm+ and you should see your GP.

Waist-to-hip ratio

Use the same measuring technique as above but also measure your hips at the widest point of your buttocks. You can then put the figures into an online calculator to get your results. A healthy waist-to-hip ratio for men is 0.90 or less. According to the World Health Organisation, a waist-to-hip ratio greater than 1.0 is indicative of a higher than normal risk of developing heart disease.

Calipers

The skinfold caliper measures body fat by pulling fat away from muscle. The Jackson-Pollock method involves checking three places on the body's right and putting the data into an equation.

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Facts on DEXA

n DEXA is a simple, very low radiation X-ray that measures three body tissues; muscle, bone and fat. Each of these tissues has a different density and this allows the X-rays the DEXA uses to give the muscle, bone and fat a mass (in grams) as the rays pass through the different tissues.

“The most important aspect of DEXA is that users can measure ‘true’ change in fat and lean muscle mass,” says Dr Jarrod Meerkin, chief operating officer at MeasureUp, which offers DEXA scans at its Sydney clinic, as well as via a mobile service. “This allows you to really hone your programs to reach your optimal composition – you know what’s measured by DEXA to be a true reflection of your diet or exercise program.

“Change over time is an undervalued commodity. This is why AFL and NRL athletes have scans 3-4 times per year. It allows their performance staff to review diet and training regimens and take the guesswork out of what works and what doesn’t.

“The same use of DEXA can be applied to any fitness level. Why train 4-5 days a week and guess at the result? If a program isn’t working, you can see that, and change it.” measureup.com.au



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From left: Styku performs a 3D body scan in seconds; Dean Koenig who, according to BMI, is “morbidly obese”; a DEXA scan can measure body fat, lean muscle and bone density.

Proceed with caution

“A patient’s weight is an important factor in determining their health,” says general practitioner Professor Helen Stokes-Lampard. She says doctors and other healthcare professionals use BMI as a gauge for health, but that a range of other factors are considered, too – if their consultation times aren’t too squeezed.

Other proponents of BMI claim it produces valuable and sufficiently accurate statistics in large-scale studies, and the World Health Organisation states that the index “provides the most useful population-level measure of overweight and obesity, as it is the same for both sexes and for all ages of adults”.

However, the same organisation also describes it as a “crude” formula and uses different measures for those under 19 years old, adding the caveat: “It [BMI] should be considered as a rough guide because it may not correspond to the same body fat percentage in different individuals.”

The Australia Institute for Health and Welfare cites the use of BMI as “an internationally recognised measure of overweight and obesity at a population level”, but adds that it might not be the best measure for individuals and recommends also using waist circumference as an additional measure for some, although cut-off points can differ between certain population groups, such as South Asian, Chinese and Japanese populations.

Waist measurement – around the belly button area – is a popular measure and is backed by the WHO. Advocates say it provides a useful, simple indication of visceral fat, which lies behind the abdominal wall and has been associated with type 2 diabetes, heart disease, cancer, Alzheimer’s, arthritis, dementia and an increased likelihood of having a stroke.

New tech on the block

There are a host of alternatives, and if you’re a gym regular you’ll likely have come across some that are able to tell you more than you might be ready for. For example, Tanita, Accuniq and Boditrax all produce body composition scales which use bioelectrical impedance analysis (BIA), sending a tiny current through your body. Fat does not conduct electricity well and the more sophisticated scales produce stats on your lean muscle, hydration, fat and more for different parts of the body. The downside to BIA, particularly in single frequency models, is that it can be thrown off by the body’s water content.

Other high-tech methods that might be found in your gym include the Styku 3D device, which measures body shape and composition, creating a model by capturing infrared images. They all produce

interesting data and Tanita claims its products are used for fitness, health and nutrition insights, and tracking by European and UK football clubs, in Formula One, rugby and cricket.

Former MMA fighter Sol Gilbert uses the company’s BIA scales in his three Underground Gyms in London so that members can target their workouts to areas of weakness and check their progress; he says it also helps him to guide them to lose weight and get strong in a far healthier way than he used to.

“Data is everything and I didn’t understand that then,” says Gilbert. “It’s only through error and looking at my own personal career that I have learnt and made sure I know all I need to know. Back then, making weight was literally a finger-in-the-air job. Reduce carbs because they hold water, and there was a lot of cutting water out of our body. We’d sweat it out to make weight and it could be extreme.

“In the most severe cases, I’d have to lose 8kg in 48 hours. I came off the scales, collapsed, had an IV drip put in and then had 14 hours to try to rehydrate myself back to where I wanted to be, which was about 83kg. I’d then go into the fighting with a 5-6kg deficit on my optimum fighting weight.”

Margin for error

BIA scales, whether they use single or multi-frequency, rely on equations to produce personalised data, and there is always a margin for error in any method that uses formulas based on generalised statistics because each of us is unique.

The guidance from the UK’s National Institute for Health and Care Excellence is that BIA shouldn’t be used as a substitute for the index “as a measure of general adiposity”, and there are other technologies used to measure body fat by the medical profession. These include a DEXA scan, considered the gold standard, hydrodensitometry – underwater weighing which involves being dunked in a tank – and air displacement in machines such as the Bod Pod. As Styku states on its website, “Every method, whether it’s caliper, Styku, BIA, DEXA or dunk tank will give a range of body fat percentage values, some higher, some lower.” However, the site also points out that DEXA is quite precise as a body fat percentage system.

“There has always been this hop around to find that one, singular indicator of health,” says Hunger. “When BMI started to find its critics, body fat percentage became a focus of research. People shifted to waist circumference, then hip-to-waist ratios, shoulder-to-waist ratios, then the body shape index. There’s been this desire to figure out a single thing to tell you if you’re healthy or not. But health is more nuanced than that; no tech is going to be able to provide that magic answer.”