# Perceptions, Information Sources, and Behavior Regarding Alcohol and Heart Health

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**Despite the equipoise regarding alcohol's cardiovascular effects and absence of relevant rigorous controlled trials, the lay press frequently portrays alcohol as "heart healthy." The public perception of alcohol's heart effects, the sources of those perceptions, and how they may affect behavior are unknown. We performed a cross-sectional analysis of data obtained from March 2013 to September 2014 from consecutive participants enrolled in the Health eHeart Study. Of 5,582 participants, 1,707 (30%) viewed alcohol as heart healthy, 2,157 (39%) viewed it as unhealthy, and 1,718 (31%) were unsure. Of those reporting alcohol as heart healthy, 80% cited lay press as a source of their knowledge. After adjustment, older age (odds ratio 1.11), higher education (odds ratio 1.37), higher income (odds ratio 1.07), US residence (odds ratio 1.63), and coronary artery disease (odds ratio 1.51) were associated with perception of alcohol as heart healthy (all $p < 0.003$). Ever smokers (odds ratio 0.76, $p = 0.004$) and those with heart failure (odds ratio 0.5, $p = 0.01$) were less likely to cite alcohol as heart healthy. Those perceiving alcohol as heart healthy consumed on average 47% more alcohol on a regular basis (95% confidence interval 27% to 66%, $p < 0.001$). In conclusion, of >5,000 consecutive Health eHeart participants, approximately 1/3 believed alcohol to be heart healthy, and the majority cited the lay press as the origin of that perception. Those with a perception of alcohol as heart healthy drink substantially more alcohol.**  **(Am J Cardiol 2015;116:642−646)**

Alcohol is the most commonly consumed drug in the United States.[1] Although the harms of alcohol abuse related to physical and mental health are well established,[2] there remains equipoise regarding the cardiovascular health effects of moderate consumption.[3] Alcohol may have protective lipid effects[4] and reduce incidence of myocardial infarction[5,6] but may also increase the risk of hypertension[7] and atrial fibrillation.[8−10] Yet, despite the absence of rigorous controlled trials on the actual cardiovascular benefits of alcohol and the conflicting data on the health effects of moderate consumption, the lay press frequently portrays alcohol as "heart healthy."[11,12] In considering how to best counsel patients regarding alcohol intake and provide optimal care regarding this commonly consumed substance, it is important to understand the public's source of knowledge on the cardiovascular effects of alcohol, their perceptions of alcohol's effects on heart health, and the associations between those perceptions and actual behavior.

## Methods

We performed a cross-sectional analysis of data obtained from March 8, 2013 (enrollment initiation) to September 29, 2014, from consecutive participants enrolled in the Health eHeart Study. The Health eHeart Study is an Internet-based, longitudinal, cardiovascular cohort study. Participants are recruited through lay press, promotional events, word of mouth, social media, e-mail, and clinic visits. After the baseline Internet-deployed "eVisit," participants follow-up online every 6 months. Participants are required to complete surveys addressing demographics, family and personal history, medical history, activity level, and quality of life. At baseline, all participants provide information regarding their health perceptions of alcohol (Supplementary Table 1) and complete a validated survey instrument to assess the frequency and quantity of alcohol intake.[13−16]

We analyzed the results of the question, "Do you believe alcohol is good for your heart?" with responses being "Yes," "No," or "I don't know." Those who reported that they believed alcohol to be heart healthy received a follow-up question, "You believe alcohol is good for your heart because?" with the non-mutually exclusive answers "Your doctor told you," "You learned this in school," "You learned from reading lay press," "You learned this from friends, colleagues, or word of mouth," or "Other [free text]." All free text comments were analyzed and included in one of the prespecified categories, as appropriate, and a new category based on free text review, "I read this in scientific publications," was added.

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See page 645 for disclosure information.

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Table 1
Baseline characteristics of study participants stratified by response to the survey question, "Do you believe that alcohol is good for your heart?"

| | "Yes" (n = 1,707) | "No" or "Unsure" (n = 3,875) | P value |
|---|---|---|---|
| Mean Age ± SD (years) | 52.4 ± 14.3 | 49.0 ± 15.6 | <0.0001 |
| Male | 837 (43%) | 1,670 (49%) | <0.001 |
| White | 1,357 (80%) | 3,095 (80%) | 0.75 |
| Education | | | <0.001 |
| ≤ High school | 30 (2%) | 178 (6%) | |
| Some college | 176 (12%) | 565 (18%) | |
| Bachelor's | 453 (31%) | 1,002 (32%) | |
| Post-graduate | 808 (55%) | 1,352 (44%) | |
| Annual Income (per $1,000) | | | <0.001 |
| <10 | 14 (1%) | 78 (3%) | |
| 10K - <20 | 28 (2%) | 107 (4%) | |
| 20K − <30 | 40 (3%) | 141 (5%) | |
| 30K - <40 | 47 (4%) | 143 (5%) | |
| 40K - <50 | 70 (5%) | 172 (7%) | |
| 50K - <75 | 156 (12%) | 329 (12%) | |
| 75K - <100 | 183 (14%) | 397 (15%) | |
| 100K - <150 | 286 (22%) | 516 (19%) | |
| >150 | 476 (37%) | 783 (29%) | |
| US Residence | 1,165 (94.5%) | 2,597 (89.6%) | <0.001 |
| National Region* | | | 0.003 |
| West | 631 (51%) | 1,366 (55%) | |
| Midwest | 172 (14%) | 366 (15%) | |
| South | 217 (18%) | 390 (16%) | |
| Northeast | 209 (17%) | 348 (14%) | |
| Hyperlipidemia† | 717 (48%) | 1,378 (42%) | <0.001 |
| Diabetes mellitus | 90 (6%) | 228 (7%) | 0.2 |
| Hypertension | 547 (36%) | 1,137 (35%) | 0.3 |
| Coronary Artery Disease | 238 (14%) | 442 (11%) | 0.05 |
| Myocardial Infarction | 132 (9%) | 247 (8%) | 0.1 |
| Congestive Heart Failure | 42 (3%) | 184 (6%) | <0.001 |
| Atrial Fibrillation | 161 (11%) | 393 (12%) | 0.1 |
| Stroke | 58 (4%) | 136 (4%) | 0.6 |
| Ever Smoker | 558 (29%) | 1,448 (32%) | 0.01 |

SD = standard deviation.

* Not included in multivariable analysis.

† Comorbid conditions were defined as present if the participant answered the following question in respect to a particular comorbidity in the affirmative: "Have you ever been told by a doctor or nurse that you have, or have been treated for, any of the following conditions (in the past or currently)?" Comorbidities were described in the survey as: "High cholesterol" = hyperlipidemia; "Diabetes; Do not include pre-diabetes" = diabetes mellitus; "High blood pressure or hypertension (except that occurred during pregnancy and did not last after pregnancy)" = hypertension; "Coronary artery disease (blockages in your heart vessels) or angina (chest pain)" = coronary artery disease; "Heart attack" = myocardial infarction; "Congestive Heart failure (CHF, Heart Failure)" = congestive heart failure; "Atrial fibrillation (Afib, AF)" = atrial fibrillation; "Stroke or TIA (Transient Ischemic Attack or Mini-Stroke)" = stroke.

In analyses examining the relation between the perception of alcohol and alcohol consumption, the number of drinks consumed per week was used as the primary outcome. "Current binge drinker" was defined as 5 consecutive drinks for men and 4 for women within the last 30 days.[17] Because of implausibility, patients who reported drinking more per week than 7 times their reported maximum daily amount were interpreted as erroneous entries and were, therefore, excluded (n = 112). Smokers were categorized as "never" versus "past" or "current" (i.e., "ever smoker").

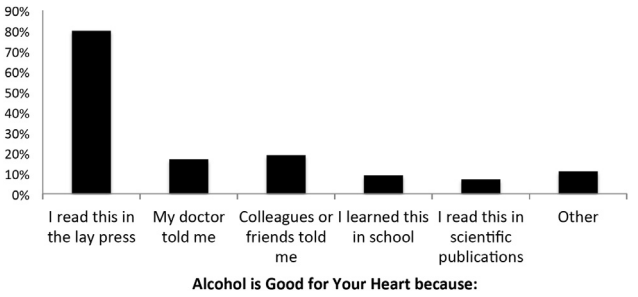


Figure 1. Of participants who reported alcohol as heart healthy, the distribution of answers to the question: "You believe alcohol is good for your heart because?" Note: Answers were not mutually exclusive ("check all that apply").

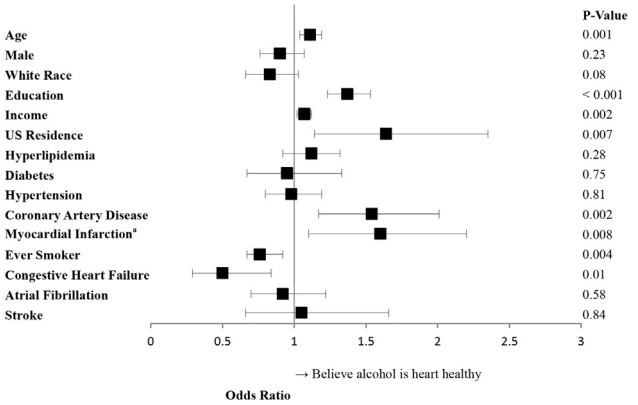


Figure 2. Multivariable adjusted odds ratios for the relations between participant characteristics and the perception that alcohol is heart healthy. Multivariable analysis was adjusted for all other covariates listed. Y error bars denote 95% confidence intervals. [a]Excluding coronary artery disease from the adjusted model because of collinearity.

The Health eHeart Study was approved by the University of California, San Francisco Committee on Human Research, and all participants provided informed consent obtained electronically through the Internet.

Normally distributed and non-normally distributed continuous variables were compared using the Student's *t* test and the Kruskal-Wallis test, respectively. To identify predictors of the perception of alcohol as heart healthy after multivariable adjustment, a logistic regression model was constructed using a dichotomous outcome (i.e., "yes" vs not "yes"). Relations between continuous variables were assessed using linear regression, with log transformation of skewed outcomes as needed (such as alcohol consumption) and investigation of residuals to assure adequate model fit. Covariates were selected for inclusion in multivariate models based on "face value" (age, gender, and race) and for covariates associated with the outcome with p values <0.1 in unadjusted analyses.

Two-tailed p values were considered statistically significant. Stata, version 13 (College Station, Texas) was used for statistical analyses.

## Results

Of the 5,582 participants who answered questions regarding their perception of alcohol, 1,707 (30%) viewed