Dairy Foods Contribute to Heart Healthy Diets in Adults

Overview

Nutrient-dense dairy foods (i.e., milk, cheese and yogurt, including lactose-free varieties) contribute several important nutrients to the American diet – including high-quality protein and key micronutrients like calcium, vitamins A, D and B12, potassium and magnesium – along with a unique package of bioactive compounds and other nutrients that may work together to benefit heart health. The body of evidence, including randomized clinical trials, prospective cohort studies, meta-analyses and systematic reviews, links dairy food consumption across a range of fat levels with beneficial to neutral cardiovascular health outcomes. Scientific evidence supports the inclusion of dairy foods in heart healthy diets, suggesting people can allow for fat flexibility in a balanced eating pattern – like choosing whole- and reduced-fat milk, cheese and yogurt – within their individual energy requirements. This science is reflected in dietary guidance from leading nutrition and health organizations and the U.S. Dietary Guidelines for Americans (DGA) which recognizes nutrient-dense dairy foods as part of a healthy dietary pattern to prevent and lower risk of cardiovascular disease.

Dairy foods provide a package of essential nutrients important for cardiovascular health

Dairy foods (i.e., milk, cheese and yogurt) are nutrient-dense components of healthy eating patterns, such as the Dietary Approaches to Stop Hypertension (DASH) eating pattern.[1] Three servings of dairy foods as part of a healthy eating pattern can contribute over 15% of total nutritional intake for high-quality protein, vitamins A and D, thiamin, riboflavin, vitamin B6, vitamin B12, choline, calcium, magnesium, phosphorus, potassium and zinc to the diets of Americans 2 years and older in the U.S.[2] – important nutrients that support heart health in a variety of ways.[1] For example, calcium plays a role in blood pressure regulation through supporting vascular function;[3] potassium helps offset and balance sodium levels to help reduce blood pressure;[4] and vitamin D helps reduce inflammation and

supports calcium absorption.[5] Dairy foods are also an affordable source of high-quality protein,[6] which can help maintain muscle mass and support weight management.[7] Dairy milk provides 13 essential nutrients,[8] and the unique nutrient package of dairy foods is hard to replace with other foods for the same price point and portion size.[8–11]

The health benefits of dairy milk and other dairy foods are backed by decades of peer-reviewed literature that supports dairy's role in healthy eating patterns and reduced risk of chronic diseases such as cardiovascular diseases (CVD).[12,13] In addition, there are many lower-lactose and lactose-free options in the dairy case that are nutrient-dense and accessible choices to help individuals with lactose intolerance confidently enjoy dairy foods. The U.S. Dietary Guidelines for Americans (DGA) recommends three servings of dairy foods (i.e., milk, cheese and yogurt) per day as part of a 2,000-calorie eating pattern due to their important nutritional and health contributions for Americans.[13]

The evolving science of the diet-heart paradigm

CVD is a group of diseases that affect the heart or blood vessels.[14] Heart disease – a type of CVD and the umbrella term for conditions that affect the structure and function of the heart[14] – is the leading cause of death among Americans, with healthcare costs related to cardiometabolic conditions reaching over $417 billion annually.[15] The most common type of heart disease is coronary heart disease (CHD), which occurs when arteries become clogged and can cause heart attacks and heart failure.[16] Nutrition plays a vital role in the risk reduction and management of CVD, and dietary changes early on can help to protect heart health, reduce or reverse key risk factors for CVD like overweight and obesity as well as high blood pressure, blood glucose and blood lipids.[17,18]

The diet-heart paradigm, established in the 1950s, was developed to help explain the relationship between certain foods linked with increased risk of CVD.[19] This paradigm describes a causal relationship where saturated fat consumption leads to elevated low-density lipoprotein cholesterol (LDL-C) levels and increased CVD risk.[19] As such, leading authoritative health organizations recommend limiting the consumption of foods high in saturated fat, such as reduced-fat (2% milk fat) and whole-milk dairy foods.[13,17,20] Over the decades since the diet-heart paradigm was first defined, a growing body of research indicates that reducing saturated fat consumption – without consideration of the food source of saturated fat or overall eating pattern – may not reduce risk of CVD as expected.[21] In a 2020 Cochrane systematic review (SR) analyzing 15 randomized controlled trials (RCTs), all designed for a minimum of 24 months duration with 56,675 total participants, no significant reduction in the risk of CVD, CHD, heart attacks, strokes or overall mortality was found as a result of lowering saturated fat intake.[21,22]

In addition, as nutrition science has continued to evolve and advance, newer research has underscored the complexity of the etiology of CVD and how diet and lipid metabolism interact to impact cardiovascular health.[23–30] While LDL-C remains the mainstream risk factor to assess CVD risk, an emerging body of evidence indicates that there may be a suite of risk factors that can provide a more comprehensive risk assessment – such as the size of LDL particles (components that make up total LDL-C), blood triglycerides, apolipoproteins A1 and B, high-density lipoprotein (HDL) function, ratios of total cholesterol to HDL cholesterol or total triglycerides to HDL cholesterol, as well as markers of inflammation and insulin resistance.[23–26,30] While more research is needed to better understand how these interrelated risk factors contribute to cardiovascular health outcomes, the current body of evidence suggests that the diet-heart paradigm may be more complex than originally understood.

Consuming dairy foods can benefit cardiovascular health in adults

A growing body of research linking dairy foods with beneficial to neutral cardiovascular outcomes suggests dairy foods can play an important role in healthy eating patterns in adults. Forty recent scoping reviews, umbrella reviews, SRs and meta-analyses examining observational and clinical studies spanning from 1979 to 2024 report beneficial[12,31–60] or neutral[12,61–66] results between dairy food consumption and CVD risk, with only three of the forty reporting poor CVD-related outcomes with dairy food consumption.[67–69] A 2022 SR and meta-analysis including 55 prospective cohort studies of adults in the U.S., Europe and Africa found consuming high amounts of dairy foods compared to consuming low amounts had a 9% lower risk of hypertension and a 10% lower risk of stroke.[44] Another 2022 SR and meta-analysis of 42 cohort studies from over 1.2 million adults in Asia, Australia, Europe and North America reported that for every 200 g (equivalent to about 1 cup of milk) of total dairy foods consumed per day, risk of hypertension decreased by 5%.[45] A similar association was observed for every 200 g of low-fat dairy foods and milk consumed daily.[45] A 2021 SR and meta-analysis reported consumption of total dairy, low-fat dairy and full-fat dairy had no association with CHD or ischemic stroke.[50]

Results of recent observational and clinical research also indicate that dairy foods are beneficial contributors to heart healthy diets in adults. Prospective cohort studies and clinical trials have observed beneficial[25,71–97] to neutral[98–119] relationships between dairy food consumption and cardiometabolic outcomes. A 2024 prospective cohort study observed no association between dairy food consumption (including total dairy foods, milk, yogurt, low-fat and whole-milk dairy foods) and risk of developing hypertension in 2,303 adults in Switzerland.[110] In 2021, Bhavadharini et al.[85] analyzed data from the Prospective Urban Rural Epidemiology (PURE) study, including 147,812 individuals (35-70 years old) across 21 countries and five continents. Researchers found an 11% lower incidence of hypertension for those who consumed at least two servings of dairy a day compared to those who ate no dairy, and the incidence was lower (13%) if more than three daily servings of dairy were consumed. A later analysis of the PURE study (244,597 adults from 80 countries globally) also reported benefits for longevity and CVD events.[25] In contrast to the above, one observational study of 102,521 postmenopausal U.S. women reported consumption of dairy foods was linked with increased risk of CVD-related mortality.[120]

Study Spotlight: Fermented dairy foods may have distinct benefits for cardiovascular health

Yogurt and other fermented dairy foods like kefir and certain cheeses are made with live and active cultures that may uniquely contribute to heart health.[36,42,70] In 2021, Savaiano et al.[36] conducted a large-scale SR to evaluate the impact of fermented dairy food consumption, specifically yogurt, kefir and other fermented milks, on a broad range of health outcomes including CVD, CHD, metabolic syndrome, risk of stroke and related risk factors like low-density lipoprotein (LDL) cholesterol, triglycerides and blood pressure. All 28 studies included in the SR reported a beneficial or neutral association of consuming fermented dairy foods with cardiovascular health.

In a 12-week RCT, 72 adults with metabolic syndrome (18-75 years old) consuming either low-fat dairy foods or whole-milk dairy foods (3.3 servings/day) saw no change in LDL cholesterol, blood pressure or other CVD risk factors compared to those following diets limited in dairy foods.[101] Rajendiran et al.[121] found that participants consuming a diet supplemented with saturated fat from cheese or butter had increased total- and LDL-C levels after four weeks compared to isoenergetic diets higher in mono- or polyunsaturated fatty acids, with no changes to HDL-C or triglycerides observed. Specific to older adults, secondary analysis of a clinical trial conducted in 60 aged care homes (median age of participants 87.8 years) found that incorporating about 1 serving each of milk, cheese

and yogurt into the diet per day had neutral effects on blood lipids, while significantly reducing the risk of falls or fractures in this at-risk population.[71] Researchers noted the important real-world application of these results, stating "correcting insufficiency in intakes of calcium and protein using milk, yoghurt and cheese does not alter serum lipid levels, suggesting that this may be a suitable intervention to promote bone health in older adults."[71]

Study Spotlight: Global study links dairy foods, including whole fat dairy foods, with heart health benefits

In data from the Prospective Urban Rural Epidemiology (PURE) study, including 244,597 adults from 80 countries globally, an eating pattern of six food groups was associated with health and longevity (median follow-up of 8.3 years).[25] Those who consumed the following components had a 30% reduced risk of all-cause mortality, 19% reduced risk of stroke, 18% reduced risk of CVD and 14% reduced risk of heart attack:

- 2-3 daily servings of fruit and vegetables
- ~2 servings of dairy foods (mostly whole-fat dairy foods)
- 1 serving of nuts
- Weekly servings of legumes and fish

Higher adherence to this diet was consistently associated with lower risks of death and major CVD events across all regions, with the greatest benefits seen in low-income countries where consumption of these foods tends to be lower.

Whole milk dairy foods can contribute to cardiovascular health: The unique role of the food matrix

Different types of dairy foods like milk, cheese and yogurt each have a different and unique food matrix – made up of nutrients and bioactive compounds within a physical structure – that set them apart from other foods.[22,122–127] An emerging body of science indicates that the heart health benefits of dairy foods may also go beyond their nutrient profile, and that nutrients may work together within the whole dairy food matrix to impact digestion and absorption, ultimately influencing its overall health impact.[22,122–127]

Milk, the food from which all other dairy foods and products are made, contains hundreds of bioactive compounds, including bioactive peptides, and polar lipids that have been linked via mechanistic research with potential benefits for cardiovascular health.[22,122–127] Food matrix science also suggests potential bioactivity in the fats found in milk contributes to health. Dairy milk contains more than 400 types of fatty acids, making the fat in milk and dairy foods the most complex of all naturally occurring fats.[128,129] These milk fats are packaged in dairy foods within a naturally-occurring, tri-layer, lipid-containing membrane known as the milk fat globule membrane.[130,131] Animal and *in vitro* studies have linked milk polar lipids, a unique class of dairy fats that are found within this membrane, with potential benefits for lipid metabolism, gut health and systemic inflammation that may help promote cardiometabolic health.[127,130] Similar potential benefits have been linked to fatty acids found in dairy foods like short-, medium-, odd- and branched-chain fatty acids and naturally occurring trans fatty acids.[132–134]

The unique food matrix of milk, cheese and yogurt may help explain why saturated fat from whole-milk and reduced-fat dairy foods does not have the same cardiometabolic health effects as other foods containing saturated fat.[22,122–127] In a 2025 prospective cohort study conducted by Yiannakou et al.[135] authors developed a novel dietary index known as mDASH, based on the Dietary Approaching to Stop Hypertension eating plan, but

modified to include total dairy foods regardless of fat level. Authors found that a higher adherence compared to a lower adherence to mDASH was associated with a greater decrease in risk of cardiometabolic health outcomes, including hypertension and atherosclerotic CVD. An RCT enrolling 60 adults with elevated blood pressure found no differences in measurements of subclinical vascular function when consuming either a diet with four daily servings of whole-milk dairy foods or a control diet without dairy foods.[103]

Study Spotlight: Cheese – a food that delivers 8 essential nutrients – can impact cardiovascular health in unexpected ways

While cheese is a food high in sodium and saturated fat, cheese also has a unique food matrix that provides 8 essential nutrients and an array of bioactive compounds that may work together to benefit cardiovascular health.[9,13,125,136]

A 2023 umbrella review and updated SR synthesizing 39 meta-analyses across 27 health outcomes reported beneficial to neutral associations between cheese consumption and health.[42] Cheese intake was linked to beneficial cardiovascular outcomes including reduced risk of CVD, CHD and stroke. There was no relationship between cheese consumption and blood pressure. Researchers found these health benefits were observed with daily consumption of ~1 to 1.5 ounces of cheese – equivalent to 1 to 1.5 dairy food servings per the DGA.[13]

Dietary guidance recommends dairy foods as part of heart healthy eating patterns

Authoritative health and wellness organizations recognize milk, cheese and yogurt as nutrient-dense foods within overall balanced eating patterns to promote heart health.[13,17,137]

Resource and Supporting Organization	Dairy Food Recommendations
2025-2030 Dietary Guidelines for Americans (DGA)[13] United States Department of Agriculture	"Dairy serving goals: 3 servings per day as part of a 2,000-calorie dietary pattern, adjusting as needed based on your individual caloric requirements." The DGA defines the Dairy food group as containing: "Whole, reduced-fat, low-fat, or nonfat dairy products, including fluid, dry, or evaporated milk; yogurt; and cheeses. Lactose-free and lactose-reduced products, as well as fortified dairy alternatives, are also options."

Resource and Supporting Organization	Dairy Food Recommendations
Saturated Fat 2023 Evidence-based Nutrition Practice Guideline[138] Academy of Nutrition and Dietetics	Implementation tips provided include: "Individualized healthy dietary patterns should be prioritized over strict exclusion of food groups or specific foods." Guidelines note: "Low certainty evidence demonstrates that a variety of dairy products are not associated with an increased risk of CVD; however, reduction of red meat and processed meat is associated with reduced CVD risk."
2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines[17] The American College of Cardiology and American Heart Association	The DASH eating pattern is an example of a healthy diet for prevention and treatment of hypertension: "Consume a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat."
2025 AHA / ACC / AANP / AAPA / ABC / ACCP / ACPM / AGS / AMA / ASPC / NMA / PCNA / SGIM Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/ American Heart Association Joint Committee on Clinical Practice Guidelines[137] Led by the American Heart Association and American College of Cardiology Joint Committee on Clinical Practice Guidelines Developed in collaboration with and endorsed by: the American Academy of Physician Associates; the American Association of Nurse Practitioners; the American College of Clinical Pharmacy; the American College of Preventive Medicine; the American Geriatrics Society; the American Medical Association; the American Society of Preventive Cardiology; the Association of Black Cardiologists; the National Medical Association; the Preventive Cardiovascular Nurses Association; and the Society of General Internal Medicine	The DASH eating pattern is an example of a heart healthy eating plan: "Reduced sodium intake and a diet high in vegetables, fruits, whole grains, legumes, nuts and seeds, and low-fat or nonfat dairy, and includes lean meats and poultry, fish and non-tropical oils."

Conclusion

Dairy foods are an important component of healthy eating patterns, providing an affordable package of highly bioavailable essential nutrients that can promote heart health. A robust and growing body of evidence demonstrates that dairy foods, including nonfat, low-fat, reduced-fat and whole-milk varieties and fermented options like yogurt and cheese, are associated with beneficial to neutral cardiovascular outcomes, with emerging research indicating a potential role of the dairy food matrix in driving these effects. Collectively, the body of evidence and the 2025-2030 DGA indicate that the source of saturated fat in the diet may distinctly impact health, and that Americans can choose among a wide variety of dairy foods like milk, cheese and yogurt at their fat level of choice as part of balanced, nutrient-dense eating patterns to support cardiovascular health.

Key Takeaways for Health & Wellness Professionals

- **Dairy foods can be a part of heart-healthy eating patterns recognized by leading health experts**. Milk, cheese and yogurt are included in the DASH diet and the Dietary Guidelines for Americans to help support cardiovascular health.[13,17,137]
- **Dairy foods provide a unique package of nutrients that can help support heart health**. The high-quality protein, calcium, potassium, magnesium and vitamin D that can be found in dairy foods may help regulate blood pressure, support vascular function and weight management and reduce inflammation.[1,3–7]
- **The health benefits of dairy foods go beyond individual nutrients**. Milk, cheese and yogurt have a unique food matrix where nutrients and bioactive compounds may work together to impact health.[22,122–127]
- **Dairy foods are linked with beneficial to neutral heart health outcomes**. A large and growing body of evidence shows dairy consumption across a range of fat levels is associated with improved or unchanged cardiovascular risk.[12,31–66]
- **Fermented dairy foods like yogurt and cheese may offer unique heart health benefits**. Foods made with live and active cultures have been linked with improvements in cardiovascular risk factors like blood pressure, cholesterol and inflammation.[22,42,122–127]
- **There are many options when it comes to dairy foods that can help support a heart-healthy lifestyle**. Whether choosing fat-free, low-fat, reduced-fat or whole-milk varieties, dairy foods provide important nutrients for heart health as part of a balanced diet[1,3–7]

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