Study finds link between foods scored higher by new nutrient profiling system and better long-term health outcomes

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"[Food Compass] provides a more comprehensive, holistic rating of a food's nutritional value than existing systems, and these new findings support its validity by showing it predicts better health," said Friedman School's Dariush Mozaffarian. Credit: Shutterstock

The idea that what we eat directly affects our health is ancient; Hippocrates recognized this as far back as 400 B.C. But, identifying healthier foods in the supermarket aisle and on restaurant menus is increasingly challenging. Now, researchers at the Friedman School of Nutrition Science and Policy at Tufts have shown that a holistic food profiling system, Food Compass, identifies better overall health and lower risk for mortality.

In a paper published in *Nature Communications* on November 22, researchers assessed whether adults who ate more foods with higher Food Compass scores had better long-term health outcomes and found that they did.

Introduced in 2021, Food Compass provides a holistic measure of the overall nutritional value of a food, beverage, or mixed meal. It measures nine domains of each item, such as nutrient ratios, food-based ingredients, vitamins, minerals, extent of processing, and additives. Based on scores of 10,000 commonly consumed products in the U.S., researchers recommend foods with scores of 70 or above as foods to encourage; foods with scores of 31-69 to be eaten in moderation; and anything that scores 30 or below to be consumed sparingly. For this new study, Food Compass was used to score a person's entire diet, based on the Food Compass scores of all the foods and beverages they regularly consume.

"A nutrient profiling system is intended to be an objective measure of how healthy a food is. If it's achieving its purpose, then individuals who eat more foods with higher scores should have better health," said Meghan O'Hearn, a doctoral candidate at the Friedman School and the study's lead author.

For this validation study, researchers used nationally representative dietary records and health data from 47,999 U.S. adults aged 20-85 who were enrolled between 1999-2018 in the National Health and Nutrition Examination Survey (NHANES). Deaths were determined through linkage with the National Death Index (NDI).

Overall, researchers found that the mean Food Compass score for the diets of the nearly 50,000 subjects was only 35.5 out of 100, well below ideal. "One of the most alarming discoveries was just how poor the national average diet is," said O'Hearn. "This is a call for actions to improve diet quality in the United States."

When people's Food Compass diet scores were assessed against health outcomes, multiple significant relationships were seen, even adjusting for other risk factors like age, sex, race, ethnicity,

education, income, smoking, alcohol intake, physical activity, and diabetes status. A higher Food Compass diet score was associated with lower blood pressure, blood sugar, blood cholesterol, body mass index, and hemoglobin A1c levels; and lower prevalence of metabolic syndrome and cancer. A higher Food Compass diet score was also associated with lower risk of mortality: for each 10-point increase, there was a 7 percent lower risk of death from all causes.

"When searching for healthy foods and drinks, it can be a bit of a wild west," said Dariush Mozaffarian, Jean Mayer Professor of Nutrition and dean for policy at the Friedman School. "Our findings support the validity of Food Compass as a tool to guide consumer decisions, as well as industry reformulations and public health strategies to identify and encourage healthier foods and beverages."

Compared to existing nutrient profiling systems, Food Compass provides a more innovative and comprehensive assessment of nutritional quality, researchers say. For example, rather than measuring levels of dietary fats, sodium, or fiber in isolation, it takes a more nuanced and holistic view, evaluating the ratio of saturated to unsaturated fat; sodium to potassium; and carbohydrate to fiber.

Food Compass also boosts scores for ingredients shown to have protective effects on health, like fruits, non-starchy vegetables, beans and legumes, whole grains, nuts and seeds, seafood, yogurt, and plant oils; and lowers scores for less healthful ingredients like refined grains, red and processed meat, and ultra-processed foods and additives.

Researchers designed Food Compass with the ever-evolving field of nutrition science in mind, and their multidisciplinary team—comprised of researchers with expertise in epidemiology, medicine, economics, and biomolecular nutrition—will continue to evaluate and adapt the tool based on the most cutting-edge nutrition research.

"We know Food Compass is not perfect," said Mozaffarian. "But, it provides a more comprehensive, holistic rating of a food's nutritional value than existing systems, and these new findings support its validity by showing it predicts better health."

These findings are timely given the release of the new U.S. National Strategy on Hunger, Nutrition and Health. One pillar of this strategy is to "empower all consumers to make and have access to healthy choices" through measures such as updating food labeling and making it easier to interpret, creating healthier food environments, and creating a healthier food supply.

"This study further validates Food Compass as a useful tool for defining healthy foods. We hope the Food Compass algorithm—publicly available to all—can help guide front-of-pack labeling; procurement choices in workplace, hospital, and school cafeterias; incentive programs for healthier eating in healthcare and federal nutrition programs; industry reformulations; and government policies around food," said O'Hearn.

Researchers plan to work on a simplified version that requires fewer nutrient inputs, as well as versions tailored to specific conditions such as diabetes and pregnancy or to other nations' populations. The research team is also interested in adding Food Compass domains based on other aspects of foods, such as environmental sustainability, social justice, or animal welfare.

"We look forward to continuing to find ways to improve the Food Compass system, and to get it to more users to help clear up confusion about healthier choices," said Mozaffarian.

More information: Meghan O'Hearn et al, Validation of Food Compass with a healthy diet, cardiometabolic health, and mortality among U.S. adults, 1999–2018, *Nature Communications* (2022). DOI: 10.1038/s41467-022-34195-8

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