

What We Drink

Salud! L'Chaim! Sláinte! In countries around the world, when you drink, you often toast to your health and the health of your friends. What you drink is as important as what you eat, and it can have a large impact on your overall health. We have more beverage options now than we ever have before in human history. This tool reviews some of the research on various drinks and offers suggestions on how to drink for optimal health.

Around 21% of our daily caloric intake comes in the form of beverages.¹ This is about 500 calories a day for a moderately active male in the United States. If you are looking for a single piece of advice to give patients who want to lose weight, this is a low-hanging fruit: Changing what you drink has a powerful effect on weight loss.

By cutting out or minimizing the amount of soda, sweetened tea or coffee, juice, alcohol, energy drinks, milk (yes, milk), or smoothies you drink in a day, people cannot only improve their health, but they can also decrease their total caloric intake. More nutritious options include water, of course, but also unsweetened teas (e.g., herbal, green, or black), coffee, and wine or beer (in moderation). The ideal amount of liquid to drink in a day varies from person to person. The standard recommendation is 64 oz. of water (or eight 8-oz. cups daily), but this has not yet been confirmed by research findings.

People may require more or less liquid if they are very active; live in a hot, dry climate; or have a medical condition that causes them to retain fluid. If someone is thirsty, he or she is already showing signs of early dehydration. Another good guide to assess for hydration is whether or not they are passing colorless or clear urine every 2-3 hours. If their urine is too yellow, they need to drink more!

More on Specific Beverages

Water

Pure water is the world's first and foremost medicine.

—Slovakian proverb

Water is the second most-popular beverage in the United States (second to soda but ahead of beer).² Water is the perfect drink because it has no calories and no additives, and, when enjoyed from the tap, it costs very, very little (fractions of a penny per cup). There is no regulation on bottled water. Although a bottle of water has a picture of water bubbling down a mountain stream, it does not mean that water came from a mountain stream. It may have actually come from the tap, as 25% of bottled water does.³ Any water source that flows naturally to the earth's surface may be called spring water regardless of location.

Unless their home water is somehow unsafe, it might be wisest for people to do the environment and their checkbooks a favor and not buy bottled water. Tap water is actually much more closely monitored for safety than bottled water. In general, there is no evidence that using bottled or filtered water prevents disease in immunocompetent people. The [Environmental Working Group](#) website is a wonderful resource for information about water safety, water in your area, different water filters, and bottled water grades.

Alcohol

By now, most people are aware of the cardiovascular benefits of drinking red wine, which came to light largely in the 1990s after *60 Minutes* did a health report on “The French Paradox.” This research has been reproduced in many different populations with the same results; it is thought that resveratrol, a phenol found in the skin of grapes, plays an important role in wine’s health benefits.⁴ More surprising is that further studies have shown that beer also has health benefits. While there is not a huge body of evidence, some early studies indicate it is cardioprotective and that it also has more B vitamins and protein than wine,⁵ as well as a different flavonoid profile.⁶

One important detail that came from studies on the benefit of red wine consumption is the presence of a J- or U-shaped curve that indicates a health benefit from alcoholic beverages only for those who drink modestly—1 drink daily for women and 2 drinks daily for men. Those who abstained from alcohol and those who drank in excess of those quantities had poorer health outcomes.⁷ If your patients drink alcohol, encourage them to drink in moderation, and carefully monitor them for signs of misuse or overconsumption. It is generally not recommended that clinicians encourage a patient to begin drinking for health benefits if they do not drink in the first place. Finally, it is important to adjust recommended daily maximum drinks for geriatric populations. Specifically, patients over 65 years old should not consume more than seven drinks per week because it could exacerbate existing health problems and interfere with medications.⁸

Tea

Tea is a delightful way to begin or end the day. Herbal teas are flavorful, and many of them offer health benefits. Green tea seems to be helpful for preventing multiple cancers and all-cause mortality.⁹ Extracts have even been found helpful for treating genital warts.¹⁰ It is thought that the health benefits of green tea come from the polyphenols and catechins found in the tea leaves.

Examples of herbal teas that are generally recognized as safe, and their potential uses, are listed in Table 1. Teas tend to be much less concentrated than other botanical products.

Table 1. Herbal Teas and Their Medicinal Uses^{11,12}

Herb	Medicinal Use
Chamomile (can be enjoyed with lemon balm or valerian, which also have sedative properties)	Sedative, anxiolytic; used to treat diarrhea and colic in infants



Herb	Medicinal Use
Cassia cinnamon	Treats flatulence, lowers blood glucose and lipids, is an appetite stimulant
Ginger	Postoperative nausea and vomiting, arthritis, migraine
Stinging nettle	Benign prostatic hypertrophy, diuretic effects
Peppermint	Digestive aid, irritable bowel syndrome (when enterically coated), tension headache

Coffee

Coffee may confer some health benefits, particularly for the prevention of type 2 diabetes,¹³ Parkinson's disease,¹⁴ colorectal cancer,¹⁵ and hepatocellular cancer.¹⁶ Previous studies linking coffee to cancer had methodological flaws and did not account for the fact that many of those studied who drank coffee were also smokers. A recent meta-analysis showed an inverse relationship between coffee consumption and prostate cancer, as well as no evidence of increased risk of renal or bladder cancers.¹⁷

When taken in excess (5-10 cups/day), coffee (due largely to its caffeine content) can cause insomnia and anxiety, and it can increase risk for coronary heart disease (CHD) and myocardial infarction (MI), though the most recent meta-analysis for the data on coffee and CHD/MI is over 20 years old.¹⁸ Data has not shown that drinking a moderate amount of coffee puts one at increased risk of arrhythmia or sudden death.¹⁹ The relationship between caffeine and osteoporosis is unclear at this time, as data has been conflicting. It appears that caffeine inhibits some calcium absorption. It has been recommended that women limit coffee to 3 cups daily (or the equivalent of 300 mg of caffeine) and make certain they get adequate calcium and vitamin D from their diet. There has been considerable debate over drinking coffee or consuming caffeine during pregnancy and the risk of spontaneous abortion. Recent epidemiological reviews did not demonstrate a causal relationship between coffee and spontaneous abortion.²⁰ The American Board of Obstetrics and Gynecology states that consuming 2 cups or less of coffee per day is safe during pregnancy.²¹

Milk

Milk is one way to get calcium, but it carries with it a lot of extra calories and saturated fat, unless the fat has been removed. Studies have shown mixed results about whether milk consumption is protective for bone health; in fact, some studies have shown an increased risk of fractures with more milk consumption.²² Also, 50 million adults in the United States cannot digest milk due to lactose intolerance. It is possible to get plenty of calcium from foods other than milk, such as fortified cereals, greens, tofu, sweet potatoes, or garbanzo beans.

Over the years, cows have been bred for increased milk production, and they are now routinely milked far into pregnancy. This means that there are more hormones (e.g., estrogen, progesterone, androgens, and insulin-like growth factors) in the milk we drink now, as well as more antibiotics. Organic milk will not necessarily have lower hormone levels, but there may be differences based on the diet of the cows. There are also hormone-free milk options that are available. Some of these use recombinant bovine somatotropin, held to be a safe way of

augmenting milk production. It is perhaps best to consider milk and dairy as an optional part of the diet, depending on the availability of alternate calcium sources.

Juice/juicing

Home juicing has become increasingly popular and is a convenient way to consume more fruits and vegetables. However, studies have shown that juicing may alter the nutritional effects of a fruit or vegetable. A comparison of the benefits of whole apples and apple juice over a 4-week period showed that whole apples reduced total cholesterol and LDL cholesterol while apple juice increased these values.²³ Still, juicing vegetables and fruits at home is better than buying a similar product from the store or eating no fruit at all.

When buying prepared juices, look at the label to be sure there are not any added sweeteners. Research has shown that people still eat the same amount of calories as food, regardless of the amount of beverage calories they drink.²⁴ This means that if juice or other high-calorie drinks are enjoyed regularly, it can lead to weight gain over time.

Soda and energy drinks

According to the Beverage Marketing Corporation, Americans, on average, drink around 44.7 gallons of carbonated soft drinks annually. That equates to 40 (12-can) cases per year and almost a gallon of soda per person per week. Multiple studies have shown a relationship between sugar-sweetened beverages and metabolic syndrome, dental cavities, osteoporosis, gout, and insulin resistance.^{25,26} In fact, consuming one can of soda per day can lead to a 67% increase in risk for developing diabetes.²⁷ Moreover, consuming these beverages can significantly increase visceral adipose tissue in our bodies over just 6 months.²⁸ There is no health benefit from drinking these beverages. Encourage your patients to avoid them altogether. Even diet sodas are not recommended as an alternative.

Since their introduction to the market in 1997, energy drinks have become increasingly popular with young adults, and people in the military consume more energy drinks than the civilian population.²⁹ In contrast to soda and coffee, which contain approximately 35 mg of caffeine per can and 150 mg caffeine per cup, energy drinks may contain levels of 500 mg of caffeine or more, as well as sweeteners and other herbal supplements. Supplements frequently added to these beverages include bitter orange, guarana, ephedra, yohimbine, taurine, and 5-hydroxytryptophan, which can interact with medications and have other side effects.

Excessive amounts of caffeine can lead to long-term health effects and adverse reactions such as anxiety, insomnia, tachycardia, caffeine intoxication syndrome, and caffeine withdrawal. An Australian study found an association between energy drink consumption and increased anxiety in males, but not depression or stress. This effect may be worse in teenagers. A Korean study showed that adolescents who consumed energy drinks five or more times per week had a higher risk of severe stress, depression, and suicidal ideation.³⁰ Data on whether energy drinks improve reaction time, promote weight loss, or boost performance, mood, and concentration are conflicting.³¹ Athletic performance improvements have been attributed to caffeine and glucose.^{32,33} Specifically, caffeine can improve both endurance and strength training performance.^{34,35}

In Conclusion

The variety of things to drink these days is endless. As you help patients choose—and make choices yourself—keep the above research findings in mind. Salud!

Resource Links

- [Environmental Working Group](https://www.ewg.org/): <https://www.ewg.org/>

Author(s)

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References

1. Nielsen SJ, Popkin BM. Changes in beverage intake between 1977 and 2001. *Am J Prev Med*. 2004;27(3):205-210.
2. United States Department of Agriculture Economic Research Service. Food availability: spreadsheets. <https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/>. Accessed July 21, 2020.
3. Olson ED. Bottled water: pure drink or pure hype? <http://www.nrdc.org/water/drinking/bw/bwinx.asp>. Accessed June 2, 2014.
4. Kopp P. Resveratrol, a phytoestrogen found in red wine. A possible explanation for the conundrum of the 'French paradox'? *Eur J Endocrinol*. 1998;138(6):619-620.
5. United States Department of Agriculture. USDA nutrient database for standard reference, release 13. <https://data.nal.usda.gov/dataset/usda-national-nutrient-database-standard-reference-legacy-release#:~:text=The%20USDA%20National%20Nutrient%20Database,database%20in%20its%20current%20format>. Accessed July 21, 2020.
6. Madigan D, McMurrough I, Smyth MR. Determination of proanthocyanidins and catechins in beer and barley by high-performance liquid chromatography with dual-electrode electrochemical detection. *Analyst*. 1994;119(5):863-868.
7. Ronksley PE, Brien SE, Turner BJ, Mukamal KJ, Ghali WA. Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis. *BMJ*. 2011;342.
8. Older Adults. National Institute on Alcohol Abuse and Alcoholism website. Available at: <https://www.niaaa.nih.gov/alcohol-health/special-populations-co-occurring-disorders/older-adults>.
9. Kuriyama S, Shimazu T, Ohmori K, et al. Green tea consumption and mortality due to cardiovascular disease, cancer, and all causes in Japan: the Ohsaki study. *JAMA*. 2006;296(10):1255-1265.
10. Tatti S, Swinehart JM, Thielert C, Tawfik H, Mescheder A, Beutner KR. Sin catechins, a defined green tea extract, in the treatment of external anogenital warts: a randomized controlled trial. *Obstet Gynecol*. 2008;111(6):1371-1379.
11. Jellin JM, Gregory P. *Pharmacist's Letter, Prescriber's Letter Natural Medicines Comprehensive Database*. 9th ed. Stockton, CA: Therapeutic Research Faculty; 2007.
12. Wagner S, Rakel D. Medicinal Uses for Herbal Teas: Evidence, Dosing, and Preparation Methods. 2007; University of Wisconsin Integrative Medicine Department of Family Medicine website. Available at: http://www.fammed.wisc.edu/sites/default/files/webfm-uploads/documents/outreach/im/ss_herbal_tea.pdf. Accessed September 11, 2014.



13. Salazar-Martinez E, Willett WC, Ascherio A, et al. Coffee consumption and risk for type 2 diabetes mellitus. *Ann Intern Med.* 2004;140(1):1-8.
14. Ascherio A, Weisskopf MG, O'Reilly EJ, et al. Coffee consumption, gender, and Parkinson's disease mortality in the cancer prevention study II cohort: the modifying effects of estrogen. *Am J Epidemiol.* 2004;160(10):977-984.
15. Tavani A, La Vecchia C. Coffee, decaffeinated coffee, tea and cancer of the colon and rectum: a review of epidemiological studies, 1990-2003. *Cancer Causes & Control.* 2004;15(8):743-757.
16. Gelatti U, Covolo L, Franceschini M, et al. Coffee consumption reduces the risk of hepatocellular carcinoma independently of its aetiology: a case-control study. *J Hepatol.* 2005;42(4):528-534.
17. Huang T-b, Guo Z-f, Zhang X-l, et al. Coffee consumption and urologic cancer risk: a meta-analysis of cohort studies. *Int Urol Nephrol.* 2014:1-13.
18. Myers MG. Caffeine and cardiac arrhythmias. *Ann Intern Med.* 1991;114(2):147-150.
19. Frost L, Vestergaard P. Caffeine and risk of atrial fibrillation or flutter: the Danish Diet, Cancer, and Health Study. *Am J Clin Nutr.* 2005;81(3):578-582.
20. Signorello LB, McLaughlin JK. Maternal caffeine consumption and spontaneous abortion: a review of the epidemiologic evidence. *Epidemiology.* 2004;15(2):229-239.
21. American College of Obstetricians and Gynecologists (ACOG). ACOG Committee Opinion No. 462: Moderate caffeine consumption during pregnancy. *Obstet Gynecol.* 2010;116(2 Pt 1):467-468.
22. Michaelsson K, Wolk A, Langenskiöld S, et al. Milk intake and risk of mortality and fractures in women and men: cohort studies. *BMJ.* 2014;349:g6015.
23. Ravn-Haren G, Dragsted LO, Buch-Andersen T, et al. Intake of whole apples or clear apple juice has contrasting effects on plasma lipids in healthy volunteers. *Eur J Nutr.* 2013;52(8):1875-1889.
24. Flood JE, Roe LS, Rolls BJ. The effect of increased beverage portion size on energy intake at a meal. *J Am Diet Assoc.* 2006;106(12):1984-1990.
25. Malik VS, Popkin BM, Bray GA, Després J-P, Willett WC, Hu FB. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: meta-analysis. *Diabetes Care.* 2010;33(11):2477-2483.
26. Choi HK, Curhan G. Soft drinks, fructose consumption, and the risk of gout in men: prospective cohort study. *BMJ.* 2008;336(7639):309-312.
27. Nettleton JA, Lutsey PL, Wang Y, Lima JA, Michos ED, Jacobs DR, Jr. Diet soda intake and risk of incident metabolic syndrome and type 2 diabetes in the Multi-Ethnic Study of Atherosclerosis (MESA). *Diabetes Care.* 2009;32(4):688-694.
28. Maersk M, Belza A, Stodkilde-Jorgensen H, et al. Sucrose-sweetened beverages increase fat storage in the liver, muscle, and visceral fat depot: a 6-mo randomized intervention study. *Am J Clin Nutr.* 2012;95(2):283-289.
29. Johnson LA, Foster D, McDowell JC. Energy drinks: review of performance benefits, health concerns, and use by military personnel. *Mil Med.* 2014;179(4):375-380.
30. Park S, Lee Y, Lee JH. Association between energy drink intake, sleep, stress, and suicidality in Korean adolescents: energy drink use in isolation or in combination with junk food consumption. *Nutr J.* 2016;15(1):87.
31. Trapp GS, Allen K, O'Sullivan TA, Robinson M, Jacoby P, Oddy WH. Energy drink consumption is associated with anxiety in Australian young adult males. *Depress Anxiety.* 2014;31(5):420-428.
32. Wilhelm P, Van Diepen M, Nieuwenhuis L, Boulogne T. The effect of energy drinks on the cognitive performance of adolescents. *Tijdschr Psychiatr.* 2012;55(1):57-62.
33. Ballard SL, Wellborn-Kim JJ, Clauson KA. Effects of commercial energy drink consumption on athletic performance and body composition. *Phys Sportsmed.* 2010;38(1):107-117.
34. Woolf K, Bidwell WK, Carlson AG. The effect of caffeine as an ergogenic aid in anaerobic exercise. *Int J Sport Nutr Exerc Metab.* 2008;18(4):412-429.
35. McNaughton LR, Lovell RJ, Siegler J, Midgley AW, Moore L, Bentley DJ. The effects of caffeine ingestion on time trial cycling performance. *Int J Sports Physiol Perform.* 2008;3(2):157-163.