

# Drinking and Cardiovascular Health

## The Issue in Brief

Different drinking patterns—abstention, moderate consumption, and heavy consumption—are associated with differing levels of risk for cardiovascular disease (CVD).

In general:

- Moderate drinking has been linked to cardio-protective outcomes, particularly for older men and post-menopausal women.
- Heavy drinking, both chronic and acute, represents increased risk for CVD.

The relationship between alcohol consumption and risk for many cardiovascular conditions is characterized by a U- or J-shaped curve.

Thirty years of robust biomedical, clinical, and epidemiological evidence support a significant inverse relationship between moderate drinking and CVD.

The effects of moderate drinking are seen across beverage types.

Heavy alcohol consumption may increase risk for several types of cardiovascular disease.

The relationship between drinking patterns and CVD outcomes is influenced by additional genetic, physiological, and lifestyle factors.

The mechanisms by which drinking affects cardiovascular disease have been extensively studied and are well documented.

Some have questioned the relationship between moderate drinking and cardioprotective effects.

Suggested confounders derive from possible classification errors in identifying abstainers and drinkers in epidemiological studies on the relationship between drinking and cardiovascular outcomes.

However, the balance of the evidence supports the observation that moderate drinking confers cardiovascular benefits for some adults, even when controlling for these classification problems.

ICAP's Health Briefings cover the effects of alcohol consumption on health. They offer an overview of the relationship between drinking patterns and health outcomes, compile the key literature, and provide the reader with an extensive bibliography that refers to original research on each topic. The Briefings attempt to present the balance of the available evidence. They have been peer reviewed by external experts and do not necessarily reflect the views of ICAP or its sponsoring companies.

## Relevant ICAP Publications:

Ellison, R. C. (Ed.). (2007, May). Health risks and benefits of moderate alcohol consumption: Proceedings of an international symposium. *Annals of Epidemiology*, 17(Suppl.), S1–S116. Available: <http://www.annalsofepidemiology.org/issues>.

## What Is the Evidence?

### Patterns of drinking and outcomes

**Different drinking patterns—abstention, moderate consumption, and heavy consumption—are associated with differing levels of risk for cardiovascular disease (CVD).<sup>1</sup>**

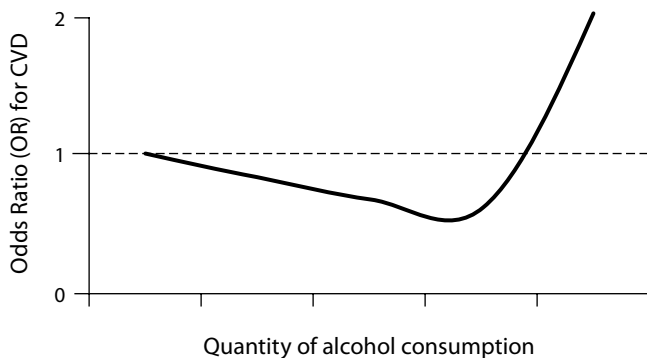
In general:

- Moderate drinking has been linked to cardioprotective outcomes, particularly for middle-aged and older men and postmenopausal women.
- Heavy drinking, both chronic and acute, represents increased risk for CVD.

The effects of alcohol on cardiovascular health were first reported in the *Journal of the American Medical Association* in 1904 (1) and have since been supported by hundreds of epidemiologic and experimental studies.

**The relationship between alcohol consumption and risk for many cardiovascular conditions is characterized by a U- or J-shaped curve.**

Risk for moderate drinkers is lower than for abstainers or for heavier drinkers (2).



A U-shaped curve has also been established between moderate drinking and all-cause mortality (3).

- While the main contributor to this relationship is CVD, other diseases are also involved.
- Some argue that the cardioprotective effects do not counterbalance the harms of heavy drinking related to other disease conditions (4).

Research indicates that moderate alcohol consumption is one of at least five lifestyle factors that may add years to life (5). The others include not smoking, maintaining healthy body weight, regular exercise, and a healthy diet.

**Thirty years of robust biomedical, clinical, and epidemiological evidence support a significant inverse relationship between moderate drinking and CVD.**

The strongest protective effects have been described for middle-aged and elderly men (2, 6, 7) and for postmenopausal women (8, 9).

- Studies that account for changing consumption over an individual’s lifetime (such as abstaining from alcohol due to illness) still reveal cardiovascular benefit from moderate drinking (7).

An inverse relationship between moderate alcohol consumption and risk of illness has been observed among the following cardiovascular and related illnesses:

- nonfatal myocardial infarction (heart attack) (10, 11);
- ischemic stroke (12);
- coronary heart disease (CHD) (2, 13);
- peripheral arterial disease (PAD) (2, 12, 14);
- heart failure (mediated by CHD) (15);
- hypertension (high blood pressure) (16).

**The effects of moderate drinking are seen across beverage types (2).**

The main mechanism of action is linked with ethanol in wine, beer, and spirits (17).

- However, research suggests that other ingredients—such as resveratrol and other polyphenols (found especially in wine)—confer additional benefits due to antioxidant effects (18).

**Heavy alcohol consumption may increase risk for some types of cardiovascular disease (3).**

Both heavy chronic and acute drinking patterns are linked with adverse cardiac outcomes.

- Heavy chronic drinking is associated with increased incidence of cardiomyopathy and possibly with acute myocardial infarction (19).

<sup>1</sup> Definitions of levels of consumption considered to be “moderate” vary in the scientific literature. Similarly, there is no consensus on the exact threshold for “harmful” drinking levels. However, the governments of numerous countries around the world have issued guidelines around drinking that aim to establish levels of drinking thought to be “safe” or “low-risk.” These can be found on the ICAP website at: <http://www.icap.org/PolicyIssues/DrinkingGuidelines/GuidelinesTable/tabid/204/Default.aspx>.

- Interestingly, in patients with cardiomyopathy whose alcohol consumption is heavy, switching to moderate drinking can lead to the reinstatement of full cardiac function (12).
- Heavy chronic or episodic drinkers may experience increased risk for hemorrhagic stroke due to alcohol's anticoagulant properties (12).
- Atrial fibrillation (so-called "holiday heart") is associated with heavy episodic ("binge" or "extreme") drinking (12).

**The relationship between drinking patterns and CVD outcomes is influenced by additional genetic, physiological, and lifestyle factors.**

*Behavioral factors* such as diet can mediate the effect of alcohol on cardiac health.

- For example, moderate drinking in the Mediterranean diet, in which drinking accompanies meals, increases its cardioprotective effects (20, 21).

*Physiological factors* such as lipid metabolism, coagulation pathways, and insulin-mediated processes are all linked within the body. Associations between these pathways can influence the outcomes of drinking (22).

*Genetic factors* may affect alcohol metabolism and also the risk for cardiovascular disease (23), which is closely linked with family history.

**The mechanisms by which drinking affects cardiovascular disease have been extensively studied and are well documented.**

These mechanisms are mediated by alcohol (ethanol) itself, which:

- reduces the development of atherosclerosis and arterial plaques (24);
- improves endothelial (vascular lining) function (25);
- increases levels of high-density lipoprotein (HDL) or "good" cholesterol, which also improves vascular health (23);
- reduces the risk of arterial blockage through thrombolytic (anti-coagulation and blood clotting) action in conditions such as ischemic stroke and atherosclerosis (26).

In some instances, the same pathways that confer benefits may also lead to negative outcomes in some individuals (27).

- For example, in bleeding disorders, such as hemorrhagic stroke, or for individuals on anticoagulant prescription drugs, alcohol may exacerbate negative health outcomes.

**Confounding factors around moderate drinking**

**Some have questioned the relationship between moderate drinking and cardioprotective effects.**

Suggested confounders derive from possible classification errors in identifying abstainers and drinkers in epidemiological studies on the relationship between drinking and cardiovascular outcomes.

- Ex-drinkers and so-called "sick-quitters" may be misclassified as abstainers, confounding results (28, 29).
- Similarly, an individual's reasons for abstention, especially among the elderly, may affect health outcomes.
- These individuals' generally poor health may influence the observation that moderate drinkers' CVD status is improved over that of abstainers.

Confounding by a number of factors may be difficult to control.

- Since only clinical trials can truly elucidate causal effects, prospective and retrospective epidemiological studies may be inconclusive (30). However, large-scale clinical trials are not feasible for ethical and methodological reasons.
- Diet, health status, and other factors such as socioeconomic status all modulate cardiovascular risk, and may potentially confound its association with alcohol consumption (31).
- Smoking, which is an important risk factor for CVD, is another lifestyle confounder, especially among drinkers who smoke.
- Finally, discrepancies among definitions of "moderate drinking" across studies make it difficult to form a consensus on the amount of alcohol specifically associated with different outcomes.

However, the overwhelming balance of the evidence supports the observation that moderate drinking may confer cardiovascular benefit for many adults, even when controlling for these classification problems (3).

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