

How Do you Measure Health? BMI Isn't Enough, Finds Data from Women's Health Initiative

New studies using Women's Health Initiative data highlight new “biomarkers” to predict mortality risk and guide providers' care.

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For years, people have been taught to pay attention to three little letters that are supposed to tell them exactly how healthy they are — or aren't.

BMI, also known as body mass index.

Unfortunately, BMI doesn't tell the whole story and may not even be as valuable as once thought, especially when it comes to determining what kind of a risk obesity poses to any one person.

Previous [research shows that peoples' waistlines are growing](#) over time — even faster than their overall weight. Unfortunately, this deep belly fat is the kind most strongly linked to serious health problems.

“BMI is a somewhat crude measure of obesity,” said Fred Hutch Cancer Center biostatistician and [Women's Health Initiative](#) principal investigator [Garnet Anderson, PhD](#), who collaborated with other Fred Hutch researchers on the [new study](#), published Tuesday in Annals of Internal Medicine.

Anderson holds the Fred Hutch 40th Anniversary endowed chair. “We can do a better job of figuring out who is at risk for mortality by adding one measure that's generalizable and that any physician could do in their office. Even better, it's very cheap and there's no risk.”

What is that one measure and how do you collect it? It's simple: grab a tape measure, wrap it around your waist and note the number.

Waist circumference, the researchers found, when combined with BMI, can tell you — and more importantly your physician — much more about your health than BMI alone. It can even predict your risk of dying.

Building on BMI

Fred Hutch public health researcher and lead author of the paper, Aaron Aragaki, said BMI is basically a handful of simple categories without much room for nuance.

“If your BMI is 25 to 30, then you’re overweight,” he said. “If it’s 30 to 35, you’re in obesity category 1, 35 to 40 is obesity category 2 and so on,” he said. “But there’s a lot of variability within BMI categories, and it doesn’t get to visceral adiposity, the fat around your belly.”

Fred Hutch’s [Anne McTiernan, MD, PhD](#), who researches cancer prevention but was not part of this study, underscored how visceral or intra-abdominal fat is “the most dangerous type of fat.”

In addition to increasing the risk of cardiovascular disease, diabetes and other conditions, visceral fat can raise insulin levels, which promotes the growth of cancer cells.

“It’s the most clinically significant type of fat, and it’s where women tend to store fat after menopause,” McTiernan said.

Expanding BMI’s categories, Aragaki said, makes for a more accurate assessment, allowing the provider to take measurements, then provide meaningful advice.

Using a 2020 recommendation from the International Atherosclerosis Society and the International Chair on Cardiometabolic Risk, or IAS/ICCR, who [called for waist circumference to be used as a “vital sign,”](#) the team differentiated people into either “normal” and “large” waist categories within the BMI framework.

“This provides additional info on a patient’s risk,” Aragaki said. “A physician could measure their waist to see if they’re lower or higher than a particular cut point.”

The team used these new categories to analyze data gathered over years from the WHI cohort — including mortality data — and made a surprising discovery.

“Women who were just overweight or normal weight but with large waists had similar mortality risk as women with obesity category 1 with normal-sized waists,” Aragaki said. “It was a real eye-opener. Waist circumference makes a big difference as far as identifying people with a lower or higher risk of mortality.”

Finding applies to post-menopausal women

Fred Hutch staff scientist Lesley Tinker, PhD, chair of the WHI’s Obesity & Diabetes Scientific Interest Group, emphasized that the study cohort they used for this research was from WHI so was exclusively composed of post-menopausal women.

“Somebody reading this report who is 30 or 40 needs to know it doesn’t apply to them — at least

not at this point in their lives,” she said. “It’s a study using data from post-menopausal women, who were ages 50 to 79 at baseline.”

Tinker, a registered dietitian, said it could be especially meaningful for women who are postmenopausal or approaching that stage of life.

“Body fat and muscle redistributes and changes over a lifetime and with menopause, body fat starts accumulating around the waist,” she said. “It’s been documented that it’s hormonal. Menopause can change the picture even for those with healthy BMI. Clinicians may want to start thinking about patients who are transitioning into menopause and keep an eye on them. Keep them on a healthier path.”

The researchers hope it will help providers better assess their patients’ health and perhaps provide more nuanced recommendations.

“For both pharmacologic and other obesity treatments like bariatric surgery, the typical indication is a BMI of 30 kg/m² or higher,” Aragaki said. [BMI is calculated by dividing weight in kilograms by the square of height in meters.]

“Someone with a high BMI might be a candidate for anti-obesity medications, but they may be reluctant to start them due to financial or other concerns,” he continued. “Waist circumference provides an additional layer of information about risk. This can help guide a more informed conversation between doctors and patients about diet, exercise, pharmacologic or surgical interventions.”

Another blood biomarker reveals risk

Researchers at Duke University in North Carolina used data from nearly 800 women involved in the WHI’s prospective Observational Study — women who’d been followed by researchers for nearly 20 years to observe their health outcomes — to identify another new biomarker “significantly positively associated with risks of all-cause mortality and any cancer incidence.”

Plasma levels of IGFBP7, or insulin-like growth factor-binding protein 7 as well as the ratio of IGFBP7 levels to insulin-like growth factor 1, or IGF-1, are emerging as biomarkers of kidney and cardiovascular disease, according to the study team. But much less was known as to what they might mean with regard to cancer.

Now a [study published last month](#) in the AACR journal Cancer Epidemiology, Biomarkers & Prevention, has shown that plasma levels of IGFBP7 “may be positively associated with obesity-related cancer risk.”

The researchers called their work “hypothesis-generating,” concluding that “future study of IGFBP7 as a risk biomarker of premature death and cancer development is warranted.”

Lighting a beacon for biomarker research

Fred Hutch Cancer Center is at the forefront of efforts to discover, analyze and validate new biomarkers.

In cancer, biomarkers are biological indicators found in blood, tissue, or other samples that can help predict cancer risk, detect cancer earlier, and guide treatment decisions.

[Read more](#) about a new Fred Hutch initiative to advance the ways we detect and prevent cancer called BEACON — Biomarkers for Early Assessment, Cancer detection, and Outcome Navigation.

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