

"THE BMI IS AN OBJECTIVE MEASURE OF SIZE AND HEALTH."

Like most of us, I was taught to accept the BMI as a simple truth. It was, I had been told, a direct measure of size and health. But for something as universally relied upon as the BMI¹, its history is much less solid—and scientific—than one might think. And medicine's overreliance on the BMI may be actively harming the health of many of us—particularly fat people, Black people, Indigenous people, and People of Color.

The body mass index was invented nearly two hundred years ago. Its creator, Adolphe Quetelet, was an academic flourishing at the beginning of a wave of academic specialization; his studies included astronomy, mathematics, statistics, and sociology.² Quetelet was not a physician, nor did he study medicine. Instead, he was a polymath. Following the Enlightenment and the Belgian Revolution, he wanted to create a name for his home country as a thought leader around the world. As an avid relationship builder, he built intellectual and scientific peer networks that spanned Europe but originated in Belgium. A respected astronomer, Quetelet founded the Brussels Observatory, where he served for decades as its director.

Quetelet's biggest project was developing a framework for what he called Social Physics. He wanted to measure, quantify, and study the human social world the way physicists studied the material world. Quetelet sought to catalog the world as it was, find its averages, then

lift those averages up as ideals. He expressed a desire to quantify and measure everything from suicide rates to acts of courage. In so doing, he believed he'd find a hidden framework for understanding people as social animals. He looked for laws of human behavior that mimicked the laws of physics. And in finding those laws of human behavior and analyzing our actions, he hoped to identify the characteristics of *l'homme moyen*, or "the average man." To Quetelet, "average" represented a social ideal, a kind of glorious normalcy and conformity to which to aspire.

Quetelet worked in Western Europe during the early nineteenth century—a boom time for racist science—so that idealized norm was a white one.³ He is credited with cofounding the school of positivist criminology, "which asserted the dangerousness of the criminal to be the only measure of the extent to which he was punishable."⁴ That positivist school laid the groundwork for criminologists like Cesare Lombroso, who believed that Black people, Indigenous people, and People of Color were a separate species.⁵ *Homo criminalis*, Lombroso argued, were "savages" by birth, identified by physical characteristics that he claimed linked them to primates. For Lombroso, anyone who wasn't white comprised some kind of subspecies, congenitally driven to commit crimes. In addition to paving the way for Lombroso's work, Quetelet is also credited with founding the field of anthropometry,⁶ which itself included the racist pseudoscience of phrenology.⁷

Quetelet believed that the mathematical mean of a population was its ideal. But since gathering population-level data would've required significant time and resources, his analysis was largely restricted to data gathered through government entities. But the state didn't keep records of acts of courage, suicide attempts, or other phenomena that Quetelet wanted to study. The state kept only vital records (birth, death, and marriage certificates), compiled crime data, and gathered some information on military conscripts' weight and height. So that's where he began.

Quetelet's desire to identify and quantify the ideal, average man resulted in the invention of what later became the body mass index, a record of what Quetelet believed to be the average—therefore,

ideal—ratio of weight to height. Called Quetelet's Index, the measurements became a way of quantifying the weight-to-height ratio of *l'homme moyen*. The formula was derived from data gathered solely from male French and Scottish participants. The index was devised exclusively by, for, and about white Western European men. Quetelet's methodology ensured that if there was to be a universal, idealized average, it would be white, and it would be male.

Quetelet's contemporaries weren't sold on social physics—not because it was fundamentally exclusionary to anyone who wasn't white but because it questioned their own sense of agency. If there were these laws of human nature, what then would become of man's free will? His work was frequently debated among academics of Quetelet's generation and the next, some of whom were great admirers of it. Among his fans: Sir Francis Galton, a proponent of social Darwinism, a leader in scientific racism, and a godfather of the eugenics movement that gathered like a storm in the late nineteenth and early twentieth centuries. According to Canada's Eugenics Archive, "It was Galton who, while building upon Quetelet's notion of the 'average man' (a product of measurement and statistics), effected an important twist: instead of positing the normal as healthy and desirable, Galton equated the normal with the mediocre. Within this tradition the normal state is to be transcended, improved upon, and overcome."⁸

By the turn of the next century, Quetelet's influence was felt throughout the eugenics movement, where it operated as a scientific justification for the systemic, state-run sterilization of disabled people, autistic people, immigrants, poor people, Black people, Indigenous people, and People of Color. Quetelet's influence in eugenics traced back to *l'homme moyen*, the "average man" concept adopted by Galton. This concept rapidly gained popularity, particularly in the United States. Thirty-three states operated state eugenics boards, charged with determining which of their neighbors would be forcibly sterilized. California's program led the nation in sterilizations, offering inspiration to Nazi eugenics programs.⁹

While Quetelet's work was used to justify scientific racism for decades to come, he was clear about one aspect of the BMI: it was never intended as a measure of individual body fat, build, or health.¹⁰ To its inventor, the BMI was a way of measuring populations, not individuals, designed for the purposes of statistics, not individual health. But within a few short decades, that's exactly how it was used.

Weight wasn't considered a primary indicator of health until the late nineteenth century, when US life insurance companies began to compile tables of ideal weights to determine what to charge prospective policyholders.¹¹ Like Quetelet's Index, however, those actuarial tables were deeply flawed, representing only those with the resources and legal ability to purchase life insurance. Weight and height were largely self-reported, and often inaccurately. And what constituted an insurable weight varied from one company to the next, as did their methods of determining weight. Some included "frame size"—small, medium, or large. Others did not. Many didn't factor in age. And tables were designed for life insurance customers, but only those wealthy enough to purchase it. On top of all that, insurers were staffed by actuaries and sales agents, not medical doctors. But despite insurers' lack of medical expertise and inconsistent measures, physicians began to use their rating tables as a means of evaluating patients' weight and health.¹²

By the 1970s, medical science was on the hunt for a more effective measure of weight. Ancel Keys, a renowned researcher on the effects of starvation, heart health, and more, took on the challenge. He led a team of researchers in a study of 7,500 men from five different countries to find the most effective of medicine's existing measures of body fat, easy and inexpensive enough for regular office visits.

As in Quetelet's work, the subjects in Keys's study were drawn from predominantly white nations—the United States, Finland, and Italy—along with Japan and South Africa, though the study notes that findings in South Africa "could not be suggested to be a representative sample of [Black] men in Cape Province let alone [Black] men in general."¹³ Most of its findings, the study explains,

apply to "all but the [Black] men." That is, the findings weren't representative of, or applicable to, the very South African men included in the study. Like Quetelet's Index, whiteness took center stage in the research. But unlike Quetelet, Keys and his colleagues set out to test which diagnostic tool was the best existing measure of body fat. Keys's team looked at three imperfect measures to measure body fat: water displacement, skin calipers, and the body mass index. In the landmark study, Keys and his coauthors hedged their findings significantly. "Again the body mass index [. . .] proves to be, if not fully satisfactory, at least as good as any other relative weight index as an indicator of relative obesity."¹⁴ The BMI emerged as the least objectionable about three imprecise measures. Its claim to fame? Accurately diagnosing "obesity" about 50 percent of the time. As recently as 2011, that number held fast, as the *Journal of Obstetrics and Gynecology* found that the BMI detected less than 50 percent of "obesity" cases in Black, white, and Hispanic women.¹⁵

In his study, Keys renamed Quetelet's Index the "body mass index." And with that, a statistician's largely forgotten index entered the world of individual health care—despite the fact that its inventor had designed the index for population-level statistical analysis, not as a diagnostic tool for physicians.

Keys's work ushered in a decades-long era of repeatedly changing the definitions of "overweight" and "obese." In the early 1980s, the National Institutes of Health (NIH) convened a conference on the health implications of obesity that focused on the creation of medical categories for fat bodies. Those categories weren't defined by increased health risks or the likely onset of specific health outcomes. Instead, they were defined by a percentage of the population at the time. For example, the conference defined "overweight" people as those in the 85th percentile of the population by weight, and "severe overweight" as those in the 95th percentile.¹⁶ "Obesity" and "severe obesity," by contrast, were measured not by BMI but using calipers for a skin fold test. But neither "overweight" nor "obesity" were defined based on specific health concerns. Rather, they were defined by

being *fatter than everyone else*. These new categories didn't articulate an existing health risk; they created a new category altogether. Nevertheless, the NIH adopted the new categories. And with that, this perennially imperfect measurement was relatively quickly enshrined in US public policy.¹⁷

Just ten years later, in 1995, the World Health Organization (WHO) adopted the BMI as an international standard for measuring patients' weight. They did so by convening the International Obesity Task Force, largely made up of directors of medical weight-loss clinics—stakeholders who stood to profit from expanding the pool of people who were expected to seek medical treatments for their weight. Researchers recommended to the task force that the existing standards for a "normal" BMI were too restrictive, and that the range of acceptable BMIs should be expanded. In other words, researchers believed that a larger range of body weights could be medically considered healthy. The task force overrode that recommendation. Instead of expanding the parameters for its definition of a "healthy weight," the task force restricted them. And they extended the BMI—previously used primarily for adults—to use with children.¹⁸

Later, the *British Medical Journal* reported that the lion's share of the budget for this change in definitions of who was "overweight" or "obese" was furnished by Abbott and Roche, both of whom had weight-loss drugs stuck in the FDA's then notoriously restrictive approval process for weight-loss drugs.¹⁹ From the *British Medical Journal's* coverage:

On the question of what was motivating sponsors to be involved, Tim Gill, a representative of the task force and executive officer of the Australasian Society for the Study of Obesity, said that although the task force focused mainly on prevention rather than treatment, drug companies benefited anyway from raised public awareness, as they needed to sell products to only a tiny proportion of people defined as diseased to achieve a good market.²⁰

In 1998, the NIH once again changed their definitions of "overweight" and "obese," this time to align with the new guidance from WHO. In so doing, they substantially lowered the threshold to be medically considered fat. CNN wrote that "Millions of Americans became 'fat' Wednesday—even if they didn't gain a pound"—as the federal government adopted a controversial method for determining who is considered overweight.²¹ Within two short years, new weight-loss drugs from Abbott and Roche had been approved for sale in the United States. And with newly expansive definitions of who could be considered by medical institutions to be too fat, their pool of potential patients—and customers—had increased dramatically.

The adoption of these new standards for thinness grew the customer base for weight-loss industries. And it also paved the way for a new public health panic: the "Obesity Epidemic."

By the turn of the millennium, the BMI's simple arithmetic had become a *de rigueur* part of doctor visits. Charts depicting startling spikes in our overall fatness took Americans by storm, all the while failing to acknowledge the frequent changes in definition that, in large part, contributed to those spikes. At best, this failure in reporting is misleading. At worst, it stokes resentment of bodies that have already borne the blame for so much and fuels medical mistreatment of fat patients.^{22, 23}

Since then, the cultural conversations about fatness, health, and respect reflect that significant failure in reporting. Views haven't progressed, although the science has started to. In 2015, researchers at Harvard University and the University of Sheffield released a study identifying six different types of obesity,²⁴ each of which had their own etiology and types of treatment. By the next year, researchers at Massachusetts General Hospital had observed fifty-nine different types.²⁵ With so many types of fatness—and more still being identified—what could the brutally oversimplified arithmetic of the BMI meaningfully contribute to our understanding and treatment of fat patients? As clinical psychiatry professor Sylvia R. Karasu put it, "Despite all the progress we have made in science

since Quetelet's nineteenth-century index, we are still far from being able to measure our body's fat conveniently and accurately in a physician's office."²⁶

But more than that, science and history alike have repeatedly demonstrated that a measure built by and for white people is even less accurate for—and may even lead to the misdiagnosis and mistreatment—of People of Color. According to studies published by the Endocrine Society, the BMI overestimates fatness and health risks for Black people.²⁷ Meanwhile, according to the WHO, the BMI underestimates health risks for Asian communities, which may contribute to underdiagnosis of certain conditions.²⁸ On a global scale, declaring obesity to be first a "global epidemic" has created profit streams for weight loss and pharmaceutical companies around the world. Now, instead of competing for individual customers, those companies can compete for insurance coverage and state contracts. As with any global issue, news coverage of the "obesity epidemic" includes coverage of where the purported epidemic is at its worst. The nations with the highest rates of BMI-defined obesity are those for which the BMI was never designed: Indigenous island nations like Nauru, the Cook Islands, Palau, Tonga, Tuvalu, the Marshall Islands, Samoa, and the Federated States of Micronesia.²⁹

And, despite the purported universality of the BMI, it papers over significant sex-based differences in the relationship between body fat and the BMI.³¹ That is, because so much of the research behind the BMI was conducted on those assigned male at birth, those assigned female may be at greater health risk if their diagnosis hinges on a measurement never designed for them. The BMI proves a significant barrier to essential health care for trans and nonbinary people, regardless of their assigned sex. Doctors frequently mandate a lower BMI from trans patients³¹ before providing lifesaving,³² gender-affirming health care.

Beyond that, the BMI has contributed to a common misconception in our popular imagination: it's just a matter of time until people with "overweight" and "obese" BMIs become chronically

ill, disabled, or otherwise fall to ill health. But despite our collective certainty, the scientific research into the population-level health of fat people is far from clear-cut. Indeed, researchers have found a wide range of health measures and predictors in which people whose BMIs are "overweight" and "obese" fare *better* than their "healthy weight" counterparts. Researchers have labeled this collective phenomenon "the obesity paradox," so named for the conflict between research findings and popular expectations about fat people's health. One research review of forty studies with participants totaling over 250,000 found "significantly lower risks for total mortality and cardiovascular mortality in overweight patients. These mortality risks were not increased in obese patients compared with normal-weight subjects."³³ The "paradox," then, is that someone can be both fat *and* not at increased risk of mortality or other selected health conditions.

The so-called obesity paradox has been upheld time and time again. In a 2019 study tracking 6.8 million patients in the Korean National Health Insurance Service, being underweight and having diabetes were associated with an increased risk of Parkinson's disease, but being fat wasn't.³⁴ In a 2020 paper discussing the ethics of clinical weight-loss recommendations, it was noted that the much-touted benefits of weight loss were the benefits of increased exercise and dietary changes—even if no weight was lost. "Systematic reviews and meta-analyses show how health benefits via lifestyle changes can prevent and treat diabetes and heart disease *irrespective of weight loss*."³⁵ A Brazilian national analysis of patients with type 2 diabetes found "no significant correlation" between an individual's BMI and their blood sugar levels. They did, however, find correlations with lower educational levels and with diets low in whole grains. (The researchers noted that whole grains require time to cook, time many low-income people don't have.)³⁶ Results like these suggest that economic justice—not weight loss—could be a key component of the management of type 2 diabetes.

Even when a perceived link between a person's BMI and their health risks seems solid in the popular imagination, research often

paints a more complicated picture. A 2020 research paper complicated the much-touted link between BMI and COVID-19, finding that fat Black people and fat People of Color in the UK were 1.75 to 2.56 times more likely to test positive for COVID-19 than their white counterparts.³⁷ (Thin Black people and thin People of Color showed no disparity in test results.) Because most of these studies don't take social dynamics into account, like income level, discrimination, and other social determinants of health, they point to biological causes for what may well be social problems. Findings like these—and popular perception of them—provide an unsettling echo of the BMI's racist history. Instead of further examining these sized and racialized disparities, most of us hear *high BMI* and *health risk* and intuitively, often uncritically, believe it to be true. But even scratching the surface of the experiences of fat Black, Indigenous and People of Color quickly complicates the simple arithmetic of those judgments.

Researchers and media alike have written a great deal about the so-called obesity paradox, often without interrogating its premise: the assumption that fat people *cannot* be in good health. That is, the phenomenon of healthy fat people is only a paradox if you cannot conceive of fat people being healthy. And, thanks to pervasive, decades-long conversations about the obesity epidemic, as defined by the BMI, most of us cannot believe the simple fact that *any fat person* could have good health outcomes. After all, as the BMI has taught us, the aberration of fatness *itself* is a transgression of health. By definition, we believe, fat people simply cannot be healthy. And structures like the BMI lend false legitimacy to our own faulty, unexamined assumptions.

Despite its fraught history and proven inaccuracies, the BMI soldiers on. The science has disproved many common myths about size, health, and weight loss for years.³⁸ Yet instead of recognizing the evolving and increasingly complex science around fatness, people stick stubbornly to the truisms that allow them to freely marginalize fat people. Like phrenology and positivist criminology before it,

the body mass index is a product of its social context, which proudly held up whiteness as an idealized kind of normalcy. Because of its ubiquity in public policy and global institutions, the BMI remains—even though its biggest champions say it's not an effective measure of fatness, much less overall health.