

# Food as Medicine: Can nutrition be a prescription?<sup>1</sup>

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Diet and lifestyle behaviors can affect health status and the development of disease. Large research studies have shown making healthy choices, such as improving diet, regular exercise, managing stress, sleeping well, avoiding smoking, and moderating alcohol, can add over a decade of disease-free years to our lives (Li et al. 2020; Li et al. 2018). In fact, organizations like the American Heart Association highlight reductions of diet and lifestyle risks as first-line approaches for treating disease (Arnett et al. 2019; Mach et al. 2020). These professional organizations and clinical practice guidelines show how food can be used as medicine, such as through produce prescription programs, personalized nutrition education, medically tailored meals, and medically tailored groceries. The importance of nutrition in healthcare is especially relevant as one in five deaths globally can be connected to poor diet (Afshin et al. 2019). The “Food as Medicine” method and programs stress how food can be an integral part of preventing, managing, and treating disease. This publication, intended for general learners, dives into how nutrients connect to disease and how to use “Food as Medicine.”

## Nutrients and Disease 101

The nutrients that make up food can influence health in extensive ways—both positively and negatively. Each cell in the body needs a supply of nutrients from food to maintain and carry out functions. This starts with breaking large nutrients in food into smaller units (digestion), which then move from the digestive system into the blood (absorption) to travel to all parts of the body. Nutrients in food become

part of the body, available to use wherever they are (or perhaps are not) needed. Beyond basic needs, nutrients and nutrient deficiencies can alter many metabolic pathways (i.e., all the reactions that happen in cells). When factors are out of normal ranges (such as having too high or too low fats or sugar in your blood), risk for disease can increase. When factors are optimal, you can lower the risk for a condition.

For example, researchers looking at the relationship between nutrition and disease found specific diet factors, including low fiber intake, were associated with nearly half of all cardiometabolic deaths related to heart disease, stroke, and type 2 diabetes in 2012 (Micha et al. 2017). Diets high in fiber, which is found in fruits, vegetables, legumes, and whole grains, may lower disease risk.

## How Can Food as Medicine Be Used?

Uses of Food as Medicine are evolving every day, with evidence suggesting they can be effective. These practices may promote general well-being or target a certain disorder. While it is common to receive prescription medications, nutrition prescriptions can also be part of improving health. For example, your doctor or dietitian may work with you to “prescribe” meals or talk about cooking techniques and recipes based on an eating plan that supports your health (Hirsch. et al. 2019). Other resources such as food vouchers and education are often given to help with making lifestyle changes. Food as Medicine includes produce prescription

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programs, personalized nutrition education, medically tailored meals, and medically tailored groceries (Downer et al. 2020; Yoder, Proaño, and Handu 2021).

**Produce prescriptions** give vouchers for free or discounted fruits and vegetables, and they have shown promising improvements in accessing and eating healthy foods (Little et al. 2019; Bhat et al. 2021). Fresh “**Food Pharmacies**” or other incentive programs, such as matching dollars for healthy foods at a farmer’s market, have also led to better diet intake and food access (Savoie-Roskos et al. 2016). Food pharmacies prepare and dispense healthy foods. In a study of 97 adults with type 2 diabetes, a fruit and vegetable prescription program (*Veggie Rx*) resulted in significantly lower HbA1c (a long-term measure of blood sugar control as an average over the past two to three months) levels (Veldheer et al. 2021). The Geisinger Fresh Food Pharmacy, another produce prescription and fresh food program, has also shown cost and clinical benefits, including an average 2-point reduction in HbA1c and lower low-density lipoproteins, triglycerides, and blood pressure (Feinberg et al. 2018; Hess, Passaretti, and Coolbaugh 2019).

**Personalized nutrition education** may not provide foods, but it tailors messages to you—through one-on-one support, group classes, grocery store tours, websites, handouts, or recipe cards. To support medical conditions, personalized nutrition may apply Medical Nutrition Therapy (MNT), the individualized nutrition-based process provided by a registered dietitian nutritionist (RDN) for a disease (Academy of Nutrition and Dietetics n.d.).

**Medically tailored meals** are ready-to-eat, prepared foods crafted (usually by an RDN) specific to an individual’s medical needs. According to the Food is Medicine Coalition, medically tailored meals translate evidence-based nutrition standards into meals for a range of conditions, such as heart disease, kidney disease, and diabetes (Food Is Medicine Coalition n.d.). In a study of adults with type 2 diabetes, medically tailored meals enhanced intake of healthy foods and blood sugar control (Berkowitz, Delahanty, et al. 2019). Another study of over 1000 patients showed medically tailored meals were associated with about half the number of hospital admissions compared to nonrecipients (Berkowitz, Terranova, et al. 2019). Improvements in quality of life, mood, and medication use have also been connected to medically tailored meals (Downer et al. 2020; Hirsch et al. 2019).

Similar benefits that regulate blood sugar levels and improve fruit and vegetable intake have resulted from **medically tailored groceries** of non-prepared foods (Seligman et al. 2015). Medically tailored groceries or food

boxes are often paired with clinic or hospital-based food pantries, with a set of disease-friendly ingredients (Oronce et al. 2021).

The foods you choose at the grocery store and how you make them into meals are both strategies for changing risk factors. Healthy cooking can be a key way of implementing Food as Medicine in your daily habits and may be combined with other programs. Connecting foods that are both good for you and tasty to eat has led to using culinary medicine as part of Food as Medicine.

## Culinary Medicine: Kitchen Prescriptions

Culinary medicine is a growing field that blends the art of preparing and presenting food with the science of medicine to target disease processes or overall health (Hirsch et al. 2019; La Puma 2016). Along with medically tailored meals, meal kit delivery services, and health apps, culinary medicine includes culinary therapy, teaching kitchens, and cooking classes. Teaching kitchens are emerging in many communities and clinics for hands-on guidance through a “kitchen prescription” to make nourishing meals together and talk about other lifestyle habits. In most teaching kitchens, a trained dietitian or doctor will teach you culinary skills and food access strategies to take nutrition research to the kitchen (Eisenberg and Imamura 2020; Teaching Kitchen Collaborative n.d.). Recent evidence has shown culinary medicine can help people develop cooking skills and knowledge, improve diet intake, and manage risk factors (Hasan et al. n.d.; Reicks, Kocher, and Reeder 2018; Monlezun et al. 2015; Eisenberg et al. 2019). Virtual culinary coaching by a healthcare provider has also shown similar benefits (Polak et al. 2017; Silver et al. 2021; Polak et al. 2014). In one study, participation in a clinic-led virtual food prescription and culinary medicine program resulted in significantly better blood sugar control in patients with diabetes (Sharma et al. 2021).

A central part of culinary medicine is integrating delicious food with healthy food—bringing both the flavor and the wholesome nutrition. The influence of food on health extends beyond the nutrient compounds that make up its structure. Sensory and emotional pleasure, from the tastes and textures to memories with friends and family, are also important to encourage healthy food choices and manage stress levels, preventing and managing disease (Bédard et al. 2021; Hirsch et al. 2019).

## The Future of Food as Medicine

While nutrition can be a powerful tool for your health, learning what works for your body within a healthy pattern and maintaining a positive relationship with food are important. Enjoying meals without excess fear or stress is another vital part of health. Every person responds differently to food (due to genetics, environment, and lifestyle, among many factors), and the “Food as Medicine” term can provoke nutrition myths about what researchers have allegedly found to lower disease risk. It is not uncommon to find false nutrition claims promising quick fixes or cures to disease on websites and social media, sometimes even from “medical experts.” Relying on trained health professionals and credible sources of information, such as professional, government, or academic sites, can help lower the chances of falling prey to nutrition fads. Food as Medicine is meant to support, rather than replace, other forms of medical care.

The role of a healthy diet and lifestyle in preventing and managing many diseases is evident. Promising research shows the possibilities of healing through food, with meaningful connections from the soil to our plates to our health. Hospital systems are already beginning to adopt rooftop farms, teaching kitchens with cooking classes, preventive food pantries, and gardens as a routine part of patient care (Fitz et al. 2017; Musicus et al. 2019). As healthcare evolves, diet is becoming a vital sign—that is as essential in assessing health as heart rate and blood pressure—to complement medicine with new kinds of nutrition prescriptions.

## Learn More

Diet and Health Conditions: <https://www.nutrition.gov/topics/diet-and-health-conditions>

Nutrition and Health: <https://www.niddk.nih.gov/health-information/diet-nutrition>

Culinary Medicine and Teaching Kitchens: The Teaching Kitchen Collaborative Food as Medicine map shows where you can find Teaching Kitchens, medically tailored meals, and produce prescriptions across the nation. <https://teachingkitchens.org/map-fim/>

Food as Medicine from the Academy of Nutrition and Dietetics: <https://www.eatrightfoundation.org/resources/food-as-medicine>

Food is Medicine Coalition Medically Tailored Meal Providers: <http://www.fimcoalition.org/partners>

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