

Understanding BMI's Origins and Limitations:

1. "To start, can you give us a brief history of the BMI and its original purpose? It seems it wasn't always intended as a health indicator, correct?"

Body Mass Index (BMI) is calculated as weight in kilograms divided by height in meters squared. Developed by Adolphe Quetelet in the early 1800s using data exclusively from white men, BMI was originally intended as a population-level tool to describe the "average man" and predict population size and shape. Despite Quetelet's explicit warning against individual use, BMI has become a key criterion for accessing certain medical care in many healthcare systems globally.

Around the 1940s, Metropolitan Life Insurance Company developed "ideal weight" tables to predict policyholder longevity. In 1972, physiologist Ancel Keys popularized the term BMI, based on Quetelet's calculation, as a superior measure of relative body weight, though his study population was primarily middle-aged men of American, European, Japanese, and Black South African descent. Keys acknowledged BMI as the strongest of three imperfect measures, correctly identifying "obesity" approximately half the time. The current BMI tables were developed in 1973. The NIH initially defined overweight in the 1970s as the top 15% of the population by weight (BMIs of 27.8 for men and 27.3 for women), and severe overweight as the top 5%, thus defining health risk relative to the population. In 1985, the NIH revised its obesity definition to be BMI-based, having previously used skinfold thickness for diagnosis.

In 1995, the World Health Organization (WHO) established BMI as the global standard for classifying overweight and obesity, setting the overweight threshold at a BMI of 25. This decision followed recommendations from the International Obesity Task Force, primarily funded by pharmaceutical companies with weight loss medications in development, despite some researchers within the WHO suggesting a higher threshold based on evidence of health at higher weights. U.S. medical institutions adopted this standard within three years.

Also in 1995, BMI began to be used for pediatric populations, a practice that generated debate among pediatricians and researchers. Concerns were raised about the application of standardized BMI to children and adolescents due to the variable and rapid changes in weight and height during growth and development, making it challenging to define a universal "healthy" body size in this age group.

In 2023, the American Medical Association (AMA) released a statement acknowledging that BMI alone is an imperfect clinical measure and that the current BMI classification system can be misleading regarding the impact of body fat mass on mortality. The AMA highlighted that factors such as comorbidities, lifestyle, gender, ethnicity, genetics, duration in certain BMI categories, and age-related fat accumulation significantly affect the interpretation of BMI data concerning morbidity and mortality. They also noted the problematic use of BMI in diagnosing and treating eating disorders due to its failure to capture the spectrum of these conditions. The International Obesity Collaborative issued a similar statement shortly thereafter which is:

"BMI is a measure used to screen for obesity that neither defines the disease nor replaces clinical judgement. Social determinants, race, ethnicity, and age can modify the risk associated with a given BMI. Successful obesity management should be measured by the health and quality of life goals established through shared decision making by the patient and their healthcare provider rather than changes in BMI alone"

2. "What are the most significant limitations of BMI? We know it doesn't account for muscle mass, bone density, or fat distribution. Can you elaborate on these?"

- First I think it's important to establish quite clearly that lower weight and therefore lower BMI is not always indicative of superior body composition nor is it indicative of better health. BMI is highly specific, but sensitivity is poor (~50%). So what that means is if we assume, like conventionally healthcare has, that people with a higher BMI are "unhealthy," and people with a "normal" BMI are healthy, that "test" of BMI will correctly identify people without a weight-associated health risk (aka normal BMI individuals) but it will incorrectly identify people with a weight-associated health risk at a much greater rate. Nearly half of overweight individuals in one study were actually found to be cardiometabolically healthy. A commonly touted statistic to support deemphasizing the BMI is that using BMI to classify individuals as healthy or unhealthy misclassifies ~75 million US adults. 48 percent of the participants in the overweight category (BMI 25–29.9) were actually healthy, according to measures such as blood pressure, blood sugar, and cholesterol. So were 29 percent of people with BMIs between 30 and 34.9, and 16 percent of those with BMIs of 35 and above. Meanwhile, 31 percent of people deemed to be at a healthy weight by BMI standards were categorized as unhealthy using other medical tests. Because BMI is frequently used to determine medical care and life insurance rates, these misclassifications can be meaningful.

BMI It doesn't measure or take into account muscle mass or body fat or build or age or anything else. It is truly just your weight divided by your height. Muscle is heavier than adipose tissue aka fat, so people with higher muscle or "lean" mass will have a higher BMI, typically. And that's important because we know that lean mass is an important factor in health: people with higher strength and fitness levels have reduced cardiovascular and metabolic risk profiles and this remains true in individuals with higher BMI.

Research indicates that visceral fat, surrounding central organs, poses a greater health risk than subcutaneous fat. The location of fat deposition may be more relevant than the total amount. BMI does not differentiate between these types of fat. Additionally, bone density is a significant factor in health risk, influencing fracture risk and mobility, which BMI also fails to assess.

"How does BMI's reliance on height and weight alone create potential inaccuracies across different populations, such as athletes, older adults, and various ethnicities?"

So, the BMI was cooked up using data from a pretty similar bunch of dudes, which means it's not super accurate when we try to apply it to everyone else. Lots of different kinds of people just weren't part of the original study.

Think about athletes, especially the really strong ones. They can have a high BMI just because they've got a lot of muscle, even if their body fat is low. You know the classic example: Dwayne "The Rock" Johnson supposedly being "obese" according to BMI, which is obviously not the case. It's an interesting point, but honestly, athletes don't usually face the same kind of weight bias that folks with bigger bodies do.

Then you've got older adults. They tend to have more body fat as they age, and most people lose some muscle mass as they get older too. So, even if their weight and BMI go down a bit, they might still have a similar or even higher amount of body fat. What's really interesting is that for older adults, especially after menopause, research actually suggests that a BMI that would be considered overweight or even obese in younger people might actually be linked to better survival and overall health. It could be protective against things like frailty and getting sick as often. BMI charts, which classify people based on a weight-to-height ratio, don't really factor in different body builds. For example, folks of different ethnicities often store fat differently, though there's a lot of individual variation within those groups, of course.

Here's the deal: the current BMI cutoffs might incorrectly label some Black individuals as having obesity because they might naturally have less body fat and more muscle compared to white individuals at the same BMI. On the flip side, for many Asian individuals (and this is a huge, diverse group), the risk for things like metabolic issues and heart disease can show up at lower BMIs, so it

might get missed using the standard cutoffs. Plus, Black individuals tend to have more fat under the skin, while white individuals tend to carry more fat around their organs. BMI can't tell the difference, even though where the fat is located seems to matter for health, with visceral fat being linked to insulin resistance.

"We often hear that BMI is a 'screening tool.' What does that actually mean? And when does it become problematic to use it as a definitive measure of health?"

Okay, so when we look at BMI, at its most basic, it's just a number that can be one piece of the puzzle when we're trying to figure out someone's risk for certain health issues. But as we've discussed, relying on BMI alone can really miss the mark. It can overlook people who actually are at risk and, on the flip side, incorrectly flag perfectly healthy individuals. The truth is, BMI was really designed, and still works best, as a tool to look at trends across large groups of people. We do see data that shows, on a population level, that higher BMIs tend to correlate with poorer health outcomes. But there are other things that actually correlate even more strongly with health that we haven't focused on as much.

The important thing to remember is that BMI wasn't intended for individual use. It's tough for us as clinicians to pinpoint someone's ideal body size or weight using just BMI because we're taking a statistical tool from population data and trying to apply it to one person. Another real issue is that BMI isn't just used to screen for potential health risks; it's also used to gatekeep access to certain medical care, like fertility treatments, some surgeries, and gender-affirming care.

And this screening tool has actually changed quite a bit over the years. If we go back to when BMI first started being used in medicine in the 1970s, the NIH defined overweight as anyone in the top 15% of the population by weight – that was a BMI of around 27.8 for men and 27.3 for women. "Severe" overweight was the top 5%. So, essentially, people were being labeled as at risk not because of specific health risks, but based on where they fell compared to everyone else. It wasn't until 1985 that the NIH changed things and started using BMI to define obesity as well; before that, it was actually diagnosed based on skinfold thickness.

In 1995, the World Health Organization (WHO) declared BMI the global standard for classifying overweight and obesity. That same year, the use of BMI in children also began, which sparked a lot of debate among pediatricians and researchers. The concern was that the way kids grow – with unpredictable and rapid spurts in weight and height – makes it really problematic to try and standardize what a healthy body looks like during childhood and adolescence. It's a time of so much change and individual variation.

Exploring Alternative Health Measures:

"If BMI isn't the gold standard, what are some more accurate and comprehensive ways to assess someone's health? Let's talk about body composition, waist circumference, and other metrics."

When we're really looking at someone's overall health, I honestly think we can move beyond just body measurements. Things like body size and shape affect health in such different ways for each person.

Instead, I'd first consider the big picture stuff – what we call the social determinants of health. This includes their financial stability, their access to education and quality healthcare, the environment they live in (like whether they have access to healthy food, safe places to be active, and transportation), their social support, any experiences they've had with discrimination, and their access to community resources. These factors have a huge impact on health.

Then, we can look at some more direct health behaviors, which are often more within an individual's control. This includes things like consistent and varied food intake, getting enough sleep, regular physical activity that feels good for them, healthy skin and hair, good digestion, oral health, bone density, regular periods for those who menstruate, and how they manage stress. And of course, lab work like cholesterol, blood sugar, and inflammation markers can give us important information too.

"How important is it to consider metabolic health markers, such as blood sugar, cholesterol, and blood pressure, in addition to or instead of BMI?"

I think these are much more important and direct measures of health and health risk than body composition. Often weight, BMI or body size are used as a kind of proxy for health or disease, but we could cut out that middleman so to speak and just look directly at the health assessment tools, screening at regular intervals and maybe more often based on symptoms or family history. I think I would be remiss to say though, that these health markers are also not solely within one's control, genetics, chronic stress, weathering related to racism or low socioeconomic status are huge non-controllable factors impacting metabolic markers.

"What role do emerging technologies, like DEXA scans or other body composition analysis tools, play in providing a more detailed picture of an individual's health?"

I think tools like this are really important in research setting, and when we want to look at things like bone health or bone loss in the setting of eating disorders or malnutrition, of course which is the original purpose of a dexa scan, but again in practical day to day practice, these emerging technologies are expensive, invasive and don't give a whole lot more clarity to a person's health than the BMI, in terms of lean and fat mass, yes a DEXA scan improves our understanding of that, but the impact of these measures on the individual can vary a lot. And in the end, I like to ask, what would be do with that information. If we are following a HAES aligned approach, then percent of fat mass isn't going to be our target for change or outcome of interest, it's going back to health and quality of life markers like mood, energy, digestion, labs, which DEXA doesn't help us with.

"On a 'micro' level, how can we assess health beyond physical measurements? What about factors like mental well-being, sleep quality, and stress levels?"

The great thing is that all we need to assess these things are mostly free; time and a listening ear. We learn about and help people modify these factors through ongoing conversation, assessment with where they are at and counseling in a way that lets the individual make shifts in their lifestyle that are both of interest and accessible to them.

Addressing Myths and Misconceptions:

- 1. "Let's tackle the myth that a 'normal' BMI automatically equates to good health. What are some examples of people with 'normal' BMIs who might still have underlying health issues?"**

Any health condition that is typically associated with higher body weight is also a health condition that thin people can get: heart disease, joint issues, diabetes, high blood pressure, you name it. There is no health condition I can think of that people with normal BMIs are exempt from, unless you consider obesity a health condition in and of itself, which some health professionals do, but I do not subscribe to that school of thought.

- 2. "Conversely, is it always true that a 'high' BMI indicates poor health? Are there instances where a higher BMI might not be a cause for concern?"**

Yes, body size does not directly dictate an individual's health status, so this works in both directions. As a dietitian I consistently advocate for putting BMI and weight aside and looking at factors like quality of life, relationship with food, cardiovascular fitness, strength, functional status, and

all the things we listed above, like labs and other health markers to determine whether an individual should be concerned about their health status, keeping in mind one person's definition of health and ability to meet these criteria can vary so much from person to person.

3. "How has the focus on BMI contributed to weight stigma and potentially harmful dieting practices? What are the psychological impacts of relying too heavily on this metric?"

In healthcare, we've unfortunately developed a real focus on larger body sizes, partly due to the ingrained use of BMI. This has been fueled by a lot of research – often funded by industries with a vested interest – that's been trying to prove how higher weight or BMI causes health problems, essentially using BMI as a stand-in for health. Instead, we should be asking better questions like, "What habits and practices are actually linked to specific diseases?"

This weight-focused approach has led us to often ignore much more meaningful indicators of health that aren't even that hard to assess. We could be understanding diet-related health issues in a far more accurate way. Right now, BMI and body fat are often presented as direct signs of poor health. There's this often incorrect assumption that bigger bodies are inherently unhealthy and that fatness automatically means someone is more likely to get heart disease or has hidden health problems.

Because we can't just look at someone and see their cardiovascular risk, we rely on body size because it's quick and allows for fast judgments. And with doctors being increasingly pressed for time, this issue just keeps going. But if we just took a few extra minutes to ask about lifestyle factors and family history, we could learn so much more about someone's actual risk. We're using BMI as a shortcut when more accurate information is within reach with a little more time and critical thinking.

The frustrating thing is, we know what interventions work for specific health risks. But instead of directly applying those interventions, the medical system often uses BMI as the measure for those risks. Then, the focus shifts to trying to control someone's weight as a way to manage those risks, rather than just implementing the interventions that directly address the health risks themselves.

"What is the relationship between BMI and mortality risk? Are there any studies that contradict the common narrative?"

As a medical professional embracing a Health at Every Size (HAES) perspective, it's important to understand that the relationship between Body Mass Index (BMI) and mortality risk is complex and not as straightforward as often portrayed. While population-level data sometimes show a correlation between higher BMIs and increased mortality, this doesn't necessarily translate to individual risk, and there's growing evidence challenging this narrative. Of course we as science minded people are familiar with the adage that correlation or association (in other words a relationship between) two factors is not the same as causation. There are many so called third variables emerging that explain some of the BMI/mortality correlation such as the chronic stress of weight stigma, poorer health care delivery, healthcare avoidance due to predicted weight stigma, and many more. But in terms of studies, yes a few that come to mind that highlight the nuances and limitations of using BMI as a sole predictor of mortality include

- A 2023 study analyzing a large contemporary US adult population found that while a BMI of 30 or higher was associated with a 21-108% increased mortality risk, there was no significant increase in mortality across a wide range of BMI categories, particularly in older adults (BMI 22.5 to 34.9) and even in younger adults with BMIs in the overweight range (25.0-27.4). This suggests that "overweight" as defined by BMI may not independently increase mortality risk.
- Another 2023 publication pointed out that BMI is a crude measure that doesn't account for body composition (muscle vs. fat) or how long someone has been at a particular weight. The researchers found that excess weight may be more deadly than previously believed when accounting for these biases, but also emphasized the limitations of BMI in accurately reflecting health outcomes.

- Research has also consistently shown what's termed the "obesity paradox" in certain populations, particularly older adults and those with chronic diseases like heart failure. In these groups, higher BMIs have sometimes been associated with *lower* mortality rates. A 2024 study on older adults (≥ 80 years) found that overweight men and women had a lower mortality risk compared to those with "normal" or underweight BMIs, even after adjusting for lifestyle factors and comorbidities. This suggests that the protective effects of a higher weight might exist particularly in older age.
- Furthermore, a 2023 study directly challenged the "obesity paradox" in heart failure patients by using waist-to-height ratio instead of BMI. They found that the supposed survival advantage at higher BMIs disappeared when this more nuanced measure of body fat distribution was used, suggesting that central adiposity might be a more critical factor than BMI alone.

In summary, while some studies still show an association between higher BMI and increased mortality, particularly at BMIs of 30 and above, recent research indicates that this relationship is not always consistent, especially in older adults and when considering factors beyond just weight and height. The "obesity paradox" and the limitations of BMI in capturing individual health risk highlight the need to move beyond a simplistic weight-centric view of health and consider a broader range of factors, aligning with the HAES framework.

Practical Implications and Recommendations:

1. "How can healthcare professionals use BMI responsibly in their practice, while also considering other relevant factors?"

Honestly, I think the only responsible way to use BMI is to document it if absolutely necessary for insurance purposes (often it is not and patients can opt out of being weighed unless needed for medical dosing, etc.) and if you live in a state where patients can view their medical notes, to tell them you are documenting it but that you recognize its limitations and do not subscribe to the view that uses BMI as a measure of health, but rather will work with the patient to assess their SDOH, lifestyle, family history and quality of life to collaboratively make decision about their health. And as a healthcare professional,

2. "What advice would you give to individuals who are concerned about their BMI? How can they shift their focus to more holistic measures of health?"

It's normal that you would be worried about or even fixated on your body mass index. From BMI report cards in schools, to consistent emphasis on BMI in the doctor's office, it's not easy to unlearn and challenge the idea that your BMI is a direct measure of your health, or even your worthiness.

3. "What are some actionable steps people can take to improve their overall health, regardless of their BMI?"

It's fantastic that we're shifting the conversation to focus on overall health rather than just weight! Research increasingly shows that many health benefits can be achieved independently of changes in body weight or BMI. Here are 5 evidence-based ways to improve health, taking weight and weight loss out of the equation:

1. **Prioritize Cardiorespiratory Fitness (CRF) and Physical Activity:** This is perhaps the most powerful factor. Studies consistently show that being physically fit significantly reduces mortality risks and improves overall health, regardless of a person's BMI. Regular physical activity, even moderate intensity, can lead to:
 - o Improved heart health (lower blood pressure, better cholesterol)
 - o Reduced risk of type 2 diabetes by reversing insulin resistance
 - o Stronger bones and improved balance
 - o Enhanced mood and reduced anxiety/depression

- o Better sleep quality
- o Improved immune function
- o Enhanced memory and brain health
- o Increased longevity

It's incredibly important to emphasize here that improving cardiorespiratory fitness and physical activity is absolutely possible for people with low mobility or chronic pain, and it can significantly enhance their quality of life. The key is to find activities that are gentle, low-impact, and can be adapted to individual needs and limitations. These might include aquatic therapy or exercise, chair-based exercise, resistance bands or mind-body practices like Tai-Chi.

2. **Focus on Nutrient-Dense Eating Patterns (e.g., Mediterranean, DASH diets):** Shifting to a pattern of eating that emphasizes whole, unprocessed foods can profoundly impact health without necessarily targeting weight loss. Nutrition routines that are primarily comprised of plant foods have the strongest evidence for overall health and well-being.
 - o **Mediterranean Diet:** Rich in fruits, vegetables, whole grains, nuts, seeds, healthy fats (like olive oil), and lean protein (especially fish), this diet is linked to reduced cardiovascular disease risk, improved lipid profiles, and reduced inflammation.
 - o **DASH Diet (Dietary Approaches to Stop Hypertension):** Emphasizes fruits, vegetables, and low-fat dairy while limiting saturated fat, cholesterol, and sodium. It's particularly effective at lowering blood pressure.
 - o These patterns of eating also contribute to a healthier gut microbiome, which is increasingly linked to overall health and disease prevention.
3. **Get Adequate and Quality Sleep:** Sleep is a cornerstone of health, and chronic sleep deprivation has significant negative consequences independent of weight. Research shows that good sleep can:
 - o Improve mood, focus, and memory
 - o Support a healthy immune system
 - o Regulate hormones related to appetite and metabolism
 - o Reduce the risk of heart disease and type 2 diabetes
4. **Practice Stress Management and Cultivate Mental Well-being:** Chronic stress has a detrimental impact on nearly every bodily system. Implementing stress-reducing techniques can lead to significant health improvements.
 - o Mindfulness, meditation, and yoga can reduce stress hormones and improve emotional regulation.
 - o Strong social connections and a sense of purpose contribute to mental and physical resilience.
 - o Addressing mental health conditions (like anxiety and depression) through therapy or other support systems is crucial for overall health.
5. **Limit Ultra-Processed Foods and Sugary Drinks:** These items are often high in added sugar, unhealthy fats, and artificial ingredients, contributing to inflammation and various chronic diseases, even in individuals who aren't considered overweight. Reducing their intake and opting for whole, minimally processed foods is a key strategy for improving health markers like blood sugar levels, blood pressure, and inflammation, regardless of their impact on body weight.

The key takeaway is that focusing on these health-promoting behaviors offers significant and measurable benefits for everyone, regardless of their body size, and can be more sustainable and empowering than a sole focus on weight.

4. "Where do you see the future of health assessment going? Are we moving away from simplistic metrics like BMI and towards more personalized approaches?"

When we're trying to have a real talk about health, especially when we're looking at both the big picture (like population health) and individual patient care, the Body Mass Index (BMI) often throws us off track. It's

becoming pretty clear, even from organizations like the AMA and from what most people like us are saying, that BMI is pretty limited and often just plain wrong. This tells us we really need to stop using BMI, or even just weight, as the main way to measure health.

Think about it: the whole problem with BMI goes way back to its beginnings. It was originally developed by just one researcher as a way to look at populations, not individuals. But over time, different groups – especially insurance and pharmaceutical companies – latched onto it. A lot of the time, this was more about money than actual health outcomes. They kept pushing it and making it seem more important than it really is, and that's something that really needs to change across the board.

Now, I'll admit, moving away from BMI isn't easy. It's so simple and has been used for so long in everything from doctor's guidelines to insurance policies and public health programs. So, there's definitely some resistance. But here's the good news: more and more people are recognizing its limitations, and that's actually sparking some exciting new ideas about how we can really assess health. This could inclusive quantitative measures, for those who really like numbers like hospital and insurance companies, things like Clinical Biomarkers and Functional Measures, in other words labs like lipid panels or hemoglobin A1c or measures of Cardiorespiratory like a Submaximal Exercise Tests: how long someone can walk on a treadmill or their heart rate recovery after exercise or Functional strength tests like grip strength or sit-to-stand tests provide valuable information about physical capacity and one's ability to stay independent. Certainly family history is a good foundation to draw from as well. Standardized questions or open-ended questions, depending on the setting, about lifestyle that get at food and nutrition security, relationship with food and possible disordered eating, dietary patterns, physical activity, stress, sleep, mood, social connection and quality of life are really where individualized approaches start.

These tools allow healthcare providers to assess and support health behaviors and physiological markers without solely focusing on weight or using weight as the primary determinant of health. They recognize that health is complex and multi-faceted, and individuals of various body sizes can achieve optimal health by prioritizing these non-weight-centric indicators and behaviors. The emphasis shifts from *what a body looks like* to *what a body can do* and *how a person feels and functions*.

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