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Study links high alcohol use to 385,800 cardiovascular deaths worldwide in 2021

Eastern Europe recorded the highest burden, with most alcohol-attributable cardiovascular subtypes projected to rise by 2050

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A global analysis published in Frontiers in Cardiovascular Medicine estimates that high alcohol use was linked to about 385,800 cardiovascular deaths worldwide in 2021 and to 9.3 million disability-adjusted life years, a measure that combines years lost to early death and years lived with illness or disability.

The study used data from the Global Burden of Disease 2021 project, which compiles health estimates for 204 countries and territories. Researchers examined overall cardiovascular disease and five major subtypes from 1990 through 2021, then used a statistical model to project trends through 2050.

They found that the age-standardized global death rate from cardiovascular disease attributable to high alcohol use was 4.6 per 100,000 people in 2021. The age-standardized rate for disability-adjusted life years was 107.6 per 100,000. Even though those rates fell over the past three decades, the researchers said the absolute burden remained large.

From 1990 to 2021, the global age-standardized mortality rate for alcohol-attributable cardiovascular disease declined by 36.3%, while the age-standardized disability burden rate fell by 31.2%. The study said stroke accounted for the largest share of that burden in 2021, with an estimated 360,700 deaths and 8.4 million disability-adjusted life years linked to high alcohol use. Hypertensive heart disease and cardiomyopathy or myocarditis also made substantial contributions.

The regional differences were sharp. Eastern Europe had the highest age-standardized mortality rate, at 17.2 per 100,000, followed by Central Europe at 9.8 and Southern Sub-Saharan Africa at 7.5. The lowest rates were recorded in North Africa and the Middle East, at 0.5 per 100,000. For disability burden, Eastern Europe again ranked highest, at 590.8 per 100,000, ahead of Central Europe and Southern Sub-Saharan Africa.

The authors also reported that the burden rose with age and was higher in males than in females. They described the relationship between cardiovascular burden and social and economic development as non-linear, meaning the impact did not move in a simple pattern across richer and poorer regions.

Under the Global Burden of Disease framework, “high alcohol use” was the name of the risk category for alcohol consumption above the theoretical minimum risk exposure level. In this analysis, that minimum level was set at zero consumption for all ages, sexes, years and places, so the category covered any intake above zero rather than a separate heavy-drinking cutoff. Exposure was measured as average grams of pure

alcohol consumed per day.

One of the more unusual findings involved ischemic heart disease. The study reported a net negative attributable burden for that category, including negative estimates for deaths and disability-adjusted life years. The authors said those figures do not mean observed deaths were negative. Instead, they reflect how the Global Burden of Disease model handles risk under its counterfactual framework. The paper also warned that former drinkers are generally grouped with non-current drinkers in the underlying dataset, which may introduce what researchers call sick-quitter bias, especially for ischemic heart disease. The authors said those results should be interpreted with caution.

That caution runs through the broader paper. The estimates are model-based population figures, not direct counts of individual cases, and the authors said they should not be read as proof of causation at the individual level. The projections to 2050 are also conditional on historical patterns continuing.

Even with those limits, the outlook in the paper was concerning. Using a Bayesian age-period-cohort model, the researchers projected that age-standardized rates for most alcohol-attributable cardiovascular subtypes may rise by 2050, with the higher burden in males likely to persist. Ischemic heart disease was excluded from the projection analysis because of the negative attributable estimates.

The findings add to a large body of evidence tying alcohol use to cardiovascular harm, but they also matter beyond medical research. Because the estimates cover nearly every country and track trends over three decades, they could shape future public health warnings, alcohol-control policy debates and industry communication across beer, wine and spirits markets. For beverage companies and trade groups, the study adds another global data point that health authorities may use when discussing labeling, marketing restrictions or consumption guidelines, even though the paper itself does not assess specific products or regulations.

The authors said the results highlight the need for more effective interventions to reduce harmful alcohol use, especially in regions carrying the heaviest burden. They argued that better-targeted prevention and health education will be important if

countries want to reduce premature cardiovascular deaths linked to alcohol in the coming decades.