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Alcohol

Throughout the 10,000 or so years that humans have been drinking fermented beverages, they've also been arguing about their merits and demerits. The debate still simmers today, with a lively back-and-forth over whether alcohol is good for you or bad for you.

It's safe to say that alcohol is both a tonic and a poison. The difference lies mostly in the dose.

Moderate drinking seems to be good for the heart and circulatory system, and probably protects against type 2 diabetes and gallstones. Heavy drinking is a major cause of preventable death in most countries. In the U.S., alcohol is implicated in about half of fatal traffic accidents.⁽¹⁾ Heavy drinking can damage the liver and heart, harm an unborn child, increase the chances of developing breast and some other cancers, contribute to depression and violence, and interfere with relationships.



Alcohol's two-faced nature shouldn't come as a surprise. The active ingredient in alcoholic beverages, a simple molecule called ethanol, affects the body in many different ways. It directly influences the stomach, brain, heart, gallbladder, and liver. It affects levels of lipids (cholesterol and triglycerides) and insulin in the blood, as well as inflammation and coagulation. It also alters mood, concentration, and coordination.

What's "Moderate"? What's "A Drink"?

Loose use of terms has fueled some of the ongoing debate

Is Wine Fine, Or Beer Better?

Almost 200 years ago, an Irish doctor noted that chest pain (angina) was far less common in France than in Ireland. He attributed the difference to "the French habits and mode of living."⁽¹⁷⁾

The comparatively low rate of heart disease in France despite a diet that includes plenty of butter and cheese has come to be known as the French paradox. Some experts have suggested that red wine makes the difference, something the wine industry has heavily and heartily endorsed. But there's far more to the French paradox than red wine.

The diet and lifestyle in parts of France, especially the south, have much in common with other Mediterranean regions, and these may account for some of the protection against heart disease.



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Alcohol

about alcohol's impact on health. In some studies, the term "moderate drinking" refers to less than one drink per day, while in others it means three or four drinks per day. Exactly what constitutes "a drink" is also fairly fluid. In fact, even among alcohol researchers, there's no universally accepted standard drink definition.⁽²⁾ In the U.S., one drink is usually considered to be 12 ounces of beer, 5 ounces of wine, or 1½ ounces of spirits (hard liquor such as gin or whiskey).⁽³⁾ Each delivers about 12 to 14 grams of alcohol.

The definition of moderate drinking is something of a balancing act. Moderate drinking sits at the point at which the health benefits of alcohol clearly outweigh the risks. The latest consensus places this point at no more than one to two drinks per day for men, and no more than one drink per day for women. This is the definition used by the U.S. Department of Agriculture and the Dietary Guidelines for Americans, and is widely used in the U.S.

Possible Health Benefits of Alcohol

Cardiovascular Disease

More than 100 prospective studies show an inverse association between moderate drinking and risk of heart attack, ischemic (clot-caused) stroke, peripheral vascular disease, sudden cardiac death, and death from all cardiovascular causes.⁽⁴⁾ The effect is fairly consistent, corresponding to a 25-40% reduction in risk. Results of some of the largest of these are summarized in [Table 1](#). The connection between moderate drinking and lower risk of cardiovascular disease has been observed in men and women. It applies to people who do not apparently have heart disease. It also applies to those at high risk for having a heart attack or stroke or dying of cardiovascular disease - people with type 2 diabetes ⁽⁵⁾ and those with high blood pressure, angina (chest pain), a prior heart attack, or other forms of cardiovascular disease.⁽⁵⁻⁸⁾

The idea that moderate drinking protects against cardiovascular disease is biologically and scientifically plausible. Moderate amounts of alcohol raise levels of high-density lipoprotein (HDL, or "good" cholesterol),⁽⁶⁾ and higher HDL levels are associated with greater protection against heart disease. Moderate alcohol consumption has also been linked with beneficial changes

Some studies have suggested that red wine - especially when drunk with a meal - offers more cardiovascular benefits than beer or spirits. These range from international comparisons showing a lower prevalence of coronary heart disease in "wine-drinking countries" than in beer- or liquor-drinking countries.^(18, 19)

Red wine may contain more and more various substances in addition to alcohol that may prevent blood clots, relax blood-vessel walls, and prevent the oxidation of low-density lipoprotein (LDL, "bad" cholesterol), a key early step in the formation of cholesterol-filled plaque.

In practice, though, beverage choice appears to have little effect on cardiovascular benefit. A report from the Health Professionals Follow-up Study, for example, examined the drinking habits of more than 38,000 men over a 12-year period. Moderate drinkers were 30-35% less likely to have had a heart attack than non-drinkers.⁽²⁰⁾

This reduction was observed among men

in a variety of factors that influence blood clotting, such as tissue type plasminogen activator, fibrinogen, clotting factor VII, and von Willebrand factor.(6) Such changes would tend to prevent the formation of small blood clots that can block arteries in the heart, neck, and brain, the ultimate cause of many heart attacks and the most common kind of stroke.

Does alcohol cause these benefits?

People who drink in moderation are different from non-drinkers or heavy drinkers in ways that could influence health and disease. Part of a national 1985 health interview survey showed that moderate drinkers were more likely than non-drinkers or heavy drinkers to be at a healthy weight, to get 7-8 hours of sleep a night, and to exercise regularly.(7) Researchers have statistically accounted for such confounders, and they do not come close to accounting for the relationship between alcohol and heart disease. This, plus the clearly beneficial effects of alcohol on cardiovascular risk factors, makes a compelling case that alcohol itself, when used in moderation, reduces the risk of cardiovascular disease.

The most definitive way to investigate the effect of alcohol on cardiovascular disease would be with a large trial in which some volunteers were randomly assigned to have one or more alcoholic drinks a day and others had drinks that looked, tasted, and smelled like alcohol but were actually alcohol-free. Such a trial will probably never be done. Nevertheless, the connection between moderate drinking and cardiovascular disease almost certainly represents a cause-and-effect relationship.

Beyond the Heart

The benefits of moderate drinking aren't limited to the heart. In both the Nurses' Health Study and the Health Professionals Follow-up Study, gallstones and type 2 diabetes were less likely to occur in moderate drinkers than in nondrinkers. (11-13)

The social and psychological benefits of alcohol can't be ignored. A drink before a meal can improve digestion or offer a soothing respite at the end of a stressful day; the occasional drink with friends can be a social tonic. These physical and psychic effects may contribute to health and

who drank wine, beer, or spirits, and was similar for those who drank with meals and those who drank outside of meal time. This study suggests that the frequency of drinking may matter. Men who drank every day had a lower risk of heart attack than those who drank once or twice a week.

Vitamin Connection

Folic acid, the B vitamin that helps guide the development of an embryo's spinal cord has equally important jobs later in life. It helps the body get rid of homocysteine. This byproduct of protein metabolism appears to be involved with the development of atherosclerosis, the gradual accumulation of cholesterol-filled patches in artery walls that often precedes heart attacks and strokes. Folic acid also helps build DNA and so is involved with accurate cell division.

Alcohol blocks the absorption of folic acid and inactivates folic acid in the blood and tissues. It's possible that this interaction may be how alcohol

wellbeing.

The Dark Side of Alcohol

If all drinkers limited themselves to a single drink a day, we probably wouldn't need as many cardiologists, liver specialists, mental health professionals, and substance abuse counselors. But not everyone who likes to drink alcohol stops at just one. While most people drink in moderation, some don't. Problem drinking affects not just the drinkers themselves, but may touch their families, friends, and communities. According to the National Institute on Alcohol Abuse and Alcoholism: (1)

- 14 million Americans meet standard criteria for alcohol abuse or alcoholism
- Alcohol plays a role in 1 in 4 cases of violent crime
- More than 16,000 people die each year in automobile accidents in which alcohol was involved
- Alcohol abuse costs more than \$180 billion dollars a year

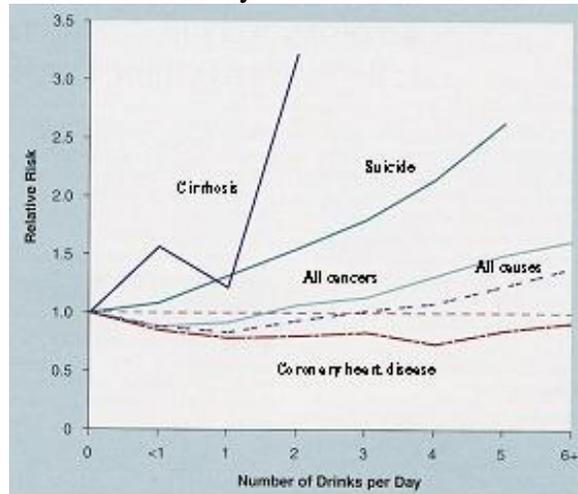
On the personal level, heavy drinking can take a toll on the body. It can cause inflammation of the liver (alcoholic hepatitis) and lead to scarring of the liver (cirrhosis), a potentially fatal disease. Heavy drinking can increase blood pressure and damage heart muscle (cardiomyopathy). It has also been linked with several cancers, particularly those of the mouth, throat, esophagus, colon, and breast.

Even moderate drinking carries some risks. Alcohol can disrupt sleep. Its ability to cloud judgment is legendary. Alcohol interacts in potentially dangerous ways with a variety of medications, including acetaminophen,

consumption increases the risk of breast, colon, and other cancers.

Getting extra folic acid may cancel out this alcohol-related increase. In the Nurses' Health Study, for example, among women who consumed one alcoholic drink a day or more), those who had the highest levels of this B vitamin in their blood were 90% less likely to develop breast cancer than those who had the lowest levels of the B vitamin.(21)

An earlier study suggested that getting 600 micrograms a day of folic acid could counteract the effect of moderate alcohol consumption on breast cancer risk.(22)



Association between alcohol consumption and relative risk of dying from various causes for middle aged men.
Source: Boettz and Garfinkel 1990

antidepressants, anticonvulsants, painkillers, and sedatives. It is also addictive, especially for people with a family history of alcoholism.

Alcohol Increases Risk of Developing Breast Cancer

Among women in the Nurses' Health Study, two or more drinks a day increased the chances of developing breast cancer by 20%-25%.[\(14, 15\)](#) This doesn't mean that 20% to 25% of women who have two drinks a day will get breast cancer. Instead, it is the difference between about 12 of every 100 women developing breast cancer during their lifetimes - the current average risk in the US - and 14 to 15 of every 100 women developing the disease. This modest increase would translate to significantly more women with breast cancer each year. Adequate daily intake of folic acid, at least 600 milligrams a day, can mitigate this increased risk ([see Vitamin Connection](#)).

Even moderate drinking carries some risks. Alcohol can disrupt sleep. Its ability to cloud judgment is legendary. Alcohol interacts in potentially dangerous ways with a variety of medications, including acetaminophen, antidepressants, anticonvulsants, painkillers, and sedatives. It is also addictive, especially for people with a family history of alcoholism.

Genes Play a Role

Twin, family, and adoption studies have firmly established that genetics plays an important role in determining an individual's preferences for alcohol and his or her likelihood for developing alcoholism. Alcoholism doesn't follow the simple rules of inheritance set out by Gregor Mendel. Instead, it is influenced by several genes that interact with each other and with environmental factors.[\(1\)](#)

There is also some evidence that genes influence how alcohol affects the cardiovascular system. An enzyme called alcohol dehydrogenase helps metabolize alcohol. One variant of this enzyme, called alcohol dehydrogenase type 3 (ADH3), comes in two "flavors." One quickly breaks down alcohol, the other does it more slowly. Moderate drinkers who have two copies of the gene for the slow-acting enzyme are at much lower risk for cardiovascular disease than moderate drinkers who have

two genes for the fast-acting enzyme.⁽¹⁶⁾ Those with one gene for the slow-acting enzyme and one for the faster enzyme fell in between. It's possible that the fast-acting enzyme breaks down alcohol before it can have a beneficial effect on HDL and clotting factors.

Interestingly, these differences in the ADH3 gene do not influence the risk of heart disease among people who don't drink alcohol. This adds strong indirect evidence that alcohol itself reduces heart disease risk.

Shifting Benefits and Risks

The benefits and risks of moderate drinking change over a lifetime. In general, risks exceed benefits until middle age, when cardiovascular disease begins to account for increasingly large share of the burden of disease and death.

- For a pregnant woman and her unborn child, a recovering alcoholic, a person with liver disease, and people taking one or more medications that interact with alcohol, moderate drinking offers little benefit and potential risks.
- For a 30-year-old man, the increased risk of alcohol-related accidents outweighs the possible heart-related benefits of moderate alcohol consumption.
- For a 60-year-old man, a drink a day may offer protection against heart disease that is likely to outweigh potential harm (assuming he isn't prone to alcoholism).
- For a 60-year-old woman, the benefit/risk calculations are trickier. More than ten times as many women die each year from heart disease than breast cancer - more than 500,000 women a year from cardiovascular disease compared with 41,000 a year from breast cancer. However, studies show that women are far more afraid of developing breast cancer than heart disease, something that must be factored into the equation.

Balancing Act

Given the complexity of alcohol's effects on the body and the complexity of the people who drink it, blanket recommendations about alcohol are out of the question. Because each of us has unique personal and family

histories, alcohol offers each person a different spectrum of benefits and risks. Whether or not to drink alcohol, especially for "medicinal purposes," requires careful balancing of these benefits and risks. Your health-care provider should be able to help you do this.

Your overall health and risks for alcohol-associated conditions should factor into the equation. If you are thin, physically active, don't smoke, eat a healthy diet, and have no family history of heart disease, drinking alcohol won't add much to decreasing your risk of CVD.

If you don't drink, there's no need to start. You can get similar benefits with exercise (beginning to exercise if you don't already or boosting the intensity and duration of your activity) or healthier eating. If you are a man with no history of alcoholism who is at moderate to high risk for heart disease, a daily alcoholic drink could reduce that risk. Moderate drinking might be especially beneficial if you have low HDL that just won't budge upward with diet and exercise. If you are a woman with no history of alcoholism who is at moderate to high risk for heart disease, the possible benefits of a daily drink must be balanced against the small increase in risk of breast cancer.

If you already drink alcohol or plan to begin, keep it moderate - no more than two drinks a day for men or one drink a day for women. And make sure you get plenty of folic acid, at least 600 micrograms a day.

Participants	Duration	Association with moderate consumption*
Kaiser Permanente cohort: 123,840 men and women aged 30+	10 years	40% reduction in fatal myocardial infarction, 20% reduction in cardiovascular mortality; 80% increase in fatal hemorrhagic stroke (23)
Nurses' Health Study: 85,709 female nurses aged 34-59	12 years	17% lower risk of all-cause mortality; (24) an earlier report showed a 40% reduction in risk of CHD and 70% reduction in risk of ischemic stroke (25)

Physicians' Health Study: 22,071 male physicians aged 40-84	11 years	30-35% reduced risk of angina and myocardial infarction, 20-30% reduced risk of cardiovascular death (7 , 26)
American Cancer Society cohort: 489,626 men and women aged 30-104	9 years	30-40% reduced risk of cardiovascular death (27)
Eastern France cohort: 34,014 men and women	10-15 years	25-30% reduced risk of cardiovascular death (28)
Health Professionals Follow-up Study: 38,077 male health professionals aged 40-75	12 years	35% reduced risk of myocardial infarction (20)

* compared with non-drinkers

Table 1. Results of some large prospective studies of alcohol consumption and cardiovascular disease.

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